THE IMPORTANCE OF THE SCIENTIFIC KNOWLEDGE DISSEMINATION TO THE PRACTICE OF PERIOPERATIVE NURSING

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Technological advances and scientific efforts toward knowledge sharing that have occurred in recent decades are challenging health professionals to keep themselves continuously updated. To accomplish this task, it is necessary to decide, both quickly and prudently, which articles should be read as well as to be well trained to perform a critical analysis of the literature. Often we ask ourselves: in which circumstances does a research impact the scientific practice and when does it generate scientific evidence?

Scientific evidence is generated when the search result occurs under methodological rigor that minimizes the chances of bias, that is, a kind of error that systematically distorts the results. The raw material of scientific evidence is clinical epidemiology, one of the basic sciences that count on mathematical and statistical foundations associated with the prevention of biases that lead us to research results based on basic and reliable scientific conclusions.

The decision-making in health is very complex and should be adopted based on careful identification of the consistency and levels of evidence of the research. For example, systematic review and meta-analysis generate strong evidence, a clinical trial is considered an evidence level 1, a cohort study is level 2, and a case–control study is considered level 3. In addition to this, the practice in the health field should be supported by researches that generate evidence.

The utilization of high-quality clinical research is essential for health professionals as it provides strong foundation to critically evaluate the medical practice versus research findings and promote evidence-based changes. A great challenge in the next decade is to educate and train health professionals to develop the discernment to understand clinical and statistical significance and competence to measure the impact of a clinical trial, as well as to identify whether the proposed intervention reduces morbidity and mortality and improves the quality of life of patients treated in health centers[1,2].

Perioperative Nursing professionals have long experienced situations that generate research possibilities and many questions still unanswered. We encourage these nurses to approach the universities to be guided in the search for answers to their questions aimed at the possibility of generating new knowledge.

Thus, the journal of the Association of Perioperative Nurses, Anesthetic Recovery and Material and Sterilization Center, called SOBECC, takes a new step toward the dissemination of knowledge to develop the nursing professionals who provide care to surgical patients. The current editorial management team takes on the challenge of disseminating research supported by evidence that brings impact to the field and will certainly bring benefits to health care.

We hope that the efforts of this Editorial Board in supporting the knowledge dissemination in the field turn into a tool to help and inspire experts to seek evidence for intervening in the practice safely.

Dulce Barbosa
Associate Professor at the Escola Paulista de Enfermagem da Universidade Federal de São Paulo – Unifesp – São Paulo (SP), Brazil
Elena Bohomol
Assistant Professor at the Escola Paulista de Enfermagem da Universidade Federal de São Paulo – Unifesp – São Paulo (SP), Brazil

REFERENCES

1. Barbosa, DA. Importância da pesquisa clínica para a prática na área de saúde. Acta Paul Enferm. 2010;23(1):vii.
2. Barbosa D, Taminato M, Fram D, Belasco A. Enfermagem Baseada em Evidências. 1a ed. São Paulo-(SP): Atheneu; 2014.

UNINTENTIONAL HYPOTHERMIA FREQUENCY IN THE PERIOPERATIVE PERIOD OF ELECTIVE SURGERIES

Frequência de hipotermia não intencional no perioperatório de cirurgias eletivas

Frequência de hipotermia não intencional sin perioperatório de cirurgias eletivas

Elaine Ribeiro[1], Natália Tabian Navarro[2], Viviane Cristina Bastos Armede[3], Hevelline Sponton Rodrigues[4], Janaína Pavaneli do Valle[5], Erika Christiane Marocco Duran[6]

ABSTRACT: Objective: To analyze the frequency of unintended hypothermia in patients undergoing elective surgery in the perioperative period, scoring its relationship with the type of anesthesia. **Method:** Cross-sectional, descriptive, and quantitative approach study with a sample of 53 patients aged between 18 and 90 years, developed in a surgical center of a private hospital in the Midwest region of the São Paulo State. **Results:** The female gender appeared as a major variable (79.3%), and 96.3% of the assessed patients presented hypothermia, ranging from mild to moderate. The number of hypothermic patients undergoing spinal anesthesia was higher when compared to those undergoing general anesthesia, both in the operation room (93.5%) and in the postanesthetic room (96.8%). **Conclusion:** Hypothermia is a common event that affects a large portion of patients undergoing surgical procedures, so it is essential that nurses early identify the occurrence of this phenomenon to provide a qualified and safe care to these patients.

Keywords: Hypothermia, Surgicenters, Perioperative period

RESUMO: Objetivo: Analisar a frequência de hipotermia não intencional em pacientes submetidos a cirurgias eletivas no período perioperatório, pontuando sua relação com o tipo de anestesia. **Método:** Estudo transversal, descritivo e de abordagem quantitativa, com amostra de 53 pacientes com faixa etária entre 18 e 90 anos, desenvolvido num centro cirúrgico de hospital privado da região Centro-oeste do estado de São Paulo. **Resultados:** O sexo feminino apareceu como variável preponderante (79,3%) e 96,3% dos pacientes avaliados apresentaram hipotermia, com variação entre leve e moderada. O número de pacientes hipotérmicos submetidos à raquianestesia foi maior quando comparado àqueles submetidos à geral, tanto na sala de operação (93,5%) quanto na sala de recuperação pós-anestésica (96,8%). **Conclusão:** A hipotermia é um evento comum que acomete uma grande parcela de pacientes submetidos a procedimentos anestésico-cirúrgicos, assim, torna-se imprescindível que o enfermeiro identifique precocemente sua ocorrência, a fim de oferecer uma assistência qualificada e segura a esses pacientes.

Palavras-chave: Hipotermia. Centros cirúrgicos. Período perioperatório.

RESUMEN: Objetivo: Analizar la frecuencia de hipotermia no intencional en pacientes sometidos a cirugías electivas en el período perioperatorio, señalando su relación con el tipo de anestesia. **Método:** Estudio transversal, descriptivo e de abordaje cuantitativo, con muestra de 53 pacientes en la franja etaria de 18 a 90 anos, desarrollado en un quirófano de hospital privado de la región Centro-oeste del estado de São Paulo. **Resultados:** El sexo femenino apareció como variable preponderante (79,3%) e 96,3% de los pacientes evaluados presentaron hipotermia, con variación entre leve y moderada. El número de pacientes hipotérmicos sometidos a anestesia raquídea fue mayor al ser comparado a aquellos sometidos a general, tanto en sala de operación (93,5%) como en la sala de recuperación post-anestésica (96,8%). **Conclusión:** La hipotermia es un evento común que afecta una gran parte de pacientes sometidos a procedimientos anestésico-quirúrgicos, así, se vuelve imprescindible que el enfermero identifique precozmente su ocurrencia, a fin de ofrecer una asistencia calificada y segura a esos pacientes.

Palabras clave: Hipotermia. Centros quirúrgicos. Periodo perioperatorio.

[1]Nurse. Master in nursing by the *Universidade de São Paulo* (USP) Ribeirão Preto. Coordinator of the Graduate Course in Surgical Center (SC) and Materials and Sterilization Center (MSC) at *Centro Universitário Hermínio Ometto* (Uniararas). Professor of Nursing in the area of SC and MSC at *Instituição de Ensino São Francisco* (IESF) and at *Instituto de Ensino Superior de Itapira* (IESI). Rua Dionísia Rocha Serra, 45, São Vicente, CEP: 13974-615, Itapira (SP), Brasil. E-mail: enf.elaine.ribeiro@gmail.com
[2]Nurse. Graduate Student of the Graduate Course in CS and MSC at Uniararas. E-mail: natytabian@msn.com
[3]Nurse. Specialist in SC and MSC. Professor at *Centro Universitário Católico Salesiano de Lins*. E-mail: viviarmede@hotmail.com
[4]Nurse, *Centro Universitário Católico Salesiano de Lins*. E-mail: heveline@hotmail.com
[5]Nurse graduated by the *Centro Universitário Católico Salesiano de Lins*. E-mail: janainapavaneli@hotmail.com
[6]Nurse. Professor and coordinator of the Nursing Course at *Universidade Estadual de Campinas* (Unicamp). E-mail: ecduran@fcm.unicamp.br
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INTRODUCTION

Hypothermia is defined as body temperatures below 36ºC, in which the body is unable to produce enough heat to perform their functions[1]. It may be classified into unintentional (accidental) and therapeutic, the early (focus of this study) occurs mainly among patients submitted to anesthetic-surgical procedures or trauma victims, among other causes. It derives from various isolated or associated factors, with excessive heat loss, inhibition of physiological thermoregulation, or lack of appropriate prevention measures. Therapeutic hypothermia on the other hand, also called "triggered" hypothermia, is set, consciously, by the medical team, with the objective of treatment. It may also be classified as mild (from 36 to 34ºC), moderate (between 34 and 30ºC), and severe (lower than 30ºC)[2,3].

This is one of the main complications in the perioperative period, and to provide the surgical center (SC) nursing team with the necessary tools is the only way to reduce the rates of those complications[4]. It may affect over 70% of patients who undergo anesthetic-surgical procedures, and it may cause significant complication[5,6], such as increase in morbidity rates, increase in the incidence of infection of the surgical site, increase of heart demand and of oxygen in the presence of tremors, and damages to the platelet function.

Therefore, in order to offer assistance directed to the surgical patient needs, nursing professionals need to identify early the occurrence of this alteration, thus enabling the reduction of possible complications and avoiding delay in their recovery[7].

With regard to the maintenance of perioperative normothermia, the *American Society of Peri Anesthesia Nurses* (ASPAN)[8] instructs that the advanced age and female gender should be considered as a risk factor for hypothermia. Thus, the nursing team should developed a plan of care during these patients' admission to minimize the risk of hypothermia among them. Nursing professional must ensure an appropriate environment for the development of care, involving, among others, the physical and social environments[9].

The perioperative hypothermia has been prevalent among elderly patients, due to their compromised thermoregulatory system. Age is a risk factor for the development of hypothermia, and that equal to 60 years or over is a predictive factor for hypothermia during surgery. These patients need greater care in the postoperative period, due to their reduced thermoregulatory response, when compared to patients in other age groups, as a result from the alteration in the vasoconstrictor response acquired with age[10].

The prevention of hypothermia is very important as their negative effects hinder the recovery of patients and the current literature still diverges in relation to the most efficient method for warming the patient[10].

Even though hypothermia is a common complication in the anesthetic recovery (AR), as well as in the whole perioperative period, the lack of studies on this subject is evidenced in a review study of the literature[11]. In this study, 297 examples were found, 4 of which approached hypothermia as a nursing diagnosis with main related factors, and 1 of which recommended the prevention of this complication[11].

In this context regarding hypothermia in the perioperative period, as well as their consequences for the recovery of patients who have undergone surgeries, the following question arises: What is the frequency of unintentional hypothermia in the perioperative period and how does it relate to anesthesia?

OBJECTIVE

To analyze the frequency of unintentional hypothermia in the perioperative period among patients who have undergone elective surgeries in a SC of a private hospital in the Midwest region of the state of São Paulo, and to define their relation to the type of anesthesia.

METHOD

A cross-sectional descriptive study with a quantitative approach, developed in a private hospital institution, located in the Midwest region of the state of São Paulo. It is a medium-sized hospital, consisting of a SC, the unit of the institution where the research was carried out, three operation rooms (OR), one birth room (BR) and a postanesthesia care unit (PACU), with capacity for up to three patients and three beds reserved for bed-day patients.

The study included 53 patients with elective surgeries scheduled for the period proposed to conduct the research. Among these patients, 42 were women and 11 were men, with age ranging from 18 to 90 years. Data collection lasted 2 months (from July 1 to August 31, 2012).

Patients were selected randomly according to the eligibility criteria, namely: age ≥18 years old, having an elective surgery scheduled in the referenced health institution for the period of data collection, being present on the day of the surgery and agreeing to take part in the research. After agreeing to participate in the research, patients were instructed during the preoperative period, within the SC, about the objectives of the research and signed the informed consent.

The study followed the rules and ethical procedures proposed in Resolution No. 466/2012 and was approved by the Research Ethics Committee of the institution on April 26, 2012, protocol No. 413.

For the implementation of the research a script of the case study and a script for the systematic observation were used, which consisted of, respectively, the following information:

- Observation of the nursing care given to the patients submitted to elective surgeries, as well as the physical, material, and human resources needed, in addition to the nursing actions directed to the patient and teamwork;
- Location of the research and main activity; observation of the activities carried out by team and the materials utilized, in addition to the application of the data collection tool, which was used in OR and PACU, which in turn consisted of characterization of sample data regarding the pre-, peri- and postoperative periods.

To verify the temperature of the patients, an ear thermometer by G-Tech was used, measuring the temperature from the admission until their exit from the SC, with a 15-minute interval between each verification.

For the analysis of the data, a descriptive statistical analysis was used and for the verification of the variations in temperature an one-way analysis of variance (ANOVA) was used with a post hoc Tukey test.

Prior to this procedure, normality data were analyzed by means of the Shapiro-Wilk test. For this analysis, a significance level of $p \leq 0.05$ was used.

RESULTS

A total of 53 patients were evaluated, being 42 (79.3%) women and 11 (20.7%) men, aged between 18 and 90 years. A higher concentration of individuals aged between 30 and 42 years was observed.

Female gender appeared as a predominant variable; however, it is noteworthy that the gender was not statistically significant in this study, with a $p>0.05$.

Table 1 shows that 50 (94.4%) patients had hypothermia in the OR, whereas 48 (94.1%) patients had hypothermia in the PACU (Table 2); 2 patients were not referred to the PACU.

In the OR, 3 (5.7%) patients did not become hypothermic. The same situation (3 patients, representing 5.9%) was observed in the PACU.

Comparing the frequency of hypothermia according to age range, it is noticeable that, in the groups from 18 to 30 years of age, from 42 to 54 years of age, and from 78 to 90 years of age, all patients had hypothermia during the perioperative period.

Tables 1 and 2 shows that 86.8% of patients had mild and 7.6% had moderate hypothermia in the OR, while in the PACU, 88.2% of them had mild and 5.9% had moderate hypothermia.

Patients were analyzed separately by the type of anesthesia, considering the risk factors for hypothermia

Table 1. Patients according to age range and classification of hypothermia in the operation room.

Age range (years)	Classification of hypothermia						
	n	Mild	%	Moderate	%	No hypothermia	%
18–30	8	8	100.0	–	–	–	–
30–42	20	17	85.0	2	10.0	1	5.0
42–54	8	8	100.0	–	–	–	–
54–66	5	3	60.0	1	20.0	1	20.0
66–78	10	9	90.0	–	–	1	10.0
78–90	2	1	50.0	1	50.0	–	–
Total	53	46	86.8	4	7.6	3	5.7

among surgical patients. Two types of anesthesia were included in the evaluation process: the spinal and the general anesthesia.

Tables 3 and 4 shows that the number of patients with hypothermia who have undergone spinal anesthesia was higher when compared to those who were submitted to the general anesthesia both in the OR (93.5%) and in the PACU (96.8%).

Graphic 1 shows the variation of temperature during the perioperative period, divided into two moments, in the OR and in the PACU, when the ear temperature was measured every 15 min, from the moment the patient entered the SC until they left it.

In the OR, the average temperature remained stable up to the 15-minute. From then on, there was a statistically significant decrease compared to both temperatures measured at the

Table 2. Patients according to age range and classification of hypothermia in the postanestheisa care unit.

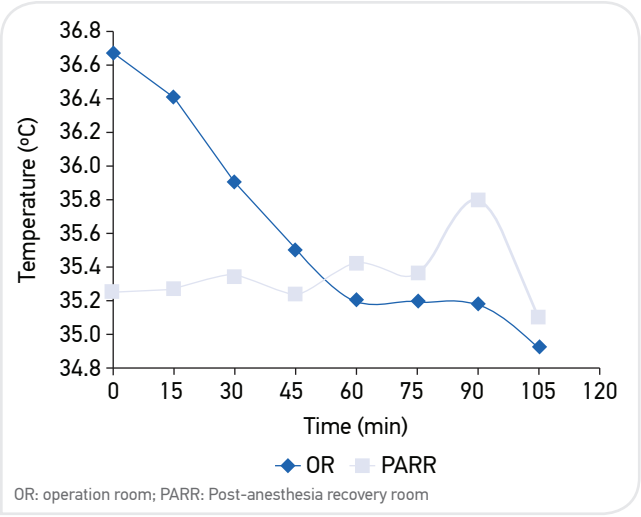
Age range (years)	Classification of hypothermia						
	n	Mild	%	Moderate	%	No hypothermia	%
18–30	8	8	100.0	–	–	–	–
30–42	20	20	100.0	–	–	–	–
42–54	8	7	87.5	–	–	1	12.5
54–66	4	3	75.0	–	–	1	25.0
66–78	9	5	55.6	3	33.3	1	11.1
78–90	2	2	100.0	–	–	–	–
Total	51	45	88.2	3	5.9	3	5.9

Table 3. Patients submitted to general anesthesia and frequency of hypothermia.

Age range (years)	Operation room					Postanesthesia care unit				
	n	With hypothermia	%	Without hypothermia	%	*n*	With hypothermia	%	Without hypothermia	%
18–30	2	2	100.0	–	–	2	2	100.0	–	–
30–42	9	8	88.9	1	11.1	9	8	88.9	1	11.1
42–54	3	3	100.0	–	–	3	2	66.7	1	33.3
54–66	3	3	100.0	–	–	2	2	100.0	–	–
66–78	4	3	75.0	1	25.0	4	4	100.0	–	–
78–90	1	1	100.0	–	–	2	1	50.0	1	50.0
Total	22	20	90.9	2	9.1	22	19	86.4	3	13.6

Table 4. Patients submitted to spinal anesthesi and frequency of hypothermia.

Age range (years)	Operation room					Postanesthesia care unit				
	n	With hypothermia	%	Without hypothermia	%	*n*	With hypothermia	%	Without hypothermia	%
18–30	6	6	100.0	–	–	6	6	100.0	–	–
30–42	11	11	100.0	–	–	11	11	100.0	–	–
42–54	5	4	80.0	1	20.0	5	5	100.0	–	–
54–66	2	1	50.0	1	50.0	2	1	50.0	1	50.0
66–78	6	6	100.0	–	–	6	6	100.0	–	–
78–90	1	1	100.0	–	–	1	1	100.0	–	–
Total	31	29	93.5	2	6.5	31	30	96.8	1	3.2



OR: operation room; PARR: Post-anesthesia recovery room

Graph 1. Mean variation of temperature in the perioperative period.

admittance and at the 15-minute. From the 60- to the 90-minute, the mean temperature remained virtually constant. From the 90-minute on, the mean temperature suffered a severe drop, showing a statistically significant difference in relation to the admittance, the 15-, and the 60-minute temperatures.

In the PACU, there was no statistically significant difference between the moments, meaning that the patients were admitted with a given temperature and were discharged with the same temperature. Thus, many patients left the OR and entered the PACU in a hypothermic state.

DISCUSSION

Despite not having presented statistical significance, the female gender is an important variable to be pointed out as a risk factor for the development of hypothermia. Women have less lean body mass and higher rates of body mass surface compared to men, which may make them more susceptible to heat losses to the environment. However, women may present a lower heat loss in the perioperative period compared to men, as their bodies have higher percentages of adipose tissue, which works as a protective layer[10].

All patients had hypothermia during the perioperative period. A special emphasis to groups of patients between 18 and 30 years of age, from 30 to 42 years of age, and from 42 to 54 years of age, whose rate of hypothermic patients was high in the OR, considering that the literature points out the age of 60 years old or older as a risk factor for the development of this condition[11-13].

With regard to the type of anesthesia, hypothermia was higher among patients submitted to spinal anesthesia, which may be related to the number of cesarean births that corresponded to 30% of all surgeries during the research period. It is also worth noting that when patients are submitted to general anesthesia, they leave the OR awaken after the surgery, that is, not under the effect of anesthesia, and thus, regaining their normal physiological responses. In contrast, the duration of the spinal anesthesia is three hours on average, which reduce the threshold of cutaneous vasoconstriction, which is one of the thermoregulatory mechanisms of temperature[14].

The results of this research corroborate other studies, demonstrating that hypothermia is a risk for patients in the perioperative period. Despite this scenario, the production of works in this area is still scarce[11-13].

A study[13] indicate that hypothermia has been triggered in the OR by the lack of appropriate preventive measures, resulting in complication in the AR period.

The identification of risk factors in the pre- and perioperative period is necessary, which, whether alone or as a group, may be controlled to minimize morbidity and mortality of patients who have undergone surgical procedures[15,16].

These data suggest that the nurse should handle the risk factors for hypothermia since the preoperative period, considering that the effects of this condition may be minimized and/or avoided throughout the surgical process, which will contribute significantly for the unit dynamics in addition to providing safety to the patient.

It is also worth mentioning that there is a higher risk of developing unintentional perioperative hypothermia when general and regional anesthesia are combined. This is due to the deficiency in the thermoregulatory mechanisms of general anesthesia in addition to the hindered ability to keep the compensation mechanisms (such as tremors, peripheral vasoconstriction, and thermal sensation), common in regional anesthesia, contributing to lower mean temperatures[17,18].

In contrast to the results of this research, another study data concerning the occurrence of hypothermia in PACU showed that general anesthesia caused a greater incidence of hypothermia in the immediate postoperative period[19].

This study shows that hypothermia is one of the main complications in the perioperative period. Therefore, there is a belief that providing the necessary tools to the nursing team in the SC is the only path to reduce the incidence of these complications.

Planning of effective interventions, such as a care protocol for hypothermia prevention and short duration educational interventions that may contribute significantly to the effective knowledge improvement on the subject, is necessary[4].

Regardless of the type of anesthesia, it is valid to understand that hypothermia triples the incidence of myocardial adverse effects, increases the risk of infections of the surgical site, causes bleedings, and is associated to the increase of both the hospitalization period and the health costs. It also changes the pharmacokinetics and pharmacodynamics of most anesthetics, prolonging the recovery from anesthesia[20].

However, it should be highlighted that measuring the body temperature is not included as a routine in the evaluation process for PACU discharge, even knowing the importance of normothermia for the patients and the influence of unintentional hypothermia in the possible postoperative complications[14].

The knowledge and comprehension on pathophysiology, the complications and the forms of prevention, therefore, are important so that the nursing professional in the SC performs their role adequately[4].

Other studies also observed that patients with temperatures below 36ºC were discharged from the PACU. This fact suggests a review of the procedures applied and a continuous training of the team involved in the care process[14].

The results of another study on hypothermia in patients in the perioperative period are important to highlight. In this study 80% of patients remained hypothermic within 30 minutes of permanence in the PACU, with axillary temperature between 35.1 and 35.9ºC. After 30 minutes of permanence in the PACU, most of these patients started reheating, which was confirmed by axillary temperatures between 36 and 37.2ºC in 60% of patients after 60 minutes[13].

Among the limitations of this study we emphasize the size of the sample; however, the methodology of the statistical analysis ensures the reliability of the results.

Another limiting factor is related to the absence of patients' self-reported on thermal confort. This question was not formulated to the patients.

FINAL CONSIDERATIONS

The SC plays an extremely important role in the hospital scenario and in the life of many people, as it is an enclosed environment, involving peculiarities in the care of the surgical patient. The nurse should conduct a humanized care, considering that many of these patients will undergo a surgical procedure for the first time.

Both the results of other studies and those observed in this study show a high incidence of hypothermia among surgical patients.

Most patients had mild hypothermia, with a temperature decrease from the 30-minute of the surgical procedure, considering that the decrease became more significant with time and many of these patients are taken to the room whilst still in a hypothermic state.

Thus, we should highlight how important and necessary is the development of mechanisms which may contribute to the early detection of this condition, as well as the importance of investments in providing tools for the team, aiming at the prevention and the offering of a secure and quality care.

There is also a need for projects of continuous education, to inform about the importance of body temperature control during the perioperative period, as well as measures which may be implemented to early detect the condition and/or to reduce the number of hypothermic patients.

REFERENCES

1. Craven RF, Hirlen CJ. Fundamentos de enfermagem: saúde e função humanas. 4a ed. Rio de Janeiro: Guanabara Koogan; 2006.

2. Souza VP, Costa JRR. Hipotermia: evidências científicas. Medicina perioperatória. [acesso em 20 jul. 2015]. Disponível em: http://www.saj.med.br/uploaded/File/artigos/Hipotermia.pdf

3. Association of periOperative Registered Nurses (AORN). Recommended practices for the prevention of unplanned perioperative hypothermia. AORN J. 2007;85(5):972-88.

4. Mendoza IYQ, Peniche ACG. Intervenção educativa sobre hipotermia uma estratégia de ensino para aprendizagem de enfermagem. Rev Esc Enferm USP. 2012;46(4):851-7.

5. Biazzotto CB, Brudniewskl M, Schimidt AP, Auler Júnior JOC. Hipotermia no período perioperatório. Rev Bras Anestesiol. 2006;56(1):89-106.

6. Gotardo, JM, Silveira RCCP, Galvão CM. Avaliação da hipotermia no pós-operatório imediato. Rev Rene. 2009;10(2):113-21.

7. Santana RF, Delphino TM, Henriques NM, Souza PA, Soares TS, Pereira SK. Diagnóstico de enfermagem recuperação cirúrgica retardada. Rev Rene. 2014;15(3):533-42.

8. American Society of Perinesthesia Nurses (ASPAN). Clinical guideline for the prevention of unplanned perioperative hypothermia. J Perianesth Nurs. 2001;16(5):305-14.

9. Silva DC, Alvim NAT. Ambiente do centro cirúrgico e os elementos que o integram: implicações para os cuidados de enfermagem. Rev Bras Enf. 2010;63(3):427-34.

10. Muniz, GS, Teles NSB, Leitão IMTA, Almeida PC, Leitão MC. Hipotermia acidental: implicações para os cuidados de enfermagem no transoperatório. Rev SOBECC. 2014;19(1):79-86.

11. Gotardo JM, Silveira RCCP, Galvão CM. Hipotermia no perioperatório: análise da produção científica nacional de enfermagem. Rev SOBECC. 2008;13(2):40-8.

12. De Mattia AL, Maia LF, Silva SS, Oliveira TC. Diagnósticos de enfermería de complicaciones en la sala de recuperación anestésica. Enferm Global. 2010;9(1):1-11. [acesso em 08 nov. 2015]. Disponível em: http://revistas.um.es/eglobal/article/view/93601

13. Mattia AL, Barbosa MH, Rocha AM, Farias HL, Santos CA, Santos DM. Hipotermia em pacientes no período perioperatório. Rev Esc Enferm USP. 2012;46(1):60-6.

14. Castro FSF, Peniche ACG, Mendoza IYQ, Couto AT. Temperatura corporal, índice Aldrete e Kroulik e alta do paciente da unidade de recuperação pós-anestésica. Rev Esc Enferm USP. 2012;46(4):872-6.

15. Luís C, Moreno C, Silva A, Páscoa R, Abelha F. Inadvertent postoperative hypothermia at post-anesthesia care unit: incidence, predictors and outcome. Open J Anesthesiol. 2012;2(5):205-13.

16. Guyton AC, Hall JE. Tratado de fisiologia medica. 11a ed. Rio de Janeiro: Guanabara Koogan; 2006. 1115 p.

17. Hart SR, Bordes B, Hart J, Corsino D, Harmon D. Unintended perioperative hypothermia. Ochsner J. 2011;11(3):259-70.

18. Zappelini CEM, Sakae TM, Bianchini N, Brum SPB. Avaliação de hipotermia na sala de recuperação pós-anestésica em pacientes submetidos a cirurgias abdominais com duração maior de duas horas. ACM Arq Catarin Med. 2008;37(2):25-31.

19. Sessler DI. Temperature monitoring: the consequences and prevention of mild perioperative hypothermia. South Afr J Anaesth Anal. 2014;20(1):25-31.

20. Mulry D, Mooney B. Perioperative hypothermia prevention. World Ir Nurs, 2012;20(2):26-7.

I AM THIRSTY! EXPERIENCE OF THE SURGICAL PATIENT IN THE PERIOPERATIVE PERIOD

Tenho sede! Vivência do paciente cirúrgico no período perioperatório

Tengo sed! Vivencia del paciente quirúrgico en el período perioperatorio

Larissa Cristina Jacovenco Rosa da Silva[1], Patricia Aroni[2], Lígia Fahl Fonseca[3]

ABSTRACT: Objective: To unveil the experience of the surgical patient in the immediate postoperative period regarding thirst, from the perspective of the Symptom Management Theory. **Method:** A qualitative study, undertaken with 14 patients in a large university hospital in southern Brazil. For discourse analysis, we used the Discourse of the Collective Subject method. **Results:** Four categories came up: the body manifesting thirst, experienced feelings, using coping mechanisms, and receiving thirst management strategies. Signs of this symptom are disturbing and extremely stressful for those experiencing them and the multidisciplinary team does not value them. **Conclusions:** From the perspective of the Symptom Management Theory, thirst, as a multivariate symptom, is perceived and experienced through physical and emotional repercussions, reflecting feelings of anguish, fear, and helplessness when facing the symptom.

Keywords: Thirst. Perioperative care. Perioperative nursing. Nursing care.

RESUMO: Objetivo: Desvelar a vivência do paciente cirúrgico no pós-operatório imediato em relação à sede, na perspectiva da Teoria de Manejo de Sintomas. **Método:** Estudo qualitativo desenvolvido com 14 pacientes em hospital universitário de grande porte no Sul do Brasil. Para análise dos discursos, utilizou-se o método do Discurso do Sujeito Coletivo. **Resultados:** Emergiram quatro categorias: o corpo manifestando a sede, sentimentos vivenciados, utilizando mecanismos de enfrentamento e percebendo as estratégias de manejo da sede. Os sinais desse sintoma são angustiantes e extremamente estressores para quem os vivencia e a equipe multiprofissional envolvida não o valoriza. **Conclusão:** Sob a perspectiva da Teoria de Manejo de Sintomas, a sede, pela multivariedade do sintoma, é percebida e experienciada por meio de repercussões físicas e emocionais, refletindo sentimentos como angústia, medo e impotência diante do sintoma.

Palavras-chave: Sede. Assistência perioperatória. Enfermagem perioperatória. Cuidados de enfermagem.

RESUMEN: Objetivo: desvelar la vivencia del paciente quirúrgico en el postoperatorio inmediato en relación a la sed, en la perspectiva de la Teoría de Manejo de Síntomas. **Método:** estudio cualitativo, desarrollado con 14 pacientes en hospital universitario de gran tamaño en el Sur de Brasil. Para el análisis de los discursos, se utilizó el método del Discurso del Sujeto Colectivo. **Resultados:** emergieron cuatro categorías: el cuerpo manifestando la sed, sentimientos vivenciados, utilizando mecanismos de enfrentamiento y percibiendo las estrategias de manejo de la sed. Las señales de ese síntoma son angustiantes y extremamente estresantes para quienes las vivencian y el equipo multiprofesional involucrado no las valoriza. **Conclusiones:** bajo la perspectiva de la Teoría de Manejo de Síntomas, la sed, por la multivariedad de síntomas, es percibida y experimentada por medio de repercusiones físicas y emocionales, reflejando sentimientos como angustia, miedo e impotencia ante los síntomas.

Palabras clave: Sed. Atención perioperativa. Enfermería perioperatoria. Atención de enfermería.

[1]Nurse; Expert in Perioperative Nursing at Universidade Estadual de Londrina (UEL) – Londrina (PR), Brazil. E-mail: lari_jacovenco@hotmail.com
[2]Specialist in Perioperative Nursing from the Universidade Estadual de Londrina (UEL). Collaborator Professor at the Nursing Department of UEL – Londrina (PR), Brazil. E-mail: paty.aroni@ig.com.br
Avenida Juscelino Kubitscheck, 235 – Jardim Brasil Senedese – CEP: 86130-000 – Bela Vista do Paraíso (PR), Brasil.
[3]Nurse; PhD in Nursing; Adjunct Professor at the Nursing department of UEL – Londrina (PR), Brazil. E-mail: ligiafahl@gmail.com
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INTRODUCTION

Thirst in the perioperative period causes a very distressing feeling of discomfort, overcoming even pain or hunger, characterizing itself as a symptom due to its subjectivity. When not satiated, it completely takes over our consciousness, increasing anxiety, dehydration, irritability, weakness, and despair[1,2].

In patients submitted to surgeries, thirst is incident and intense, especially in the immediate postoperative period (IOP), while still fasting[3,4]. Several factors trigger thirst in the surgical patient, such as fasting, medication, and blood loss[5-7].

Similarly to pain, thirst is a subjective sensation; however, it is an underappreciated, under measured, undertreated symptom, and there are no protocols to register or measure it inserted in clinical practice[1,3,4]. There are only a few studies about the subject, and the health team is not prepared to identify and measure thirst or the perception of the patient experiencing it.

Thirst presents identifiable signs that change the physical, mental, and social functioning of the patient[1,8]. The Symptom Management Theory allows the understanding of the multifactorial aspect of thirst in the interrelation of its domains – person; environment, health/disease – and its dimensions – experience, strategy, and repercussions of the symptom[8,9].

The assumptions of this theory indicate that the detection of thirst in the perioperative period is based essentially on the verbal report of the patient. Furthermore, the surgical patient is part of a high-risk group for thirst development, leading the way to plan and implement early actions to manage it. The compromised communication of some patients may be assisted by the parents' or caretakers' report, who are considered to be reliable sources of information to intervene in the symptom. Thirst brings other uncomfortable symptoms – or attributes – such as dry lips and thick saliva, which should also be cared for in an integrated manner. The domains person, environment and state of health/disease affect the perception of thirst, its verbalization and reaction to the strategies used to manage it[8,9].

According to the theory, the experience of the symptom is subject to multiple individual factors that interfere in its onset and perception. It is observed that the patient experiences, assesses, and faces thirst in a particular way[9], especially by the interaction of different stressful elements in the perioperative period[10]. It is important that the health team understands the fragility of the surgical patient in the moments of tension and instability of this particular journey, with different repercussions for him or her[11].

This study aimed at granting the surgical patient, inserted in an institutional culture in which he or she loses autonomy and voice, the possibility of expressing their feelings and perceptions about such an incident and perverse symptom, which is, at the same time, undervalued: perioperative thirst. Understanding the experience of thirst in the perioperative period is a challenge, which leads us to question how the surgical patient perceives, assesses, and reacts to the thirst experience in this period.

Facing these issues, the objective was to unveil feelings, experiences, and the subjective perception of the surgical patient regarding thirst in the perioperative period, from the perspective of the Symptom Management Theory.

METHOD

A qualitative study carried out in a large university hospital in the south of Brazil, with patients in the IOP period who felt thirsty in the post-anesthesia recovery room, with intensity greater than five, assessed according to the visual numeric scale from zero to ten.

The criteria for participation were being older than 18 years at the postoperative period and being admitted to the ward. The criteria for exclusion included individuals who presented difficulties in oral communication and pain at the time of the interview. Fourteen patients were approached in the ward and the semi-structured interviews were recorded.

The guiding questions of the study were "Did you feel thirsty at the perioperative period? How was it to feel thirsty? Tell me more about it".

The data were analyzed by the Discourse of the Collective Subject (DCS), using a selection of key expressions, central ideas, and anchoring that organized them in a thorough synthesis discourses of representations, beliefs, and values of a population that goes through common experiences[12]. The final DCSs were presented by identifying the research subjects who composed the discourse with a code — letter E — followed by a number.

This study is in accordance with the guidelines of Resolution/CNS n. 466, from 2012, which regulates research on human beings, with the approval of the Ethics Committee of the institution where the study took place (CAE n. 02299412.6.0000.5231).

RESULTS

The 14 interviewees — 10 women and 4 men, aged between 23 and 67 years old — came from the following clinics:

orthopedics, gynecology, neurosurgery, and surgery of the digestive tract. In the discourse analysis, four categories emerged: "the body manifesting thirst"; "experienced feelings"; "using coping mechanisms"; and "perceiving strategies of thirst management"

The body manifesting thirst

In the first category, the patient reported intense and remarkable body changes related to thirst in the perioperative period. Dry mouth, dry and chapped lips, perception of changes in saliva and in the texture of the tongue, sensation of suffocation, and weakness compose a scenario of discomfort that is promptly identified by patients:

> Well, it seems like everything went dry, you know? Dry mouth and lips, as if they were about to crack, the tongue was kind of thick, coated. I can't explain. The saliva gets thick and tastes bad. There is no saliva to swallow. Your breath sometimes changes, the flavor saliva seems to change flavor, you know... I think it gets thicker and bitterer. Then I noticed my throat was dry. We get a bit suffocated, there is no liquid. It seems like nothing slides, no saliva, no nothing. My body urged for water, it was weak, as if it were drying. (E2, E3, E4, E6, E7, E9, E10, E11, E14)

The signal that was mostly pointed out by the patient was the dryness of the oral cavity, which affected his or her speech:

> We get a bad feeling in the mouth; it gets dry, difficult to swallow the saliva and even to speak, you know? I had trouble speaking because I was thirsty. Dry throat, I couldn't even talk, no saliva in my mouth! Very bad! (E1, E2, E5)

External factors, like the environment, were mentioned as potentiators of thirst:

> I felt more thirsty, I don't know if it came from the pain or the air conditioning, which is strong in the OR. Want it or not, we always lie down with our mouths a little bit open. (E7, E9, E13, E14)

Patients reported anxiety as a triggering factor for dryness in the oral cavity, which is closely related to thirst:

> When you are at the peak of anxiety, your mouth dries, your heart races [...] I can't explain it, but it seems like when I was fasting, I felt more thirsty; maybe it is that thing of not being able to drink, and that is when you wanna drink, you know? Anxiety leads to dry mouth. I was kind of sleepy, with the dry mouth, so it was: I'm thirsty, I'm thirsty" Then you keep thinking about it and you get even thirstier. (E6, E7, E9)

Patients made analogies to show the magnitude of the experience and the intensity of the symptom[13]. They did so when they described thirst, when they searched words in their vocabulary to find images related to the thirst they experienced:

> Dry mouth... everything sticks, it is like there is glue in your mouth, that is the feeling: glue in your mouth! You know when you spend a whole day without brushing your teeth, than you get that thick saliva, that tastes bad? This is how it is. You know when the pressure goes down? It is a similar feeling, only in the mouth. When you take dipyrone, doesn't it taste bad? That is the taste I perceived. I said I was becoming a camel, wanting water, needing water, very, very thirsty! (E5, E7, E8, E12)

The discourses showed that the fasting experience is unpleasant, especially for a longer period. However, it is possible to observe that hunger was more bearable than thirst:

> I didn't feel hungry, I was ok, even after 24 hours without eating I felt no hunger. But I felt really thirsty, really!!! You can handle hunger, but thirst is more complicated! I think water is more important than hunger. First, water. Water is... Wow! (E1, E2, E7, E9, E10, E11, E14)

Experienced feelings

The second category includes wishes and sensations reported after the experience of thirst. The patient remembered often previous surgical experiences, when thirst was also present:

> I remember! In the last surgery I had, I felt very thirsty. I felt the same thing [thirst] about seven years ago. They also had me fasting, and I couldn't even water my mouth. I don't like to remember it. (E6, E7, E8, E11)

The feelings resulting from thirst in this period were emphatically reported as a distressful experience:

> It is awful, pretty bad. It is terrible not to be able to drink water. It seems like there is something inside you that is driving you crazy! Then you get that anxiety… when you really can't do something, you know? I had never felt so thirsty before. And it is terrible to feel it, I don't wish it to anyone. (E1, E4, E5, E6, E7, E10, E12, E13)

Water was mentioned as the first need after waking up from anesthesia:

"As soon as I woke up from anesthesia, I woke up very thirsty, really urging for water. I even thought that, if I didn't drink water at that moment, I might die" (E3, E5, E6).

Using coping mechanisms

To reduce their discomfort, patients developed coping mechanisms, like moistening the oral cavity with their own saliva:

> You are thirsty and can't drink water. So you suck saliva, water from your throat, you try to find anything moist to swallow. (E7, E8)

Sleep presented itself as an attempt to forget the intensive discomfort: "In order to forget I was thirsty or hungry, I slept, but it didn't really work out" (E5).

The effort to concentrate in situations other than thirst was a way to divert attention from discomfort:

> The only thing I thought about was that I couldn't drink water, so I tried not to think about it. I thought about my son, and that soon all that tension would be over. I was very anxious. (E6, E9)

The patient then assumed a mutism attitude, by realizing there was no way out of the fasting situation: "You gotta be quiet, right… because you want to drink, eat, and you can't. So, you gotta be quiet" (E2).

It is observed that experiences related to thirst were shared between patients in the ward, as well as empirical strategies to manage and reduce its intensity:

> Thirst? I was smart! This time I wet my mouth and threw the water away. The girl in the other room hasn't drunk water in I don't know how many days, but she has been doing it. She said: Water your mouth and throw the water away. I said: Hey!! That is what I'll do. It seems that even brushing your teeth doesn't improve the dryness. I felt like drinking it, but I couldn't, so I threw it out. At least my throat wasn't so dry. (E6, E7, E8, E12)

The search for water was reported as a very urgent need, so patients were led to plan for actions that would ease the thirst, even if that meant breaking established protocols:

> Urgh! I can't even explain... I felt anxious and I saw a guy passing by with one litter of Coke, and I said: Hey you, for God's sake, let me drink it? I felt like grabbing it and drinking from the bottle, you know? Unbearable! I couldn't wait to take a sip of water. You see water and think: Wow, I'll just have one sip, nobody will see it, but you can't, right? I just know it is impossible to remain without water. Since I had 10 pills, I said: I'll take it out on the pills, since there were a lot of them. But it wasn't enough to quench my thirst. (E1, E2, E6, E7, E8, E9, E11, E10, E12)

Perceiving strategies of thirst management

The health team rarely used strategies to care for the thirsty surgical patient. However, reports showed that their attitudes demonstrated lack of understanding regarding the feelings and distress generated by thirst in the perioperative period:

> Today I told the nurse: But can't I have just a sip of water? And she said: No! The doctor said: I'll make you an IV to relieve a little. The whole time I said my mouth was dry, but they said that unfortunately, I couldn't have any water. All they wanted to know was whether I was thirsty or not. I asked them to moisten my mouth, not to drink it. (E1, E8, E11, E12)

> I said: Please, so let's get to the surgery soon, because I am very thirsty. I asked, I said for God's sake, can you check what time or day this surgery will happen — if today or not —, because I need water. They said no, that I had to wait, I had to be strong, I had to hold on. (E1, E5, E8, E14)

Thirst had a negative repercussion on the surgical experience, because at the preoperative stage, patients had a craving for water, and the professionals involved demonstrated little concern about that. The stress of feeling thirsty led to anguish and desire to expedite the surgery. From the patients' point of view, the team adopted strategies that were not always effective:

> Unfortunately they only watered our mouths, like that [showing with the fingers on the lips], so it wouldn't get dry. But it didn't ease our thirst, it got worse. Wow!! I felt like drinking more water. The water was mostly to get humidity back to our mouths. They didn't give us water, not even a little; they got cotton and passed it on our mouths. But that was all, they didn't give us water. I asked: "Give me water", and they came with that piece of cotton. It was terrible! I couldn't wait to put water in my mouth. They told me to water my mouth with a piece of cloth, like that [taking the hand to the lips], but it doesn't solve anything. Wow! I wanted to eat that! It is horrible! (E1, E2, E4, E6, E7, E10, E11)

The institution where this study was carried out used the Safety Protocol for Thirst Management (SPTM) and the ice popsicle in the IOP[14]. There are reports on this new care management, described as being pleasant and efficient:

> They gave me ice. I said: Delicious ice! It seemed like I was in a bath tub full of ice. The ice was tasty, fresh. It was very good and refreshing. It seems like the dry feeling gets better. Two ice cubes were enough: she gave me one, then another, and I was no longer thirsty! I felt satisfied by the ice. You know, I got better. Saliva got back to normal, my lip was a little dry, the thirst was almost over. I approved it! (E6, E7, E9, E13, E14)

DISCUSSION

Thirst is an individual and subjective experience. According to the Symptom Management Theory, the subjectivity of the experience is considered in the dimension "Experiencing the Symptom", and reflects on the biopsychosocial changes, both in the sensations and in the cognition of a person[8,9]. The attributes related to thirst, such as dry mouth, are highly correlated to its perception[15].

Thirst works as a marker for body homeostasis and, in cases where there are changes, the body perceives it and shows the need for water. The patient concentrates his or her attention on the remarkable change in well-being provoked by thirst, describing it as distressful discomfort[4,8], proportional to its intensity[16]. The time factor also affects the meaning aggregated by the individual to an unpleasant symptom; it is how he or she assesses the experience of the symptom and the emotional response coming from it[10].

The experience of the symptom reflects the individual variability of how much the same stimulus influences the intensity of discomfort[10]. The silence observed in patients in the perioperative period may indicate the presence of thirst, when generated by its peripheral component: dry mouth.

The surgical acclimatized environment and feelings usually connected to the perioperative period, like pain and anxiety, are specific stressors for the patient, making thirst worse. The administration of oxygen for prolonged periods and the fact that the oral cavity remains open during intubation intensifies it[8].

The response to a symptom includes physiological, psychosocial, sociocultural, and behavioral components, identified either isolated or jointly. Likewise, physiological reactions to thirst can include changes that worsen the symptom[8,9]; for instance, the higher the stress level and tension experienced by surgical patients, the higher the difficulties to face and overcome it[17]. Patients recognize thirst as a consequence of anxiety and perioperative fears, and also identify it as an anxiety generator, since they do not know whether or not they will be able to drink water. Therefore, a vicious circle is created in which anxiety generates thirst, which, on the other hand, generates more anxiety. Interrupting this process is fundamental to provide humanized care.

According to the Symptom Management Theory, people assess their symptoms, judge the cause, the treatment, and its effect on their lives[9]. When reacting to the perception of thirst, the perioperative patient looks for ways to explain the changes in his or her biophysical functioning and sensations.

Physiological responses to the symptoms may activate negative reactions, which strengthens these manifestations. Therefore, the patient experiencing thirst and assessing it as a threat may respond with higher levels of stress, which, in turn, reduces the action of the parotid glands in the lubrication of the oral cavity, exacerbating the general perception of threat[8,9].

The patients used figures of speech — such as "glue" and "camel" — in the attempt to describe thirst. The images are simple and explicit comparisons made by the patients between the target-concept — thirst — and an image or object representing it, conceptualizing it by the description of similarities. We do that when we are faced with new situations and look for something similar to analyze and try to understand the new object[13].

The meaning of an unpleasant symptom can only be known by the description of the individual experiencing it[10]. To demonstrate the magnitude of the sensation when recalling the experience of thirst, the patient made an analogy[13] with madness, a mental disorder in which the affected person, unaware of his or her condition, deeply changes his or her behavior, becoming irresponsible for his or her acts. Likewise, the patient in the perioperative period considered thirst so intense and disturbing that it led to thoughts of death[8]. The discomfort caused by thirst may be related to its intensity, but it is also mediated by other considerations, such as the level of attention the person gives to the symptom[10].

According to the Symptom Management Theory, its evaluation comprehends a complex group of factors characterizing the experience. These include intensity, location, frequency, temporal nature, and effective impact. When the patients assess the threat of the symptom, they perceive the danger involved or the harmful effect[9]. By seeing thirst as a threat, they create strategies to face it and overcome it. People react differently to stress, so each patient adopts a way to face it when experiencing thirst: mutism, sleep, thought diversion, and even attempts to cheat on the fasting[8,17].

According to the Symptom Management Theory, intervention strategies can be directed to one or more individual components of the symptoms, in order to reach one or more results[9]. The usual strategy of simply humidifying the oral cavity using wet cotton in room temperature instigates the patients to want more water, so it is not sufficient to quench their thirst[18]. Besides, the patients claim that the wet cotton brings an uncomfortable sensation due to its texture.

In a hospital culture in which both the patient and the team believe that thirst is a price to be paid to prevent complications in the surgical process, understanding its impact from the patients' perspective is extremely relevant[8]. The discourses reflect how little the team values, questions, and investigates thirst, demonstrating lack of empathy. The team is unaware of the advances in identifying, measuring, and assessing the safety and the use of efficient strategies to manage thirst in the perioperative period. Raising the awareness of health professional on thirst is therefore a major challenge[1,8].

SPTM is one of these advances, since this instrument is used on surgical patients presenting thirst in the postanesthesia care unit (PACU). It aims at relieving thirst with safety, and systematically assesses the level of consciousness, presence of reflexes to protect the airways, and absence of nausea and vomit; in case the patient is capable in these categories, he or she receives a 10-mL ice popsicle[19]. In small volumes, low temperatures are more efficient to quench thirst[20].

According to the Symptom Management Theory, the dimension perception of the symptom contributes significantly to the proper management of thirst. However, it includes the interpretation of reality, unique for each patient, processed by the senses, and whose information is organized, interpreted, and transformed in a dynamic way, intensifying or changing the experience[8-10].

The management of a symptom begins by assessing the experience from the patient's perspective. Understanding this phenomenon is essential to efficacious care planning and management. The results of this study indicate that patient's perception about thirst affects the way he or she evaluates and reacts to it.

CONCLUSION

This study showed that the surgical patient perceives the physical repercussions of thirst intensively, through a confluence of factors. The patient experiences feelings of despair, even making analogies about madness and death. The frequent use of images leading to the meaning of intense dryness and lack of water illustrates the strength of these feelings.

The experience of thirst was shown by the report of surgical patient, who attributed meaning to it according to their evaluation: a very unpleasant symptom.

These results can contribute to the understanding of the meaning of perioperative thirst, by giving voice to those who experience it. This is the first step to value the symptom "thirst," aiming at subsidizing humanized and qualified care to patients in the perioperative period.

REFERENCES

1. Arai S, Stotts N, Puntillo K. Thirst in critically ill patients: from physiology to sensation. Am J Crit Care. [Internet]. 2013 [citado 5 jul. 2015];22(4):328-35. Disponível em: http://www.ncbi. nlm.nih.gov/pubmed/23817822

2. Gois CFL, Aguillar OM, Santos V, Rodríguez EOL. Stress factors for patients undergoing cardic surgery. Invest Educ Enferm [Internet]. 2012 [citado 6 jul. 2015];30(3):312-9. Disponível em: http://www.scielo.org.co/pdf/iee/v30n3/v30n3a 03.pdf

3. Aroni P, Nascimento LA, Fonseca LF. Avaliação de estratégias no manejo da sede na sala de recuperação pós-anestésica. Acta Paul Enferm [Internet]. 2012 [citado 19 jun. 2015];25(4):530-6. Disponível em: http://dx.doi.org/10.1590/S0103-21002012000 400008

4. Gois CFL, Dantas RA. Stressors in care at a thoracic surgery postoperative unit: nursing evaluation. Rev Latino-am Enferm [Internet]. 2004 [citado 20 jul. 2015];12(1):22-7. Disponível em: http://dx.doi.org/10.1590/S0104-11692004000100004

5. Inenaga K, Ono K. Oral dryness and thirst: the central effect of acetylcholine on drinking behavior. J Oral Biosci [Internet]. 2010 [citado 2015 jul. 28];52(4):344-51. Disponível em: http://dx.doi.org/10.1016/S1349-0079(10)80015-5

6. Lages N, Fonseca C, Neves A, Landeiro N, Abelha FJ. Náuseas e vômitos no pós-operatório: uma revisão do "pequeno-grande" problema. Rev Bras Anestesiol [Internet]. 2005 [citado 26 jun. 2015];55(5):575-85. Disponível em: http://dx.doi.org/10.1590/S0034-7094200500 0500013

7. Pompeu DA, Rossi, LA. A administração de anestésicos voláteis como fator relacionado a náuseas e vômitos no período pós-operatório. Rev Gaúcha Enferm [Internet]. 2008 [citado 29 jul. 2015];29(1):121-8. Disponível em: http://www.seer.ufrgs.br/RevistaGauchadeenfermagem/article/viewFile/5309/3010

8. Conchon MFi, do Nascimento LA, Fonseca LF, Aroni P. Sede perioperatória: uma análise sob a perspectiva da Teoria de Manejo de Sintomas. Rev Esc Enferm USP [Internet]. 2015 [citado 1 ago. 2015]; 49(1):122-8. Disponível em: http://www.scielo.br/pdf/reeusp/v49n1/ pt_0080-6234-reeusp-49-01-0122.pdf

9. Dodd M, Janson S, Facione N, Faucett J, Froelicher ES, Humphreys J, et al. Advancing the science of symptom management. J Adv Nurs [Internet]. 2001 [citado 20 jun. 2015];33(5):668-76. Disponível em: http://dx.doi.org/10.1046/j.1365-2648.2001.01697.x

10. Lenz ER, Pugh LC. Theory of Unpleasant Symtoms. In: Smith MJ, Liehr PR. Middle Range Theory for Nursing. New York: Springer Publishing Company; 2008. p. 159-82.

11. Chistóforo BEB, Zagonel IPS, Carvalho DS. Relacionamento enfermeiro-paciente no pré-operatório: uma reflexão à luz da teoria de Joyce Travelbee. Cogitare Enferm [Internet]. 2006 [citado 20 jul. 2015];11(1):55-60. Disponível em: http://www.faculdadespequenoprincipe.org.br/publicacoes/arquivos/20080919050909_Artigo%20relacionamento%20enfermeiro%20paciente.pdf

12. Lefevre F, Lefevre AMC. Discurso do sujeito coletivo: representações sociais e intervenções comunicativas. Rev Texto Contexto Enferm [Internet]. 2014 [citado 20 jul. 2015];23(2):502-7. Disponível em: http://www.scielo.br/pdf/tce/v23n2/pt_0104-0707-tce-23-02-00502.pdf

13. Goulart JAB. Analogias e metáforas no ensino de física: um exemplo em torno da temática de campos [dissertação]. [Internet]. Brasília: Universidade de Brasília; 2008 [citado 20 jul. 2015]. Disponível em: http://repositorio.unb.br/bitstream/10482/4854/1/2008_JaniceAnitaBomfimGoulart.pdf

14. Conchon MF, Fonseca LF. Eficácia de gelo e água no manejo da sede no pós-operatório imediato: ensaio clínico randomizado. Rev Enferm UFPE [Internet]. 2014 [citado 1 ago. 2015];8(5):1435-40. Disponível em: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article /view/5839/pdf_5170

15. Stevenson RJ, Mahmut M, Rooney K. Individual differences in the interoceptive states of hunger, fullness and thirst. Appetite [Internet]. 2015 [citado 2015 jul. 26];95(1):44-57. Disponível em: http://www.sciencedirect.com/science/article/pii/s0195666315002950?np=y#

16. Puntillo K, Arai SR, Cooper BA, Stotts NA, Nelson JE. A randomized clinical trial of an intervention to relieve thirst and dry mouth in intensive care unit patients. Intensive Care Med. [Internet]. 2014 [citado 26 jul. 2015];40(9):1295-302. Disponível em: http://www.ncbi.nlm.nih.gov/pmc/articles /PMC4149585/

17. Andolhe R, Guido LA, Bianchi ERF. Stress e coping no período perioperatório de câncer de mama. Rev Esc Enferm USP [Internet]. 2009 [citado 20 jul. 2015];43(3):711-20. Disponível em: http://dx.doi.org/10.1590/S0080-62342009000300030

18. Guest S, Essick G, Young M, Lee A, Phillips N, McGlone F. Oral hydration, parotid salivation and the perceived pleasantness of small water volumes. Physiol Behav [Internet]. 2006 [citado 20 jul. 2015];89(5):724-34. Disponível em: http://dx.doi.org/10.1016/j.physbeh.2006.08.012

19. Nascimento LA, Fonseca LF, Rosseto EG, Santos CB. Development of a safety protocol for management thirst in the immediate postoperative. Rev Esc Enferm USP [Internet]. 2014 [citado 1 ago. 2015];48(5):834-43 Disponível em: http://dx.doi.org/10.1590/S0080- 6234201400005000009

20. Eccles R, Du-Plessis L, Dommels Y, Wilkinson JE. Cold pleasure: why we like ice drinks, ice-lollies and ice cream. Appetite [Internet]. 2013 [citado 20 jul. 2015];71:357-60. Disponível em: http://www.sciencedirect.com/science/article/pii/S0195666313003930

MANAGEMENT OF A SURGICAL CENTER: IDENTIFICATION OF WASTES*

Gestão em centro cirúrgico: identificação de desperdícios

Gestión en el centro quirúrgico: identificación de residuos

Maria José do Nascimento Silva[1], Adagenor Lobato Ribeiro[2]

ABSTRACT: Objective: To identify the hospital medical materials wasted in the surgical center and the causes of such waste in a public university hospital. **Method:** A descriptive, exploratory study with a quantitative approach, conducted in a midsize university hospital in Belém, Pará State, Brazil, from June to August 2014. **Results:** The most wasted materials were surgical head covers (15%), gauze (13%), pharmaceuticals (12%) and gloves (11%). Among the causes of the mentioned wastes are trainees (21.3%), inappropriate usage (16%) and quality of the material (16%). **Conclusion:** The results of this study confirm the existence (of structural and managerial characteristics) of material waste in the Surgical Center. As a consequence of this study, a change in the behavior of the professionals was observed, the materials distribution system for the surgical center was restructured, and a surgical kit was implemented.
Keywords: Hospital administration. Surgicenters. Health services.

RESUMO: Objetivo: Identificar os artigos médicos hospitalares desperdiçados no Centro Cirúrgico e as causas desses desperdícios em um hospital público e de ensino. **Método:** Estudo descritivo, exploratório, com abordagem quantitativa, realizado em um hospital universitário de médio porte em Belém, Estado do Pará, Brasil, no período de junho a agosto de 2014. **Resultados:** Os materiais mais desperdiçados foram turbantes (15%), compressas de gaze (13%), medicamentos (12%) e luvas (11%). Entre as causas dos desperdícios mais citadas estão os estagiários (21,3%) uso inadequado (16%) e a qualidade do material (16%). **Conclusão:** Os resultados deste estudo confirmam a existência (de ordem estrutural e gerencial) dos desperdícios de materiais no Centro Cirúrgico. Como fruto deste estudo, houve uma mudança comportamental dos profissionais, reestruturação no sistema de distribuição de materiais para o Centro Cirúrgico e implantação do *kit* cirúrgico.
Palavras-chave: Administração hospitalar. Centro cirúrgico. Serviços de saúde.

RESUMEN: Objetivo: Identificar los artículos médicos hospitalarios desperdiciados en el centro quirúrgico y las causas de ese desperdicio en un hospital público y de enseñanza. **Método:** Estudio descriptivo, exploratorio con enfoque cuantitativo, realizado en un hospital universitario de tamaño mediano en Belém, Pará, en Brasil, de junio a agosto de 2014. **Resultados:** Los materiales más desperdiciados eran turbantes (15%), gasa (13%), medicamentos (12%) y mangas (11%). Entre las causas de los desperdicios más mencionados son estudiantes (21,3%), uso inadecuado (16%) y calidad del material (16%). **Conclusión:** Los resultados de este estudio confirman la existencia (orden estructural y de gestión) de los desperdicios de materiales en el centro quirúrgico. Como resultado del estudio, hubo un cambio en lo comportamiento de los profesionales, una reestructuración del sistema de distribución de los materiales al centro quirúrgico y la implantación del kit quirúrgico.
Palabras clave: Administración hospitalaria. Centros quirúrgicos. Servicios de salud.

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[1]Nurse of the Operating Room and Material and Sterilization Center of the *Hospital Universitário João de Barros Barreto* (HUJBB); Master in Public Management from UFPA – Belém (PA), Brazil. Conjunto Julia Seffer, Rua Doze, Casa 87 – CEP: 67020-500 – Águas Lindas – Ananindeua (PA), Brasil. E-mail: mjosenascimento@yahoo.com.br
[2]Professor of the Postgraduate Program of UFPA; PhD in Sustainable Development from UFPA; Member of the NAEA/UFPA – Belém (PA), Brazil.
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INTRODUCTION

The management of material resources has become a major concern for healthcare organizations in both the public and the private sectors. In the public sector the concern is even higher owing to the limited budget, which requires greater control of materials consumption and costs so that professionals can provide the necessary assistance to patients[1].

The quantity of materials used for assistance and support in midsize public hospitals are considerable; most of them are used by the nursing team and consequently are the most wasted. This waste can lead to unnecessary spending on resources and inefficient processes, procedures, or services related to the assistance. Therefore, the performance of nurses in managing material resources is one of the greatest achievements in managerial decision-making, which reinforces their importance in the technical and administrative aspects inherent to the processes of care and management[2].

In many hospitals, the Surgical Center is one of the sectors that use larger quantities of material resources and also has a very complex logistical distribution system, which requires a large supply of materials, leading to high consumption and, consequently, making this area a major waste producer. Therefore, the Surgical Center represents a major challenge for the reduction of waste and elimination of material supplies.

The interest in conducting this study was due to the first author's observations made when acting as a nurse in the Surgical Center in regards to a considerable quantity of discarded medical materials, either by nonuse or from past expiration dates. These observations motivated this research in order to build the necessary parameters to assist health institutions in minimizing waste, achieving quality excellence, optimizing resources, and allowing for investments in other areas.

Given this context, this study intended to evaluate the following question: "How can identifying wastes contribute to the elimination of losses and reduction of costs"?

OBJECTIVE

To identify the hospital medical materials wasted in the Surgical Center.

METHODS

This was a quantitative, descriptive, and exploratory study. This study was carried out at a university hospital, which provides medical care exclusively by the Unified Health System (SUS). The hospital is located in the city of Belém in Pará State, and is known for clinical and surgical pulmonology and infectious and parasitic diseases. Additionally, it is a campus for graduate students and for multidisciplinary medical residents.

The study population was composed of nurses and nursing technicians who worked in the Surgical Center.

In the study period, from June to August 2014, the Surgical Center had two operating rooms and two post-anesthetic recovery rooms. The surgical center provides material and human resources to conduct the anesthetic and surgical procedures and provides assistance to patients from both the inpatient unit and the outpatient clinic. A daily schedule with elective, unscheduled elective, and emergency surgeries in various specialties is detailed, manually and in advance, by the surgical center nurse in order to prepare the surgical map.

In the study period, the surgical center worked with 180,726 items to address the various specialties need, and the annual cost of the consumables was R$ 5,194,394.05.

Data was collected in two stages. First, 195 surgical procedures were monitored from beginning to the end, during which wasted materials from those that were opened, but not used was observed. Materials stored in the various rooms of the surgical center were also observed.

During the development of the observational guide, variables related to the characterization of procedures (surgical specialty and surgery performed) and the surgery grades were included.

Data was recorded as follows: during the observation all the dispensed and not dispensed materials were registered, that is, those materials delivered and registered by the circulating nurse and those the residents withdrew from the drawers themselves because the materials were widely available and were not registered by the circulating nurse. At the end of the procedure the used materials and those opened, but not used were counted.

In the second stage, we administered a questionnaire with open-ended and closed-ended questions to the nursing professionals of the Surgical Center in order to identify, from the perspective of these professionals, wastes and

suggestions on how to avoid them. The variables related to the characterization of the professionals included in the construction of the structured instrument for data collection were the following: professional category, gender, age, length of experience, educational level, and role in the operating room.

The project was approved by the Research Ethics Committee (CEP) of the University Hospital João de Barros Barreto of the *Universidade Federal do Pará* (HUJBB/UFPA) (CAEE: 30993014.2.0000.0017 – Opinion No. 663,861), on 27 May 2014.

The objectives of the study were explained to the professionals involved in this study after approval by the CEP. The informed consent agreement was given to the participants to be signed after obtaining their verbal consents.

RESULTS

The study results should be considered within the context of some limitations, such as surgical suspensions and complications; however, the most important limitation is that the research was conducted in just one institution. Therefore, we cannot generalize the results found on the sources of wasted materials to other health institutions.

In the first phase of data collection, 195 types of procedures were monitored, and the largest numbers of wasted materials were identified (Table 1).

The materials were dispensed, wasted, and used in surgical pleural drainage, hernioplasty, open cholecystectomy, laparoscopic cholecystectomy, the insertion of central venous catheters, laparotomies, and thyroidectomy.

Table 1. Percentage distribution of consumables and medications which were dispensed and wasted, and actual consumption in surgeries during the data collection period. Belém (PA), 2014.

Materials/medications	Dispensed	Wasted	%	Utilized	%
Gauze 7.5x7.5 cm (package)	1,131	750	66.3	381	33.7
Hypodermic needles	678	15	2.2	663	97.8
Syringes	851	13	1.5	838	98.5
Surgical Gloves (pair)	568	10	1.8	558	98.2
Stopcocks	171	5	2.9	166	97.1
Endotracheal tube	56	1	1.8	55	98.2
Sutures	637	3	0.5	634	99.5
Butterfly needles	167	14	8.4	153	91.6
Crepe bandage	67	10	14.9	57	85.1
Procedures gloves	733	200	27.3	533	72.7
Head covers	2,487	390	15.7	2,097	84.3
Scalpel blade	171	2	1.2	169	98.8
Needles for anesthesia	61	4	6.6	57	85.1
Drains	76	2	2.6	74	97.4
Catheter for aspiration nº 14	188	2	1.1	186	98.9
Dimorf	44	1	2.3	43	97.7
Fentanyl	247	6	2.4	241	97.6
Midazolan	49	3	6.1	46	93.9
Ephedrine	76	3	3.9	73	96.1
Dipyrone	117	1	0.9	116	9.1
Atropine	226	2	0.9	224	99.1
Novabupi	70	1	1.4	69	98.6
Distilled water	267	1	0.4	226	99.6
Total	8,835	1,439	16.3	7,396	83.7

The 7.5x7.5 cm gauze was the most wasted material with 750 packages, which corresponded to 66.3% of the total dispensed – 1,131 packages. Therefore, only 381 (33.7%) were truly necessary for performing the surgeries. In the studied institution this material is packed with 10 gauzes per package, and improperly opening them was the main cause of the waste. The surgical head covers were also identified as the most wasted, with 390 units, which corresponded to 15.7% of the total dispensed – 2,487 units. Of this total, only 84.3% were required for the procedures. The waste was due to improper use because the head covers were used as shoe covers. The misuse was also identified with gloves, which were used as elastic to assist in venous punctures. In such cases, 200 units were wasted, 27.3% of the total dispensed.

The impact of the waste of materials on institutional finances was calculated considering the cost of wasted materials during surgical procedures and during the storage period owing to past validation dates. The currency used for the calculation was the Brazilian Real (BRL).

The cost of the total waste of materials and drugs used and stored in the Surgical Center was approximately BRL 6,695.73, according to Table 2.

The results showed that the wasted material with the highest cost were the sutures — 819 units, its waste is equivalent to BRL 1,818.18 due to expired validation dates during storage. The second highest cost from waste during surgical procedures was on the 7.5x7.5 cm gauze — 750 units, with a total amount of BRL 1,263.00. This waste was due to excessively offering the material to the surgeon, most often without the doctor's request.

With regard to the second phase of data collection, the results obtained by the questionnaires given to the Surgical Center nursing professionals on identifying of wasted materials and strategies to avoid them were presented.

The nursing professionals answered the question: "In your opinion, are there wasted consumables in the operating room? And what are the most wasted?" The answers were gauze pads with 13%; medications with 12%; and gloves with 11%.

With regard to the question "What are the main causes of waste of such materials in the Surgical Center?", the answers included the presence of interns with 19 responses (21.3%), improvisation and the quality of the materials with 14 responses (16%), followed by 13 responses (15%) on inappropriate use, 12 responses (13%) on the excess availability of materials in the units, 10 responses (11%)

Table 2. Cost of waste of the materials and medications which were used and stored in the period of two months.

Materials/ medications	Unit	Quantity	Unit value (BRL)	Total amount (BRL)
Gauze 7.5x7.5 cm	Package	750	1.68	1,263.00
Needles	One	15	7.00	105.00
Needles for anesthesia	One	80	10.97	877.60
Syringes	One	49	0.72	35.28
Surgical Gloves	Pair	10	3.18	31.80
Stopcocks	One	05	0.54	2.70
Endotracheal tube	One	11	10.40	114.40
Endobronchial tube	One	03	153.63	460.89
Sutures	One	819	2.22	1,818.18
Drains	One	52	3.00	156.00
Catheter	One	41	3.67	150.47
Probes	One	23	1.45	33.35
Hemostatic	One	5	160.00	800.00
Butterfly needles	One	14	1.38	19.32
Crepe bandage	One	10	1.18	11.80
Procedures gloves	One	200	0.70	140.00
Head covers	One	390	0.07	28.47
Scalpel blade	One	2	28.00	56.00
Fentanyl	Vial	6	2.27	13.62
Midazolam	Vial	3	13.50	40.50
Dipyrone	Vial	1	0.65	0.65
Atropine	Bottle	2	0.50	1.00
Novabupi	Bottle	3	16.60	49.80
Dopamine	Vial	23	1.76	40.48
Aminophylline	Vial	15	0.62	9.30
Furosemide	Vial	18	0.17	3.06
Amikacin	Vial	4	2.00	8.00
Dobutamine	Vial	4	14.71	58.84
Hydrocortizone	Bottle	3	2.77	8.31
Calcium gluconate	Vial	28	0.90	25.20
Reminfentanil	Bottle	6	46.00	276.00
Ringer lactate solution	Bottle	12	3.00	36.00
Glucose 25%	Bottle	4	0.32	1.28
Dimorf (morphine)	Vial	1	4.00	4.00
Distilled water	Bottle	1	0.28	0.28
Total		2,616	507.54	6,695.73

on the difficulty in controlling materials, and 7 responses (8%) on the lack of protocols.

Regarding the question, "What factors may contribute to the waste of materials?", the answers were 41% in organizational factors, 31% in management factors, and 28% in structural factors.

As to the question "What suggestions do you have to minimize the waste of consumables and medications in the operating room?", 13 respondents (25.49%) were supportive towards the implementation of surgical and anesthetics kits, 9 respondents (17.65%) suggested raising team awareness, 6 of them (11.76%) believed that there should be a work process evaluation and protocols established, 5 respondents (9.80%) suggested improving the input-output control of the materials, implementing daily dispensing and returning of excess, and creating satellite pharmacies.

DISCUSSION

The management of material resources in the health sector is becoming more important, due to not only advancements in technology, in raw materials in the pharmaceutical industry, in materials, and in equipment, but also to issues related to the administrative process of organizations, the absence of consumption control systems, wasted material and its costs, and fundamental aspects of care such as quality and safety[4].

The results show that the 7.5x7.5 cm gauze pad is the most wasted material with an exact quantity of 7,500 gauze units. However, this waste cannot always be avoided (for example, if a package of 10 gauzes is opened with some remaining, the gauze cannot be used further).

The head covers, which are part of the surgical scrub and intended to protect the heads of the Surgical Center multidisciplinary team as well as the patient's head to avoid surgical infections, are used as shoe covers in the studied institution owing to the lack of materials for this purpose. However, as these materials are not suitable for this purpose, they are used more often, which could be avoided with the use of exclusive shoes in the Surgical Center as recommended by the Health Surveillance Agency (ANVISA) and Regulatory Norm (NR) 32.

However, as the cost of this material is minimal, it is not given its due importance, and its value is only recognized when the stock ends. If there is no material in the hospital for protecting the heads of the professionals, the surgical procedures are suspended.

The same occurs with the gloves, which are also part of the personal protective equipment (PPE), since its use is important in all procedures performed with the patient, but not always used properly. The waste of this material was observed as a consequence of improvisation, as the gloves were sometimes used for tourniquets (an elastic to compress veins in order to puncture the venous access) and then discarded. This situation shows that, despite the waste and its costs (and considering that the actions goals are achieved), these materials are used to fulfill a different function from the one originally intended owing to the lack of specific materials[4].

The technique of improvisation in nursing is already considered historic and one of the strengths of care. However, with regard to managing resources, even if this technique is effective in many situations, the waste arising from improvisation must be evaluated against the costs and benefits[2].

Currently, the concern with healthcare costs especially in public institutions is increasingly present because patients are increasingly aware of their rights, leading healthcare institutions to implement habits of work efficiency, and to evaluate and to list the quantities of materials used, the production, and costs. However, this is only possible with health staff awareness to define and re-evaluate the work process[3].

Waste is intrinsic to the work process when dealing with services and in particular a public teaching hospital because although all the surgeries processes are defined and outlined, variations occur for each individual (surgeons, residents, nursing professionals, patient/pathology). Therefore, these wastes are inherent to the management process of materials consumption in surgeries[3].

The nurse has an important role as the communicator in these processes, as they share information with all professionals involved and act as the link between the different health professionals and administrative personnel, and between these professionals and the patients. Therefore, the nurse increasingly acts as a change agent in achieving the balance between the quality, quantity, and costs of surgical material[5].

With regard to the materials inventory, the studied hospital uses a traditional system of storage and dispensing of materials, which is a model that favors excesses in the workplace.

Excessive stocks are an investment with no return and pose a risk to the organization, as they increase the probability of losses via expiration date, deterioration and rework. The presence of large stocks of some materials and the scarcity of others within a hospital, as shown in the results regarding the sutures (wasted the most, generating a cost of BRL 1,818.18, due to past expiration dates in storage), is probably the issue that most concerns the professionals involved in the management process[6].

Large consumption of many materials and the high cost at the university hospital may be a consequence of an excess inventory owing to the lack of knowledge on the actual consumption and on the types of materials that are actually needed in certain surgeries[2].

Even if the control is efficient, losses of materials and medications may occur because of expiration dates, inadequate storage, and decreased inventory turnover because of the replacement of similar materials by the medical team[7].

Proven studies in public and private hospitals reveal that although the institutions have adopted institutionalized programs to eliminate such wastes, difficulties in implementing the identification process and the actions to avoid such losses are still found. Among the difficulties are the poor relationships between management and professionals, the lack of commitment of the team to the institution and vice versa, and the lack of administrative knowledge of the professionals[8].

The cost of the waste was low when compared to the total annual cost of consumption of materials in the institution (BRL 5,194,394.04). However, when we analyze the number of wasted materials, which was equivalent to 2,616, and the total cost for 2 months of approximately BRL 6,695.73, these values became significant when considered as the analysis for a single sector.

The impact of this waste on the financial health of the institution is significant, considering that the researched hospital is an academic center and a public organization dedicated to education. Thus, to maintain the proper flow of materials consumption is essential, so that the lack of materials does not compromise the care, teaching and learning, and the research processes in different areas.

The cost is the most important aspect for decision-making, requiring the implementation of cost reports for hospital survival, as managers need accurate and appropriate information to make strategic decisions and obtain operational improvements. Knowing the actual costs of services, institutions will be able to eliminate wastes, improve their services, evaluate quality incentives, and promote continuous improvement through activity-based management[9].

Therefore, every institution whose mission is to provide care to people must constantly worry about the efficiency of this assistance, and thus implement actions and programs to ensure quality and promote efficiency when providing services. Therefore, the interaction between administrative, technological, financial, healthcare, and educational and research areas is essential[10].

Especially in university hospitals, which are expensive organizations that depend on the equilibrium of costs and revenues to survive, balancing these finances by implementing actions for the detection of sources and types of waste of materials becomes more important[11].

It is important to mention the opinion of the survey participants when they attributed the major cause of waste to the presence of interns, improvisation, material quality, improper use, excess material in the units, difficulty of controlling material flow, and lack of protocols.

Among these different types of waste is the culture of abundance, especially in the absence of protocols and procedures for standardization of consumables. This situation is aggravated when the waste is not measured, as it becomes invisible and hinders opportunities to raise awareness of those involved as well as the actions to minimize losses[3,4].

As a strategy to avoid waste, implementing surgical kits was one of the most common suggestions from the respondents. The implementation of surgical kits results in optimal usage and a better oversight of materials, avoiding both excesses and shortages. The use of kits as a control strategy helps professionals anticipate necessary items and understand what was actually used from the inventory when services were provided[3,7].

This new delivery system should lead to better usage of materials, respecting their original purpose. The medical professional should reflect on its necessity because they need to justify its use, and because they are aware of the managerial oversight over the simplest, lowest cost materials to high cost materials that are classified as fundamental for the care of the surgical patient[7].

The ABC classification in assessing the importance of each of the materials also stood out as a strategy for waste control. Items are classified according to the following categories of importance:

- Class A: 20% of the items with the highest costs, accounting for approximately 80% of the amount consumed;
- Class B: items of intermediate cost, usually estimated at 30% of the total and accounting for 10% of the consumed amount;
- Class C: items of low cost, which represent 50% of all consumables and 10% of the total cost, which does not mean that these items should be ignored. However, the importance of Class A materials in regards to costs is higher[7].

Another important methodology for controlling materials is the XYZ, which evaluates the criticality or indispensability of the material in the performance of activities. However, the most common concept of criticality is how essential the item is for the organization. Certain materials paralyze hospital processes when they are out of stock; for example, if needles or syringes are missing, most procedures cannot be performed[7].

Therefore, standardization is an important management tool, which provides uniformity of actions, prevents dispersion, and also allows the professionals to perform their duties in a safe, guided manner[5].

The nurses, who are responsible for organizing the assistance and resources to facilitate the work of all professionals, are included in this context. As the managers of units that greatly consume materials, nurses are usually in charge of resource management at all levels of the organizational structure[11].

CONCLUSION

This research allowed for the identification of wastes and reinforced the need to implement awareness programs to promote behavioral change in the professionals involved in the process. Additionally, this study showed the cost of waste and presented strategies to minimize them.

Only after being aware of the actual service costs, the institutions will be able to eliminate wastes, to improve services, and to ensure quality care to the users through procedural standardization, which is extremely important in a teaching hospital.

As a result of this research, there was a restructuring in materials distribution for the Surgical Center. Prior to the study, the distribution occurred once a week; however, after the study, materials began to be distributed twice a week, reducing waste of materials that occur from past expiration dates.

Additionally, as a benefit from the research, the surgical kit for sterile materials was implemented by the Material and Sterilization Center, thus reducing losses and better organizing the work process in both the Materials and in the Surgical Centers.

Despite its limitations, the development of this study reinforced the need to apply new material management tools in hospitals.

REFERENCES

1. Garcia SD, Haddad MCL, Dellaroza MSG, Costa DB, Miranda JM. Gestão de Material médico-hospitalar e o processo de trabalho em um hospital público. Rev Bras Enferm [Internet]; 2012 [citado 2013 abr. 26];65(2):339-46. Disponível em: < http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-71672012000200021 >

2. Vaghetti HH, Roehrs M, Pires AC, Rodriguez, C. Desperdício de materiais assistenciais na percepção dos trabalhadores de enfermagem de um hospital universitário. Rev Enferm UERJ [Internet]; 2011 [citado 2013 abr. 26];19(3):369-74. Disponível em: <http://www.facenf.uerj.br/v19n3/v19n3a05.pdf>

3. Castro LC. O custo de desperdício de materiais de consumo em um Centro Cirúrgico. [Doctoral thesis on Internet]. [São Paulo (SP)]: Escola de Enfermagem, Universidade de São Paulo; 2012 [citado 2013 abr. 28]. 123 p. Disponível em: <http://www.teses.usp.br/teses/disponiveis/7/7140/tde-22082012-162211>

4. Gil RB, Chaves LDP, Laus AM. Gerenciamento de recursos materiais com enfoque na queixa técnica. Rev Eletr Enf [Internet]. 2015 [citado 2016 jul. 30];17(1):100-7. Disponível em: http://dx.doi.org/10.5216/ree.v17i1.27544

5. Richa AC, Guimarães SM, Cardoso TV. Gestão por Padronização de Processos: A percepção dos enfermeiros de centro cirúrgico. Rev SOBECC. 2014;19(1):3-10.

6. Graziano KU, Silva A, Psaltikidis EM. Enfermagem em Centro de Material e Esterilização. Barueri, São Paulo: Manole; 2011.

7. Paes LRA. Série Gestão em Saúde – Gestão de Operações em Saúde para hospitais, clínicas, consultórios e serviços de diagnóstico. São Paulo: Atheneu; 2011. 192 p.

8. Castilho V, Castro LC de, Couto AT, Maia FOM, Sasaki NY, Nomura FH, et al. Levantamento das principais fontes de desperdício de unidades assistenciais de um hospital universitário. Rev Esc Enferm USP [Internet]. São Paulo 2011 [citado 2013 abr. 28];45(Esp):1613-20. Disponível: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0080-62342011000700012&lng=en>. dx.doi.org/10.1590/S0080-62342011000700012

9. Oliveira WT, Rodrigues AVD, Haddad MCL, Vannuch MTO, Taldivo MA. Concepções de enfermeiros de um hospital universitário público sobre o relatório gerencial de custos. Rev Esc Enferm USP [Internet]. 2012 [citado 2013 abr. 28];46(4):1184-91. Disponível em: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0080-62342012000500021&lng=en>. dx.doi.org/10.1590/S0080-62342012000500021

10. Associação Brasileira de Enfermeiros de Centro Cirúrgico (SOBECC). Recuperação Anestésica e Centro de Material e Esterilização. Práticas Recomendadas SOBECC. 6ª ed. rev. e atual. São Paulo: Manole; 2013.

11. Ventura PFEV, Freire EMR, Alves M. Participação do enfermeiro na gestão de recursos hospitalares. Rev Eletr Gestão & Saúde [Internet]. 2016 [citado em 30 jun. 2016];7(1):126-47. Disponível em: <http://gestaoesaude.unb.br/index.php/gestaoesaude/article/view/1436>

POSTOPERATIVE PERIOD OF OSTOMIZED PATIENTS WITH COLORECTAL CANCER: A COMPREHENSIVE ANALYSIS

Pós-operatório de pacientes com câncer colorretal estomizados: uma análise compreensiva

Post operatorio en las personas con cáncer colorrectal estomizadas: un análisis comprensivo

Suellen Cristina Rodrigues[1], Selme Silqueira de Matos[2], Aidê Ferreira Ferraz[2], Miguir Terezinha Vieccelli Donoso[3], Eline Lima Borges[4], Salete Maria de Fátima Silqueira[5], Adelaide De Matti[2], Daniela Mascarenhas de Paula[6]

ABSTRACT: Objective: To understand the feelings of ostomized patients with colorectal cancer. **Methods:** Reports of interview respondents were transcribed and analyzed under the theoretical framework of content analysis in its thematic modality. Patients interviewed were hospitalized in the coloproctology and oncology clinics of a large hospital in Belo Horizonte, Minas Gerais, Brazil. **Results:** Two categories emerged: "coping with and facing feelings related to the stoma" and "influences on the visions of sexuality and marital relationship". These were then divided into subcategories. **Conclusion:** a change of perspective on the care of these patients is suggested, with focus on training of professionals who deal with them, so they are assisted in an integrated and humanistic way, thus minimizing difficulties faced by both the patient and the health professional.

Keywords: Colostomy. Medical oncology. Resilience, psychological. Sexuality.

RESUMO: Objetivo: Compreender os sentimentos da pessoa colostomizada devido ao câncer colorretal. **Métodos:** Os relatos dos entrevistados foram transcritos e analisados sob o referencial teórico da análise de conteúdo, na sua modalidade temática. Os pacientes entrevistados estavam internados nas clínicas de coloproctologia e oncologia dos ambulatórios de um hospital de grande porte de Belo Horizonte, Minas Gerais. **Resultados:** Emergiram duas categorias: "conviver com sentimentos relacionados ao estoma e enfrentá-los" e "influências nas concepções sobre a vivência da sexualidade e do relacionamento conjugal", que foram divididas em subcategorias. **Conclusão:** Sugere-se uma mudança de perspectiva quanto ao cuidado dos participantes deste estudo, priorizando a capacitação de profissionais que lidam com essas pessoas, para que sejam assistidas de forma integrada e humanística, minimizando-se as dificuldades enfrentadas pelo paciente e pelos profissionais de saúde.

Palavras-chave: Colostomia. Oncologia. Resiliência psicológica. Sexualidade.

RESUMEN: Objetivo: Comprender los sentimientos de los pacientes de cáncer a convertirse en estomizado. **Métodos:** Los informes de los encuestados fueron transcritos y analizados bajo el análisis de contenido teórico, en su modalidad temática. Los pacientes entrevistados fueron hospitalizados en clínicas de cirugía colorrectal y en clínicas de oncología de un hospital en Belo Horizonte, Minas Gerais, Brasil. **Resultados:** Emergieron dos categorías, "vivir con sensaciones relacionadas con el estoma y hacerles frente" y "influencias de las concepciones de la experiencia de la sexualidad y relación matrimonial", divididas en subcategorías. **Conclusión:** Se sugiere un cambio de perspectiva en la atención de los participantes en el estudio, dando prioridad a la formación de profesionales que se ocupan de estas personas, que pueden ser asistidos de manera totalmente paga y humanista, reduciendo al mínimo las dificultades sufridas por el paciente y por los profesionales de la salud.

Palabras clave: Colostomía. Oncología médica. Resiliencia psicológica. Sexualidad.

[1]Degree in Psychology, expert in psycho-oncology; Psychologist at Hospital Felício Rocho. E-mail: suellen.psique@yahoo.com.br
[2]PhD in Nursing; Professor at Nursing School of Universidade Federal de Minas Gerais (UFMG). E-mail: selmesilqueira@gmail.com; afferraz@terra.com.br
[3] PhD in Health Sciences; Professor at Nursing School of UFMG. E-mail: miguirdonoso@uol.com.br; adelaidedemattia@gmail.com
Nursing School of Universidade Federal de Minas Gerais. Avenida Alfredo Balena, 190 – Campus Saúde – Santa Efigênia – CEP: 31130-100 – Belo Horizonte (MG), Brazil.
[4]PhD in Fundamental Nursing; Professor at Nursing School of UFMG. E-mail: eborges@ufmg.br
[5]PhD in Public Health; Professor at Nursing School of UFMG. E-mail: saletesilqueira@gmail.com
[6]Master in Nursing; Nursing manager at Hospital Felício Rocho. E-mail: danielamascarenhas1@gmail.com
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INTRODUCTION

Colorectal cancer (CRC) is the third most common type of cancer and the third leading cause of death among men and women in the United States. Almost two thirds of CRC survivors live for around five years after the diagnosis[1]. In some of the developed countries, this is the second most common cancer in terms of incidence, and in many parts of the world, incidence and mortality related to this have been increasing[2].

Many surgical procedures aimed at eliminating cancer can result in intestinal stoma, the two most common being colostomy and ileostomy. Stomata are intended for the disposal of waste and flatus for the external environment, therefore it is known as stoma disposal[3].

Being ostomized due to cancer leads to situations that are beyond cultural norms and affects the meanings people give to themselves, the disease, the treatment, and their very existence[4]. The diagnosis of cancer pushes the subject into the disease world and the treatment context; with the stoma, their bodies change along with their existence[5]. The person often starts dealing with two concurrent realities: facing a diagnosis of cancer and, depending on results and procedures related to stoma disposal. Health professionals should consider such issues while planning for their care.

When a person receives the information of the diagnosis and the need of colostomy, it is hard to face and overcome the several changes of the new phase of life, including pre-, trans- and postoperative periods[6]. There are also significant changes in social and familial dynamics. Patients who undergo colostomy often struggle to accept their new condition and become weakened[7].

The multidisciplinary team of the hospital where this research was conducted, especially psychologists and nurses, realize that cancer patients who undergo colostomy are twice as vulnerable as all others, for they not only face cancer, a stigmatized disease, but also face colostomy as a consequence. This picture is aggravated when colostomy is permanent. Reactions vary from embarrassment, difficulty to verbalize, anxiety, guilt, and decreased self-esteem among others[8].

Multidisciplinary assistance has rehabilitation as its purpose, which involves comprehensive assessment, taking into account the subjectivity of each person cared for. It is important to note that these patients require social, spiritual, and emotional support in addition to physical care[9].

The fragile condition of these people demands a more steady support by the professionals involved. However, feelings experienced by a patient who faces colostomy due to cancer are not always recognized by the psychologist or the nurse in daily care, which is considered as the problem of this study. There is the need for a comprehensive approach without losing sight of subjective questions outlined from the onset of the disease and, subsequently, from the event of colostomy.

OBJECTIVE

To try to understand the feelings of patients who had been ostomized owing to CRC.

METHODS

This is a qualitative and exploratory study performed in the facilities of a private hospital of Belo Horizonte, Minas Gerais, Brazil. The institution services patients with several clinical and surgical specialties, including coloproctology, for hospitalization, intensive care, emergency, and outpatient care. People from all age groups are cared for.

The research had a convenience sample. Inclusion criteria were patients aged 18 years or older who had undergone definitive colostomy more than three months before study due to stage III CRC (when cancer affects neighboring lymph nodes, but not other body parts) or stage IV CRC (cancer can be found in a spot that is very distant from its onset site), and who were hospitalized for the treatment of the disease or stoma complications. All of them agreed to participate in the study and signed the informed consent form.

A study population was formed by 18 patients who had undergone colostomy or ileostomy, and the sample held five ostomized patients that met the inclusion criteria.

Data was collected by means of a semi-structured questionnaire, which allowed identifying subjectivity and particularities of different speeches. Three questions directed it:

1. How do you feel about using a stoma, and how do you face this experience?
2. How is the handling of the accessory?
3. Could you talk about your sexual life after being ostomized?

Interviews were conducted by one of the researchers from January 30th to March 2nd 2015 at the Oncology Psychology Unit of the hospital, thus assuring participants' privacy. In order to keep the secrecy, interviews and interviewees were named as E1, E2, E3, E4, and E5.

Few steps of content analysis in thematic modality were followed to analyze the findings, as proposed by Bardin[10]. The author recommends breaking up a text in units and categories, according to analogical regroupings. Among different subcategories, investigation by themes is considered effective and fast when it comes to simple and direct speech. The following steps were taken: pre-analysis, content exploring, data handling (inference and interpretation). In pre-analysis the recorded interviews were listened to, then transcribed and re-read.

This workflow allowed initial appropriation of the content, with posterior linking to most relevant matters regarding the study purposes when building the study corpus on the basis of representativeness, homogeneity, and suitability. The second phase was that of operations decomposition, which consists of exhaustive exploring of the material in order to consolidate categories; at this point, patients' speeches had words related to the aspects sought for and were highlighted. In the third and last phase, data was treated, validated, and considered significant or not.

The study project was approved by the Ethics Committee of the hospital, protocol CAAE 234853214.8.0000.5125, report 888.066, on October 29, 2014. It fully complies with Resolution 466/12 by the National Health Council.

RESULTS

Among the five patients of the sample, three were females and two were men. Four were married and one was divorced. Ages varied from 53 to 68 years, with mean age of 59 years. One of the patients was a housekeeper, one was a banker, one was a sewer, one was a psychiatrist, and one was a teacher.

Testimonials that resulted in two categories, "facing" and "sexuality," are below:

> [...]I was so afraid; I could only sleep belly up, afraid to turn and something bad happen to the pouch. I was very insecure and would wake up several times every night, concerned. (E5)

I was always embarrassed, because it's something that you don't expect. You get better with time, the bad feeling about the pouch starts vanishing. (E1)

[...] I get impressed, and sad, and rebel against it, because it's out of my control. I had no idea this could ever happen to me. God forbid! [cries]. (E3)

[...] now I'm getting used to it and in fact accepting facts; I'm trying to take a normal life, or the closest possible to normal, being able to turn to both sides to rest. (E5)

Well, actually, I find it hard to handle the pouch, especially to clean it, because it must be done several times a day; my husband learned to handle it and always does the changes for me. (E5)

Change must be done twice a week, but cleanse is every four hours and my wife does that. (E4)

My sister always helps me, poor thing. She is always beside me and supports me whenever I have doubts. (E2)

I used to have a lot of leisure activities, but now I prefer to stay home; after I put the "probe" on, I became a house person; not even to my garage I would go out. (E3)

It makes it so hard to go out and do exercises, I was talking about it to the Doctor. (E7)

I just can't wait to get rid of it (the pouch), so I can return to normal activities. It totally keeps us from going out of our houses. (E5)

I find comfort reading religion magazines, or those addressing healthy habits; I try to do a little of everything. (E3)

For now, I can't work as a seamstress anymore, but, maybe one day I will be able. Nothing is impossible to God. (E3)

I thought this was other-worldly and, of course, I cried a lot. But Doctor told me I would have to use it but one day I could take it off hopefully, and I hold on to this hope. (E3)

Over time, I started going to the Health Unit to get my pouch, I was handling it myself. Sometimes they give you huge pouches, which I don't like because it gets too loose; then the girls started asking for the smaller ones, so I could feel happier. (E3)

We haven't had relations since my surgery. I'm afraid of it, but Doctor told us we could. (E4)

Since I started treatment, I haven't felt sexual desire. (E5)

I don't feel like doing anything, I don't like caresses or kisses. That's terrible, because he is very caring and loving, but I'm not. (E3)

In general it's all the same, nothing has changed. (E4)

Usually once a week. (E4)

There is desire. We kiss, hug and touch each other, but sexual intercourse itself doesn't take place. However, we find a way to finish the act, because it is something you can do. (E5)

Well, I do have desire, and he has desire. He looks for it, but in the end we get afraid. I pity him. (E2)

My husband doesn't care. He is very sweet, he is a good person. Most men would leave their wife right away if something like this happened. (E3)

Our relationship is very harmonious. My husband says he is not the kind of person who will search other women because of this; he understands what I'm going through. (E2)

DISCUSSION

From data analysis, two thematic categories emerged: "facing" and "sexuality."

Category 1: what to face

Intestinal stoma causes several changes in the lives of people, especially when it comes to gastrointestinal physiology, body image, and self-esteem. Providing information and education, multidisciplinary work and etcetera is an important strategy to help and support patients who go through colostomy. These people usually are not prepared to face such a condition. However, although they are not prepared initially, after the process of adaptation they begin to conceive life in a whole new way, particularly when the underlying disease is cancer[11].

Most definitive colostomy patients demand the use of a disposal pouch over the stoma to receive the effluent (feces). Those who do not use it benefit from bowel irrigation. This technique requires motor and cognitive ability, and the patient must also meet the indication criteria.

The device (pouch) handling requires emptying, avoiding overfilling, which could result in detachment of the pouch system adhesive, leakage of fecal contents and, in most cases, peristome skin damage. It is therefore crucial that patients or caregivers are clear about when and how to properly empty the collection bag[12].

Living with this device causes conflicting feelings, concerns and difficulties when dealing with this new situation, which is also mentioned in the work conducted in Northeast Brazil[6], whose authors mention fear, shame and anguish clearly shown by respondents in their speech.

Anger and sadness were also recurring. These feelings were identified in a qualitative study about ostomized people[4]. For the authors, the state of sorrow seems to be inherent to this condition, at least in the initial stages.

Some respondents reported a hard time accepting the ostomy condition initially because of the need to deal with and handle the stoma. Its presence generates visible and significant physical change to their bodies, which causes loss of integrity, dynamism and autonomy, triggering personal and social conflicts, particularly when it comes to relationship with the outside world[13].

The participation of the family, especially the spouse, in the care process was mentioned positively, suggesting companionship in the daily life of some respondents. The inclusion of other relatives emerged as something relevant in this process. The importance of family and friends in the rehabilitation of colostomy patients is also mentioned in a study on this subject[14]. However, according to the authors, it is not always easy to involve the family in the care of

patients, as there may be rejection, fear and disgust at the first contact with the situation.

Quotes about the difficulty in going out of their homes and the preference for home activities were recurrent. Regarding return to work, a research on the evaluation of education programs addressing colostomy showed uncertainty and ignorance as to coping with everyday life on the occasion of return to normal daily activities[15]. The authors of the study report that, when in doubt, people mentioned they prefer limiting both their social and labor activities.

Religion was a frequent theme. The belief in God and prayers emerged in some reports. Religiosity, limitations from the illness, and its role in all this are described in a qualitative study[5] conducted with ostomized people, in which religion appears as a category. The authors discuss patients' weakness and spiritual involvement.

The issue of resilience, present in various reports, can be understood as a standard of adaptation processes in relation to current and accumulated risk throughout life. It covers a variety of psychological resources needed to overcome adversity and interpersonal control when interacting with social support[16]. In some statements, the factors that helped them directly or indirectly to add a new meaning to adversity were highlighted: either individual, cultural, and familial skills, or a positive view, including hope and optimism, spirituality and transcendence.

Category 2: sexuality

During interviews, participants showed difficulties in talking about sexuality. It seems that any approach related to the theme is seen by the ostomized patients as embarrassing. Speaking of sexuality in their health context seems to be complex.

Giving up on sexuality was a recurrent finding. It seems to be a natural decision among interviewees that sexual intercourse does not suit their condition.

Physical changes underlying the use of a stoma may affect people's sexual performance and behavior. Difficulties emerge from body changes or physiological dysfunctions following the surgical procedure itself. A man bearing a stoma can present reduction or total lack of sexual desire, decrease or incapacity to erection, and changes in ejaculation patterns. The most common changes among women are reduction or loss of sexual desire, and dyspareunia. Most sexual-related difficulties are psychological, mainly due to embarrassment in front of one's partner and/or the feeling of dirtiness and repulsion, both resulting in the fear of being rejected[17].

There may also be relationships that were problematic before colostomy[18]. In such cases, the process of illness and the change of stoma may favor or even determine distance or interruption of sexual relations under the social claim that a "ill" person must not have sexual relations, which may even be a relief for some. This issue should be addressed while approaching the topic of sexuality with these patients.

On the other hand, the maintenance of sexual life after colostomy was present in some speeches. An integrated review on the sexuality of ostomized patients[19] gathered statements of people who felt no difference in sexuality, as their partners contributed to and participated in the process of adaptation.

A study with 30 women who went through colostomy showed strategies to face sexuality by changing sexual routine and handling the stoma in many ways, that is, emptying the pouch before the act, and covering it with several accessories, including towels, blouses, dresses.

Hiding the pouch is aimed at preventing accidents and putting it out of sight due to repulsion of one's partner or oneself, once there is a cultural repulsion to feces and this is totally contrary to the moment of excitement and desire. These techniques altogether characterize the ability to adapt and the creativity of these patients, but also reflect delicacy and sense of esthetics, once their body is reconfigured to sexuality[20].

Sexuality is beyond physiological need and is strictly related to desire. It is not limited to the genitalia, as it also involves emotions and trespasses physical definitions, becoming a more diffuse act that is present in all moments of life, and bears complex multifaceted meanings, besides holding a heavy claim of subjectivity[18].

However, some participants related sexuality only to sexual act itself when referring to intimacy of the couple. Sexuality vs. genitality is addressed in a psychoanalytic article on human sexuality[21]. The author states that a purely medical view reduces sexuality to sexual intercourse only, putting it in the frame of biological units and ignoring the difference between them. He also reports that the body addressed by psychoanalysis is not biological only; it is erogenous and touched by language, and a part of cultural speeches.

Some statements suggest companionship. This is part of any individual's life and is influenced by several factors contributing to well-being. In order to face the new situation, one must also face physical and psychological changes so the routines can be resumed by the couple[19].

Health professionals guide their care by aspects related to diagnosis and biomedical treatment only, that is, by the disease and the cure. More subjective aspects such as sexuality are not valued, which gives the false impression it is not part of human health[22].

This study made it possible to reveal the feelings of people who went through colostomy owing to cancer, and we consider it necessary to reveal the limitations as to the specific characteristics of the participants, as well as people with stage III and IV cancer, and their realities. Another limitation of the study was being restricted to a single service unit. Therefore, results should not be generalized, and it is believed that they should be further analyzed in order to support assistance measures for this audience. Thus, it is expected that this research will encourage new questions that can increase the range of knowledge about the theme.

FINAL CONSIDERATIONS

Different forms of adaptation to the same situation were found in this study, and even though the condition addressed here were reported as something that is difficult to overcome, some key features that served as protection for some patients emerged.

This study brought more information about the subject and unveiled ways in which the ostomized patients face their condition. Also, relevant feelings and reactions were brought to light and added to the context of cancer diagnosis, dealing with stoma and care of people, and they are all very important for the planning and development of care programs aimed at this audience.

Results allow reiterating that the process of overcoming a cancer and adapting to the use of a stoma is complex and full of subjectivities and difficulties, where interaction with family, friends, and health professionals may help these people regain self-esteem.

REFERENCES

1. El-Shami K, Oeffinger KC, Erb NL, Willis A, Bretsch JK, Pratt-Chapman ML, et al. American Cancer Society Colorectal Cancer Survivorship Care Guidelines. CA Cancer J Clin. 2015:65(6):427-55.
2. De las Nieves CB, Montoro CH, Manãs MC, Marin CR, Crisol IS, Asencio JMM. Viviendo con un estoma digestivo: la importancia del apoyo familiar. Index Enferm. 2013;22(4):209-13.
3. Fernandes RM, Miguir ELB, Donoso TV. Perfil da clientela estomizada residente no município de Ponte Nova, Minas Gerais. Rev Bras Coloproctol. 2010;30(4):385-92.
4. Sales CA, Violin MR, Waidman MAP, Marcon SS, Silva MAP. Sentimentos de pessoas ostomizadas: compreensão existencial. Rev Esc Enferm USP. 2010;44(1):221-7.
5. Almeida SSL, Rezende AM, Schall VT, Modena CM. Os sentidos da corporeidade em ostomizados por câncer. Psicol Estud. 2010;15(4):761-9.
6. Batista MRFF, Rocha FCV, Silva DMG, Silva Junior FJG. Autoimagem de clientes com colostomia em relação à bolsa coletora. Rev Bras Enferm. 2011;64(6):1043-7.
7. Cetolin SF, Beltrame V, Cetolin SK, Presta AA. Dinâmica sócio-familiar com pacientes portadores de ostomia intestinal definitiva. ABCD Arq Bras Cir Dig. 2013;26(3):170-2.
8. Vieira LM, Ribeiro BNO, Gatti MAN, Simeão SFAP, Conti MHS, Vitta A. Câncer colorretal: entre o sofrimento e o repensar na vida. Saúde Debate. 2013;37(97):261-9.
9. Dessote CAM, Teixeira ASM, Sousa CDA, Sonobe HM. Estratégias de ensino em enfermagem perioperatória: uma avaliação discente. Rev SOBECC. 2015;20(4):189-96.
10. Bardin L. Análise de conteúdo. 5 ed. Lisboa: Edições 70; 2011.
11. Backes MTS, Backes DS, Erdmann AL. Feelings and expectations of permanent colostomy patients. J Nurs Educ Pract. 2012;2(3):9-14.
12. Colwell JC, Kupsick PT, McNichol LL. Outcome criteria for discharging the patient with a new ostomy from home health care: a WOCN Society Consensus Conference. J Wound Ostomy Continence Nurs. 2016;43(3):269-73.
13. Cardoso DBR, Almeida CE, Santana ME, Carvalho DS, Sonobe HM, Sawada NO. Sexualidade de pessoas com estomias intestinais. Rev Rene. 2015;16(4):576-85.
14. Ardigo FS, Amante LN. Conhecimento do profissional acerca do cuidado de enfermagem à pessoa com estomia intestinal e família. Texto Contexto - Enferm. 2013;22(4):1064-71.
15. Klein DP, Silva DMGF. Avaliação da educação em saúde recebida pela pessoa com estoma intestinal na perspectiva da clínica ampliada. Ciênc Cuid Saúde. 2014;13(2):262-70.
16. Fontes AP, Néri AL. Resiliência e velhice: revisão de literatura. Ciênc Saúde Colet. 2015;20(5):1475-95.
17. Borwell B. Rehabilitation and stoma care: addressing the psychological needs. Br J Nurs. 2009;18(4):S20-5.

18. Paula MAB, Takahashi RF, Paula PR. Os significados da sexualidade para a pessoa com estoma intestinal definitivo. Rev Bras Colo-proctol. 2009;29(1):77-82.

19. Barreto APC, Valença MP. A sexualidade do paciente estomizado: revisão integrativa. Rev Enferm UFPE on line. 2013;7(esp):4935-43.

20. Ramirez M, McMullen C, Grant M, Altdchuler A, Hornbrook MC, Krouse RS. Figuring out sex in a reconfigured body: experiences of female colorectal cancer survivors with ostomies. Women Health. 2009;49(8):608-24.

21. Couto OHC. Tudo azul com o sexual? Viagra e sexualidade. Reverso. 2011;33(61):83-9.

22. Martins VV, Penna LHG, Paula MAB, Pereira CDC, Leite HC. Sexualidade, estoma e gênero: revisão integrativa da literatura. Rev Estima. 2011;9(1):39-46.

DEPLOYMENT AND OPERATION OF A HYBRID OPERATING ROOM IN A PRIVATE HOSPITAL IN SÃO PAULO

Implantação e funcionamento de sala híbrida em hospital privado de São Paulo

Despliegue y funcionamento de sala de operaciones híbrida en un hospital privado de São Paulo

Poliana Souza Neves de Oliveira[1], Rachel de Carvalho[2]

ABSTRACT: Objective: To report the experience of the deployment of a hybrid operating room and to identify the demands of its operation in a private hospital in São Paulo, Brazil. **Method:** Retrospective study, with experience report. The database of the surgical center was used to collect information, which was recorded in an instrument (sample characterization, information on the operation, and use of the hybrid operating room). **Results:** The hybrid operating room was used for the care of 166 patients in 15 months; most were men (109; 65.7%), aged 71–80 years (42; 25.3%); diagnosed with aortic stenosis (25.9%), in the specialties: cardiology (70.7%) and vascular (16.5%). The most used features were ArtisZeego® arch C, extracorporeal circulation, audiovisual equipment, software, ultrasound, echocardiography, and Da Vinci® Robot. **Conclusion:** The implementation of the hybrid room is an innovative concept, with the integration of medical teams and the use of next-generation features. The team must be constantly learning, as difficulties in the development of professionals and high costs have limited these procedures to a few centers in the world.

Keywords: Minimally invasive surgical procedures. Intraoperative period. Operating rooms. Technology, high-cost.

RESUMO: Objetivo: Relatar a experiência da implantação de sala operatória híbrida e identificar sua demanda de funcionamento em hospital privado de São Paulo. **Método:** Estudo retrospectivo, com relato de experiência. Para coleta foram utilizadas informações do banco de dados do centro cirúrgico, registradas em instrumento (caracterização da amostra, informações sobre a cirurgia e utilização da sala híbrida). **Resultados:** 166 pacientes foram atendidos em 15 meses; a maioria do sexo masculino (109; 65,7%), faixa etária de 71 a 80 anos (42; 25,3%), com diagnóstico de estenose aórtica (25,9%), nas especialidades cardiologia (70,7%) e vascular (16,5%). Os recursos mais utilizados foram: ArtisZeego®, arco C, circulação extracorpórea, equipamentos audiovisuais, softwares, ultrassonografia, ecocardiograma e Robô Da Vinci®. **Conclusão:** A implantação da sala híbrida é um conceito inovador, com integração de equipes e utilização de recursos de nova geração. A equipe deve estar em constante aprendizado, pois dificuldades na formação dos profissionais e alto custo têm limitado esses procedimentos a poucos centros do mundo.

Palavras-chave: Procedimentos cirúrgicos minimamente invasivos. Período intraoperatório. Salas cirúrgicas. Tecnologia de alto custo.

RESUMEN: Objetivo: Reportar la experiencia de la implementación del quirófano híbrido e identificar la demanda del funcionamiento en un hospital privado en São Paulo, Brasil. **Método:** Estudio retrospectivo, con relato de experiencia. Para la recolección de datos, se utilizó las informaciones de la base de datos del quirófano, registradas en instrumento (caracterización de la muestra, información sobre la cirugía y uso del quirófano híbrido). **Resultados:** 166 pacientes fueron vistos en 15 meses; la mayoría fuera hombres (109; 65,7%), con edades entre 71 y 80 años (42; 25,3%), diagnóstico de estenosis aórtica (25,9%), en cardiología (70,7%) y vascular (16,5%). Los recursos más utilizados fueron: ArtisZeego®, arco C, circulación extracorpórea, equipos audiovisuales, *software*, ultrasonografía, ecocardiografía y Robot Da Vinci®. **Conclusión:** La implementación del quirófano híbrido es un concepto innovador, con integración de equipos y uso de los recursos de próxima generación. El equipo debe estar en constante aprendizaje, pues dificultades en la formación de los profesionales y altos costos han limitado estos procedimientos a unos pocos centros en el mundo.

Palabras clave: Procedimientos quirúrgicos mínimamente invasivos. Periodo intraoperatorio. Quirófanos. Tecnología de alto costo.

[1]Nurse, Faculdade Israelita de Ciências da Saúde Albert Einstein (FICSAE); Collaborator in the Ambulatory Surgical Center of Hospital israelita Albert Einstein (HIAE). E-mail: poliana.neves@einstein.br
[2]PhD in Nursing, School of Nursing, USP; Lecturer in Undergraduate and Graduate Courses, FICSAE. E-mail: rachel.carvalho@einstein.br
Faculdade Israelita de Ciências da Saúde Albert Einstein – Avenida Professor Francisco Morato, 4293 – Butantã – CEP: 05521-200 – São Paulo (SP), Brasil.
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INTRODUCTION

Technology is in constant evolution, and this is reflected in many different sectors, including health. The increasing number of patients with various diseases requires knowledge and innovative techniques, as well as a multidisciplinary team, in the search for a favorable clinical outcome for them[1,2].

Hospitals are increasingly standing out for their technological ability to deploy new concepts, promoting the patient safety, and a recovery free of complications, which may be fatal[3].

One of the examples of the application of global trend technology is the development and creation of a new concept: a hybrid operating room (OR). It consists of the junction of a conventional OR and a hemodynamics room, with physical structure, equipment, materials, and accessories that contribute to less invasive surgery and offer the possibility of surgical and percutaneous correction in the same procedure.

The hybrid OR is equipped with a C-arm device, attached to a robotic arm, which performs broad movements, with three-dimensional reconstructions of the images in real time, providing detailed visualization of anatomy, image fusion, resources for implementation of the aortic valve, conduction of X-ray, and tomography images simulation, contrast ejector pump, radiolucent operating table with flexibility for accurate and comfortable movements in sync with the angiography device, multiple monitors, and lighting with LED surgical lights (Figures 1 and 2). It is important to note that the rooms can be equipped with cameras and image transmission systems, for educational purposes or telemedicine[4-7].

The treatment can be performed in various specialties, focusing mainly on endovascular procedures. The technique has the advantage of reducing the complications inherent to shorter recovery time, pain and infection. However, monitoring of treated patients and the experience gained by the teams, as well as technological developments, will provide the best treatment, individualizing the care provided[5].

Professionals working in the hybrid OR require specific training on the sophisticated equipment, which require skill in handling. The teams necessary are the nursing team, surgeons, anesthesiologists, scrub nurses, perfusionists, cardiologists, echo cardiographers, biomedical or clinical technologists, and engineers, where appropriate[1,4].

The new concept is already a reality in several centers in the world and in some excellence health care centers in Brazil. The structure demands project, planning and high investment, and requires an adequate physical space to provide advanced technology[4,5,8].

In relation to the patient, the benefits of using a hybrid OR include a simultaneous surgical approach with the performance of diagnostic and interventional procedures with the same anesthesia; less surgical trauma; lower rate of blood transfusion when compared to conventional surgery; increased security; and minimally invasive incisions, thus promoting a faster recovery and better aesthetics[4,5].

Given the current scenario, the present study reports the deployment and operation of a hybrid OR, which meets the

Source: Personal archive of the authors, with permission for publication by the institution.

Figure 1. Hybrid operating room of Hospital Israelita Albert Einstein (focus on physical space).

Source: Personal archive of the authors, with permission for publication by the institution.

Figure 2. Hybrid operating room of Hospital Israelita Albert Einstein (focus on equipment).

demands with advanced technology, aiming at safety and the immediate surgical treatment of patients.

OBJECTIVE

To report the experience of deployment and identify the demands of the operation of the hybrid OR of a private hospital in São Paulo.

METHOD

This is an experience report, combined with documentary research. The survey was conducted in a large general hospital of the private network, located in the southern area of São Paulo. The institution has two surgical centers (SC), one with 14 ORs and another with 21 (19 active), in which 3,000 procedures per month are carried out on an average. The hybrid room is located in the SC with 19 ORs, with 180 m², opened on September 24, 2013 (Figures 1 e 2).

The study sample was composed of information contained in the database of the SC, relating to 166 patients admitted for surgical procedures in the hybrid room, with 2 who did not undergo the proposed surgery, amounting to 164 patients operated in the hybrid OR in the period from September 24, 2013 to December 31, 2014. To gather the information in the SC database, we used an instrument, developed by the authors specifically for this research, which contains 16 items, divided into 3 parts: characterization of the sample (gender, age, diagnosis, comorbidities), information about the surgery (date, intervention proposed and carried out, puncture, use of contrast by ejector pump, removal of the introducer, hemostatic dressing or suture of the puncture, need for blood transfusion, surgery time, need for specific care in the immediate postoperative period), and use of the hybrid room (time and resources).

Data collection was carried out between March and June 2015, after approval of the research project by the Research Ethics Committee of the institution, via Platforma Brazil (CAAE – 39502814.7.0000.0071), and authorization by the manager of the two SCs. The results were analyzed quantitatively using statistical resources appropriate to the information collected, and were presented in absolute numbers and percentages.

RESULTS

In the period analyzed, 166 patients used the hybrid room, and two of them did undergo the proposed procedure because 1 had died after a cardiac arrest (before the surgery) and another had complications (acute pulmonary edema and arrhythmia), and the procedure was cancelled.

Of the 166 initial patients, 109 (65.7%) were male and 113 were elderly aged over 60 years (67.9%), predominantly in the age group of 71–80 years (42; 25.3%).

Regarding the diagnosis of the patients admitted to the hybrid OR, the higher incidence was of patients with aortic stenosis (43; 25.9%), followed by 35 with abdominal aortic aneurysm (21.1%), 19 with arterial obstruction (11.4%), and 15 with mitral insufficiency (9.0%). Other diseases occurred in less than 10 patients.

Regarding the presented comorbidities, systemic arterial hypertension stood out, present in 55 subjects of the sample (33.1%), followed by 23 patients with valvular heart diseases (13.9%) and 21 with diabetes mellitus (12.7%).

It is worth noting that, at this stage, the 166 patients enrolled in the 15-month period are being considered, since all were admitted to the hybrid room, though two of them did not undergo the surgery.

For periods in which the hybrid room was used the most, the months of March and April 2014 were the most prevalent, with 18 surgeries (11.0%) and 17 surgeries (10.4%), respectively, followed by the months of August, September, October, and December 2014 (8.0% each).

Regarding the surgery planned and conducted in the hybrid OR, according to the SC database, it was found that in all cases, the procedure performed was the same that was programmed. In this section, we consider the total of 164 patients who actually underwent surgery in the hybrid OR.

The cardiology specialty was the most frequent among the hybrid room procedures, with 116 surgeries (70.7%), followed by vascular (27 surgeries; 16.5%); gynecological and gastrointestinal tract (5 procedures each; 3.0%); pulmonary (4 surgeries; 2.4%); anesthesia (3 procedures; 1.8%); 2 transplants (1.3%); and 2 orthopedic procedures (1.2%). In cardiology, the most performed surgeries were endovascular aneurysm repair (21 procedures, 18.1%), stent implantation and aortic bioprosthesis (20; 17.2%), valve replacement (20; 17.2%), aortic aneurysm repair (19; 16.4%), and percutaneous valve implant (13; 11.2%). In vascular, the procedures that stood out were angioplasties of the

lower limbs (16; 59.3%). The other procedures occurred in fewer than 10 patients in each of the specialties.

Regarding the use of materials and equipment, the following results were obtained: the inguinal puncture was the most used by surgeons, with 117 (71.3%) procedures, among the 164 patients operated; the contrast ejector pump was used in a few cases (3 patients; 1.8%). By promoting greater pressure in the vessels, many surgeons choose to inject the contrast without using the pump, that is, it was up to the team to decide which was the best technique according to the particular patient.

On the removal of the introducer, it was observed that in 45 patients (27.4%), the introducer was removed within the range of approximately 10–15 minutes before or after the surgery; then they performed a pressure dressing and initiated the postoperative care.

The hemostatic dressing or sutures were performed in 49 patients (29.8%) who underwent surgery in the hybrid room, using Perclose® in most procedures.

There was the need for blood transfusion in a small percentage of patients (9; 5.4%), who received blood components in the OR. Of these 9 patients, 3 were submitted to ruptured abdominal aortic aneurysm repair procedure, in which the interaction of the team and the immediate conduct are extremely important for good results, since the incidence of death is very high.

The average duration of surgeries performed in the hybrid room were calculated, according to information obtained from the database. The mean duration of surgery was 3 hours and 21 minutes. It is necessary to clarify that of the 166 surgeries, one was canceled before the start of the procedure; therefore, the average length corresponds to the total of 165 surgeries.

The need for specific care in the immediate postoperative period occurs when surgical approach was arterial or venous, using a form that tracks the evolution of the patient every 30 minutes in the first two hours, which included the presence of bleeding and hematoma (present or absent), perfusion, and pulse (normal or reduced).

On the resources available in the hybrid OR, most procedures used Artis Zeego®, the C-arm, attached to a robot arm; X-ray with CT scanner image; extracorporeal circulation; audiovisual equipment; software with three-dimensional images; ultrasound device; echocardiography, and the Da Vinci® Robot. Thus, the resources available in the room were used by the teams, which facilitates and contributes to the satisfactory outcome of the procedure.

The average length of stay of patients in the hybrid room was 5 hours and 7 minutes, and the average was calculated for the 166 patients who remained in the OR during the study period. Two patients did not complete the procedure, but one remained in the room until the complication before the proposed procedure, and the other remained until presenting cardiorespiratory arrest and having their death confirmed by the medical team.

DISCUSSION

In this study, it was found that the deployment of the hybrid OR became allied with the success of surgical, hemodynamic, and high-complexity procedures. In the period of 15 months, 166 patients were treated in this SC, and 2 did not undergo the proposed procedure, as described in the results.

The patients were predominantly male: elderly, aged from 61 to 80 years, diagnosed with aortic stenosis. Studies report that aortic stenosis is the most common heart valve disease, with insidious origin, rapid progression, and high mortality rate if untreated, and usually occurs in patients over 75 years. The procedure of choice for the treatment of stenosis is aortic valve replacement. Ideally, the procedures are to be performed in hybrid rooms, or in a space suitable for this purpose, as the room provides great ergonomics, high technology, ease of access to the detailed anatomy, monitoring and rapid intervention in case of need for cardiopulmonary bypass[9].

Considering the patients with contraindications to conventional surgery due to high mortality rates, the use of the hybrid OR is highly indicated, as the technology infrastructure provides the team with interventions of greater precision, less trauma, better results, and fast recovery, which are considered benefits of this SC[9,10].

Regarding the space of the room, there is the possibility of operation of several teams in the same surgery, allowing the sum of their knowledge according to their expertise and experience, which contributes to a planned assistance. Its structure covers approximately 13 people in the same environment, remembering that the space facilitates the mobility of teams and promotes safety in an emergency, without the need of changing rooms, which would cause inconvenience and risk of complications[11].

Currently, the hybrid OR is only available in some institutions in Brazil, especially in big cities like São

Paulo. The Hospital do Coração (HCor) offers two hybrid rooms, one exclusively for cardiology and another for procedures in the neurological, orthopedic, and other specialties. The Hospital Israelita Albert Einstein (HIAE) has a room called the technology park, as it is equipped with cutting-edge technological infrastructure. In Belo Horizonte, Minas Gerais, the Mater Dei Hospital also has a hybrid room. The hybrid OR is gaining popularity, due to its ample and versatile environment, distributing its equipment and accessories in an organized form[11].

In this study, the procedures performed in the cardiology specialty, followed by vascular, were the most prominent. The OR was also used by doctors in the gynecology, gastrointestinal tract, lung staff, transplantation, anesthesia, and orthopedics specialties.

The most common procedures for interventional cardiology in the hybrid OR were endovascular aneurysm, stent implantation and aortic bioprosthetic, valve replacement (aortic and mitral), aortic aneurysm repair, and percutaneous valve implant. It also covers numerous procedures in cardiology[11].

Cardiac surgery has gained tremendous visibility compared to previous years. The evolution of technology with innovative techniques is promising in the treatment using minimally invasive techniques, such as the aid of a robotic system[10].

The use of robotics is through a console, guided by high-definition images, from which the surgeon controls the movements of a robot equipped with four flexible and articulated arms. The arms are properly fitted by a nursing professional who operates in the OR, usually a trained nurse or nursing technician. One arm of the robot has a camera that captures three-dimensional images, and the others manipulate special surgical instruments. The procedure is performed through small holes, similar to the conventional laparoscopy, but with an extremely detailed view of the internal structures and with perfection never seen before in this type of surgical procedure. These technological robots find their place in the hybrid OR, as most conventional rooms do not include such equipment[9-11]. The institution under study here has two Da Vinci® System robots.

Studies[9-11] have shown the need for qualified and trained professionals to work in hybrid ORs, as the great difficulty in the learning curve and the high costs have limited these procedures to a few centers in the world. But professional interest in the access to these rooms has raised significant issues regarding the standardization of materials and the number of people needed. The nurses who work in the hybrid OR must be constantly learning, because the room has differentiated technologies and features that require great attention and responsibility[9-11].

Due to the high cost, the need of knowledge for handling equipment, care, and diligence are of paramount importance to the proper functioning of the room. Professionals should keep the organization accessories, equipment, and parts properly identified and sanitized in order to facilitate the work in highly complex procedures.

The technological resources available in this room are being increasingly exploited by the medical teams. In this study, there was a significant incidence of use of equipment and accessories, and, in most procedures, the following were used: Artis Zeego®, C-arm, attached to a robot arm with almost 360-degree movements, as well as the X-ray device that simulates a CT scanner with accurate image, radiolucent operating table, with full flexibility for accurate and comfortable movements; cutting edge extracorporeal circulation; audiovisual equipment, with monitors that distribute the images according to the need of the team, software resources with three-dimensional reconstruction of images used in real time, ultrasound device, echocardiography, and Da Vinci® Robot[10,11].

The deployment of the hybrid room is an innovative concept, which promotes integration of the entire team, plus the latest resources to help guide the best approach for treatment. It is being increasingly used and sought, as it is able to support various diseases and peculiarities, integrating two surgical times (diagnostic and therapeutic), in which the precision and the involvement of all professionals provide security to the surgery and allow the team to rapidly assess the clinical outcome.

Thus, we must consider that the involvement, empowerment, and training of all professionals working in the hybrid room are indispensable to a successful treatment[9-11].

CONCLUSION

The experience of the deployment of a hybrid OS in a private institution in São Paulo has proven useful and effective, and is being used by teams of different specialties working together, sharing experiences in the search for better treatments with satisfactory results. Advanced technology provides the involvement of professionals who conduct surgical, hemodynamic, and high-complexity procedures.

This study found that in the period between September 24, 2013 and December 31, 2014 (15 months), the operating demand for use of the hybrid OR was of 166 patients. The patients were usually male, elderly, and diagnosed with aortic stenosis.

The largest number of surgeries was conducted in March and April 2014, in the cardiology and vascular specialties. In cardiology, the procedures for aortic aneurysms repairs (endovascular and conventional), aortic prosthesis implantation, and valve replacement (percutaneous and conventional) were the most prominent; and, in vascular, it was angioplasty of the lower limbs. Among the features most used in the hybrid room are ArtisZeego®, C-arm, extracorporeal circulation, audiovisual equipment, software with three-dimensional images, ultrasound, echocardiography and Da Vinci® Robot.

Thus, the hybrid OR is already present in some institutions in Brazil, and the performance of the team should be constantly evolving in learning, because the difficulties in forming and training professionals, as well as the high cost, have limited these procedures to a few centers in the world.

REFERENCES

1. Lima GF, Rinaldi PA, Catunda KA, Bittar E, Bianchi ERF. Atuação do enfermeiro na estruturação e implantação de uma sala operatória híbrida. Rev SOBECC. 2014;19(2):110-8.
2. Galhardo Junior C. Sala cirúrgica híbrida: uma nova realidade no Brasil e no mundo. Rev Bras Cardiol. 2013;26(1):8-10.
3. Feldman LB, Gatto MAF, Cunha ICKO. História da evolução da qualidade hospitalar: dos padrões a acreditação. Acta Paul Enferm. 2005;18(2):213-9.
4. Poffo R, Celullare AL. Cirurgia de revascularização do miocárdio minimamente invasiva. Arq Bras Cardiol. 2012;99(3):778-9.
5. Ingrund JC, Nasser F, Jesus-Silva SG, Limaco RP, Galastri FL, Burihan MC, et al. Tratamento híbrido das doenças complexas da aorta torácica. Rev Bras Cir Cardiovasc. 2010;25(3):303-10.
6. Murayama Y, Arakawa H, Ishibashi T, Kawamura D, Ebara M, Irie K, et al. Combined surgical and endovascular treatment of complex cerebrovascular diseases in the hybrid operating room. J Neurointerv Surg. 2013;5(5):489-93.
7. Hudorovic N, Rogan SA, Lovricevic I, Zovak M, Schmidt S. The vascular hybrid room: operating room of the future. Acta Clin Croat. 2010;49(3):289-98.
8. Nollert G, Hartkens T, Figel A, Bulitta C, Altenbeck F, Gerhard V. The hybrid operating room. In: Narin C (Ed.). Special Topics in Cardiac Surgery [Internet]. InTech; 2012 [citado 2015 fev. 15]. p. 73-106. Disponível em: http://cdn.intechopen.com/pdfs/30184/InTech-The_hybrid_operating_room.pdf
9. Grando TA, Sarmento-Leite R, Prates PRL, Gomes CR, Specht F, Gheller AS, et al. Manejo anestésico e complicações no implante percutâneo de válvula aórtica. Rev Bras Anestesiol. 2013;63(3):279-86.
10. Dallan LAO, Jatene FB. Revascularização miocárdica no século XXI. Rev Bras Cir Cardiovasc. 2013;28(1):137-44.
11. Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização. Salas híbridas: um diferencial hoje, indispensável amanhã [Internet]. SOBECC com Você. 2015 [citado 2015 jul. 30];2(2):10-5. Disponível em: http://issuu.com/aureasouto/docs/sobecc-com-vc-ano2nii

ANALYSIS OF THE USE OF SURGICAL INSTRUMENTS MARKING TAPES: INTEGRATIVE REVIEW*

Análise do uso de fitas de marcação de instrumentais cirúrgicos: revisão integrativa

Análisis del uso de cintas adhesivas de marcación de los instrumentos quirúrgicos: revisión integradora

Carla Aparecida do Nascimento Mozer[1], Giovana Abrahão de Araújo Moriya[2]

ABSTRACT: Objective: Identify articles related to the use of surgical instruments marking tapes and describe best practices for their use. **Method:** Integrative literature review of articles hosted on the Virtual Health Library (BVS), with research on the website and group of online discussions of the *Association of periOperitative Registered Nurses* (AORN) and use of reverse search of publications. Written studies in Portuguese, English, and Spanish, with no specific time frame, which present information related to the use of instrumental marking tape and had their full texts online accepted. **Results:** Thirteen articles that addressed risks and benefits concerning the use of marking tapes were found. **Conclusion:** The integrative review highlighted studies are scarce and the few existing articles show low levels of scientific evidence, not offering strong enough degrees of recommendations to support the decision making process.
Keywords: Surgical instruments. Equipment and supplies labeling. Sterilization.

RESUMO: Objetivo: Identificar artigos relacionados ao uso de fitas de marcação de instrumental cirúrgico e descrever boas práticas para o seu uso. **Método:** Revisão integrativa da literatura de artigos hospedados na Biblioteca Virtual em Saúde (BVS), com pesquisas no site e grupo de discussão *online* da *Association of periOperitative Registered Nurses* (AORN) e utilização da busca inversa de publicações. Foram aceitos estudos escritos nos idiomas português, inglês e espanhol, sem recorte temporal, que apresentassem informações relacionadas ao uso da fita de marcação de instrumental e que dispunham seus textos completos via *online*. **Resultados:** Foram encontrados 13 artigos que abordaram o perigo e os benefícios quanto ao seu uso. **Conclusão:** A revisão integrativa permitiu evidenciar que os estudos são escassos e os poucos trabalhos existentes possuem níveis de evidências científicas baixos, não oferecendo graus de recomendações fortes o suficiente para auxiliar a tomada de decisão prática.
Palavras-chave: Instrumentos cirúrgicos. Rotulagem de equipamentos e provisões. Esterilização.

RESUMEN: Objetivo: Identificar los artículos relacionados con el uso de las cintas adhesivas de marcación de los instrumentos quirúrgicos y describir las buenas prácticas para su uso. **Métodos:** Revisión integradora de la literatura de los artículos alojados en la Biblioteca Virtual en Salud (BVS), con búsqueda en el sitio y en los grupos de discusión de la Asociación de Enfermeras Registradas de Peri-operación (AORN), y el uso de búsqueda inversa de las publicaciones. Fueron aceptos estudios en los idiomas portugués, inglés y español, sin un exacto período de tiempo, los cuales presentaban información relacionada con el uso de la cinta adhesiva de marcación instrumental y que tenían sus textos completos a través de la Internet. **Resultados:** Se encontraron 13 artículos que abordan los riesgos y los beneficios del su uso. **Conclusión:** La revisión integradora ha puesto de relieve que los estudios son escasos y los pocos trabajos existentes tienen bajos niveles de evidencia científica, y por eso no ofrecen grados de recomendaciones suficientemente fuertes para ayudar a la toma de decisiones práctica.
Palabras clave: Instrumentos quirúrgicos. Etiquetado de equipos y suministros. Esterilización.

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[1]Nurse. Specialist in Nursing in Surgical Center, Anesthetic Recovery and Material and Sterilization Center for FICSAE. Coordinator of the Surgical Center of the *Hospital Evangélico de Cachoeiro de Itapemirim* (HECI) – Cachoeiro de Itapemirim (ES), Brazil.
Rua Anacleto Ramos, 23 – Ferroviários – CEP: 29308-022 – Cachoeiro de Itapemirim (ES), Brasil. E-mail: carlaanmozer@hotmail.com
[2]Nurse. PhD in Science from the School of Nursing of the *Universidade de São Paulo* (EEUSP). Professor of Postgraduate Courses of FICSAE and *Centro Universitário São Camilo*, and of MBA of the *Faculdade Método de São Paulo* (FAMESP). Coordinator of the Material and Sterilization Center of *Hospital Israelita Albert Einstein* (HIAE) – São Paulo (SP), Brazil. E-mail: giovanaaanm@einstein.br
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INTRODUCTION

The material and sterilization center (MSC) is described as a processing unit (cleaning, disinfection, preparation, and sterilization) of health products serving various sectors within the hospital setting[1]. Among the activities carried out in the MSC, the process of traceability of processed materials is a *sine qua non* condition. This process is even determined by Brazilian legislation for quality assurance and safety of care, even if indirectly, legally endorsing the MSC as a way to demonstrate that best practices were applied[1-4]. The first global challenge for patient safety focused on the prevention of infections related to health care; the second challenge, with the theme "Safe Surgery Saves Lives", further strengthens this requirement that the MSC will guarantee the supply of products for health free of pathogens, corroborating with the objective of a patient free from infections[5].

There are many ways of promoting the traceability of the instruments efficiently, but what they have in common is the need for a methodical and well-structured system[6]. Some methods allow, through computerization of the process, the rapid and efficient traceability of the instruments. However, the cost may be too high when compared to manual tracing of data[7]. An example is the use of DataMatrix, a two-dimensional graphical representation code that stores information much smaller than the conventional bar code spaces[7]. Manual process of identification allows little confidence in traceability of the instruments; however, the cost is much lower. The advantage is that in both cases, rules and regulations are fully met[7].

Being the possibility of using the tool for computerized traceability a distant reality to the MSCs in the national territory[7], one of the traceability systems widely used is the marking of surgical instruments using identifying elements, such as colorful ribbons. Such identification is physically held in the instruments, tape involving a small portion of them, coding them by color. Thus, it is possible to segregate each instrumentation group or boxes/kits by different color labels, visually facilitating the manual count and assembly of boxes/appropriate kits. However, there are anecdotal reports of dissatisfaction with this product from everyday practice users, such as difficulty of standardization and frequency of change of these tapes, since there is the ease of drying and fading of the tapes over time, which may favor the accumulation of dirt and even increase the risk of detachment, allowing them to fall in the surgical area. Existing information is vague and do not please MSC nurses. Therefore, in view of that, even though being widely used and marketed, there is no scientific data on Brazilian literature showing recommendations on the use of the tapes, which raised the following question: Are the surgical instruments marking tapes safe to be used in the daily practice of the MSC?

This article proposes to identify studies related to the use of surgical instruments marking tapes, supporting the practice in Brazilians MSCs which use the coding by tapes methodology on surgical instruments.

OBJECTIVE

Identify studies in the literature related to the use of tapes used for marking surgical instruments and the evidence in relation to the risks and good practices of their use.

METHOD

This is an integrative literature review, which seeks to synthesize information from various published studies to provide evidence for clinical practice[8]. This study was conducted in six stages, following the recommendations already well established in the literature, namely: elaboration of guiding question, preparation of data search criteria, definition of information to be extracted from selected studies, evaluation of the included studies, interpretation of results, and synthesis of knowledge[8]. To find studies, a search was performed for scientific articles hosted on the Virtual Health Library (BVS), which provides high scientific research content arising from reference databases in different areas of health such as Latin American Literature in Health Sciences in Latin America and the Caribbean (LILACS), Spanish Bibliographic Index of Health Sciences (IBECS), International Literature in Health Sciences (MEDLINE), Cochrane Library, Scientific Electronic Library Online (SciELO), and a Database of Nursing (BDENF). To this end, descriptors in Portuguese via Descriptors in Health Sciences (DeCS) were utilized, obeying the following combinations: labeling of equipment and supplies AND surgical

instruments; risk management AND surgical instruments; bacterial infections AND surgical instruments; foreign bodies AND surgical instruments; color AND surgical instruments, equipment and supplies AND surgical instruments; sterilization AND surgical instruments; color AND sterilization were used.

Separately, the website of the *Association of periOperitative Registered Nurses* (AORN) has been consulted to find studies not identified in the initial search. In addition, there are discussion groups and other publications that are not disclosed in MEDLINE in that website. Thus, to further expand the search results, a search was conducted in the AORN website (AORN Journal and discussion forums). Initially, the DeCS in Portuguese was used to perform the search, but due to the difficulty in finding results, the following descriptors in English not registered in DeCS, but that relate to the theme, were chosen: *instrument tape* AND *marking tape*; *instrument tape* AND *sterilization*; *instrument tape* AND *color-coded tape*.

To complement the search, a survey was conducted in the online editions of SOBECC Journal, official publication of the Brazilian Association of Nurses of Surgical Center, Anesthesia Recovery and Materials and Sterilization Center. Still, a reverse search in which its selecting method was analyzing references of articles previously included was performed.

Data collection was conducted from August to November 2015 by a reviewer who assessed the title and then the abstract of the articles. As a selection criteria, articles published in Spanish, English, and Portuguese, with no specific time frame, which presented information related to the use of surgical instruments marking tapes, and had their full texts *online*, available for free or not, were accepted. Articles published in another foreign language and that had no correlation with the theme of the study were excluded.

Initially, there was a primary search through selection of article title and those that related to the theme were included, so their abstracts were analyzed. Proving the connection of the abstract with the objectives of the research, these articles went through a complete scan, and then data were transcribed into a data collection form. We opted for a data collection form already validated for this type of research methodology[8,9] to be able to stratify important information.

Critical evaluation of studies was performed by use of classification table for grading the level of scientific evidence by type of study of the *Oxford Center for Evidence Based Medicine*[10]. For the presentation of results, a table summarizing the information was elaborated.

RESULTS

Search strategy provided a total of 2,639 references. From this result, 218 articles were excluded by the criteria of language. Of the 2,421 studies included by language, 2,355 studies were excluded by the title, leaving 66 publications to be evaluated by the summary, of which 16 publications were included. From this result, studies have undergone an evaluation by the other inclusion criteria, and 13 publications have been accepted for this review, because they met all specifications.

Search sources that tested positive were: search on the BVS site (of 2,135 articles identified, 5 were included), search on the AORN site (270 studies identified, seven were included), and the reverse search methodology (45 references evaluated, one was included). Chart 1 presents a summary of the studies found. Regarding their characteristics, 12 articles were published in English and one in Spanish. Year of publication ranged from 1983 and 2013; however, it is noted that one publication did not mention this information. The methodological design was not mentioned in eight publications. Of the articles that clearly elucidated the methodological design, two of them used experimental design (case–control) and three used case report.

Some publications were extracted from studies or reports published by AORN. Regarding the content, two articles provide information about the benefits of using instruments marking tape. One article assessed whether a sterilization method is suitable for the safe use of the tape. Three studies reported adverse events. Six publications reported the opinion of AORN on questioning of nurses, and one publication was didactic material to be used for employees' training in the area. Sample of studies obtained did not include the best levels of scientific evidence: three articles were classified as grade of recommendation C (evidence level 4), two studies were classified as level B recommendation (evidence level 3B), and eight publications obtained classification D (evidence level 5). However, because there are controversial issues and they portray exactly the same issue of this study, they were inserted.

Chart 1. Summary of the studies included in the integrative review on the use of tape for identifying surgical instruments.

Degree of recommendation (level of evidence)	Journal (year)	Objective	Methodology	Results
C (4)	Journal of Oral and Maxillofacial Surgery (1993)	Presenting the risks produced by the use of tape with color code for marking instruments	Case report	Four of six patients undergoing vestibuloplasty, using instruments marked with surgical tape showed postoperative subcutaneous abscess, with positive cultures similar to those found in the instruments with tapes. In another case, after an oroantral fistula closure surgery, a piece of tape arising out of a misplaced tape in one of antral curettes was found after removal of dressing[11]
C (4)	British Journal of Surgery (1987)	Report the danger of the use of colored plastic tapes to mark surgical instruments	Case report	Four days after the completion of a tracheostomy without complications, the patient began to present bleeding through a tracheostomy tube, and in-depth investigation identified a blood clot. After its removal, a piece of plastic marking tape was identified next to it[12]
B (3B)	Journal Healthcare Materials Management (1993)	Assess whether the flash sterilization is suitable for instruments identified with color-coded tapes	Experimental, control case	All control group disks containing *Bacillus stearothermophilus* spores that were in contact with the instruments but not subjected to sterilization were positive for growth, as expected. But none of the disks that were in contact with the instruments and with the tape after sterilization in flash cycle showed any growth[13]
D (5)	AORN Journal (1996)	Clarify the question if, in the sterilization flash cycle for 3 min, the instruments marked with tape are actually sterilized	Without scientific methodology. Nurses questions answered by AORN	AORN does not recommend the use of color coding tapes in surgical instruments. Color coding tapes wear out quickly, and ensuring sterility of these coding tapes can be difficult. A 10 min sterilization cycle is required when combining porous and nonporous items. It would be better to consider another method for "coding" of surgical instruments and instruments sets[14]
D (5)	AORN Journal (1996)	Without a purpose set	Without scientific methodology	Color code has made screening, organization, and identification work of instruments a more manageable task for perioperative nurses and members of the support staff who may be less familiar with surgical instruments[15]
D (5)	AORN Journal (1998)	Clarify whether or not the use of marking surgical instruments with tape is a concern	Without scientific methodology. Nurses questions answered by AORN	The tape should be both permeable to vapor and ethylene oxide gas to ensure sterility. The area under the nonpermeable tape is considered nonsterile; Therefore, a tape not permeable to vapor becomes worn and breaks, which can exposed it If it is difficult to establish and monitor a program to deal with these concerns, another method of "coding" should be considered[16]
D (5)	AORN Journal (2003)	Clarify whether flash cycle for 3 min is acceptable if there are no porous items on the tray	Without scientific methodology. Nurses questions answered by AORN	The instrument tape must be porous and permeable to vapor or gas. Whenever there is tape on load, the load contains porous articles and flash sterilizing must be used with the cycle recommended for porous items. If using a gravitational autoclave, the correct cycle is 10 min at 132–133°C. If using a prevacuum autoclave, the correct cycle is 4 min at 132–133°C[17]
D (5)	AORN Journal (2004)	Clarify whether it is acceptable a flash cycle for 3 min in a pan with instruments both marked and unmarked with tape	Without scientific methodology. Nurses questions answered by AORN	Knowing that the marking tape is porous, surgical instruments must be sterilized as porous items. AORN recommends using the flash cycle for porous articles[18]

Continue...

Chart 1. Continuation.

Degree of recommendation (level of evidence)	Journal (year)	Objective	Methodology	Results
B (3B)	Children's Medicine (2008)	To investigate whether the marking tapes can avoid the risk of exchange of elements of the surgical case and reduce their preparation time	Experimental, control case	There was a decrease in the time of preparation of cases and reduction of irregularities in the organization of surgical cases when instruments marking tapes were used[19]
D (5)	AORN Journal (2010)	Clarify the question of whether factors should be considered in the use of instruments marking tapes and if flash sterilization for 3 min is acceptable for instruments marked with tape	Without scientific methodology. Nurses questions answered by AORN	Marking system must be validated with the types of sterilization methods used and should be permeable to allow the sterilant contact with the surface beneath the tape. As the marking tape with color code wears out, the piece of tape may break up and be left in a surgical wound. Continuous monitoring of marking tapes is advisable to detect any degradation. As for flash sterilization of a porous and nonporous product combined, the porous sterilization time parameter should be used. See manufacturer's specific instructions. They should be carefully followed to determine the correct cycle[20]
C (4)	Patient Safety in Surgery Journal (2013)	Check if it is true that the practices of identifying surgical instruments using tape may expose patients to a *never event*	Case report	The fragmentation of tape during surgery can end up as a "foreign" object in the patient. During surgery, a fragmentation of the tape was not detected by the surgical team. But in this case, at the end of the procedure, the surgical team accidentally found and recovered a foreign body in the wound before closing. Inspection of the foreign object identified that it was the marking tape of surgical scissors[21]
D (5)	AORN Journal (2013)	Clarify the question of how and what factors should be considered for surgical instruments to be marked to identify which group they belong	Without scientific methodology. Nurses questions answered by AORN	About instrumental marking tape, the benefits: the tape is easy to apply and there is no outsourcing process. The risks: repeated sterilization cycles can make the tape move or become brittle, falling into the operative field and become a foreign body. The tape may not be permeable to all types of sterilizing agents, restricting the method of sterilization. And color-blind individuals working in sterile processing department may be unable to determine the correct color tape. Regarding costs, it is low, but as the tape is a porous material, the processing time of a sterilization load may need to be increased[22]
D (5)	Aesculap Academy (not reported)	Review the benefits of marking instruments and describe common methods of marking instruments	Without scientific methodology. Is a didactic material of the Aesculap Academy	The use of tape is a fast, simple way to mark an instrument. The varieties of colors available allow employees to easily know which box the instrument belongs. For example, instruments marked in red belong to cardiology sets. The marking is not a permanent coding solution. Over time, the warmth of the sterilizer will cause the tape to becomes brittle, and then it will be necessary to recode the instrument. When the tape starts to curl, it must be completely removed[23]

AORN: *Association of periOperative Registered Nurses.*

DISCUSSION

By the evidence already published, discussion on the use of surgical instruments marking tapes is old and remains a controversy today. Both positive and negative information related to the use of the tapes have been identified.

Negative aspects

After various reprocesses, marking tapes may show changes in their coloring[14,16]. In addition, this discoloration will result in exposure of adhesive tape residue, which is difficult to remove[16]. However, employees who work in the MSC may present difficulties in differentiating between certain colors of tapes, especially the colorblind, which could lead to errors in the assembly of the surgical cases[22].

Another negative point is changes in tape positioning on the instrument, which may also occur due to repeated sterilizations[18,20,22]. When this happens, the tape adhesive residue will be exposed on the surface of the instrument, making it difficult to remove[18,20,22].

However, a bigger concern is drying of the marking tape, which is a process that occurs in reprocessing of the marked instrument. Over time, heat of repeated cycles of sterilization can make the tape fragile, allowing it to break or peel[22,23]. A guideline concerning the limit of cycles of sterilization that the tape would support was not found in the literature. It was only mentioned that such making tapes wear out quickly[16.18]. One of the main concerns involved in these aspects is related to risk of lodging of microorganisms below loose or moved tapes[11].

Another issue is that dryness raises possibility of pieces of tape to detach from the instrument during surgery. If not identified by the surgical team, this pieces may remain missing in the surgical wound, exposing the patient and the surgical team to the risk of retained foreign body[11,14,16,18,20-23]. Another aspect to be highlight concerning a retained tape is its radiolucent characteristic, so that once inside, it may escape radiographic detection pattern[21]. Thus, a marking tape fragment when retained in the patient's body may be undetectable and expose it to the risk of local inflammatory reactions[21]. Three articles presented adverse event reports concerning the retention of marking tape fragments in the research carried out. In one of the reports, during the end of a procedure, prior to closing of the surgical wound, the surgical team accidentally found and recovered a fragment of the marking tape of a surgical scissors. Fortuitously, the foreign body was recovered[21]. However, it is doubtful that every piece of detached tape has been recovered. Of course, the team will recover the fragment that could be visualized, but will not know in how many parts the tape was fragmented.

In another study, there was a report of a patient with a serious complication subsequent to a tracheostomy that was carried out uneventfully. After four days, there was a major bleeding through the tube of the tracheostomy. In the clinical assessment, a blood clot was identified, and beside it was a piece of instruments marking tape[12]. In a different article, six patients undergoing vestibuloplasty in which surgical instruments marked with tape were used, four patients presented postoperative subcutaneous abscess. The four patients cultures were harvested and all tested positive for the same etiological agent, *Staphylococcus epidermidis*, suspecting that the source for these infections was common. By distrust of surgical instruments used in surgery, cultures were also obtained from them. Results of the tips of the instruments were negative. However, cultures of the handles of the instruments, in which there were marking tapes, were positive.

In addition to this, there is a report of another surgery in which a marking tape fragment was found. Oroantral fistula closure surgery presents a difficult surgical field to be viewed due to inaccessible areas for a direct visual inspection. After a few days, to surprise, in removing the bandage, a 1.0x0.5 cm marking tape piece was stuck. Examination of the surgical instruments found that the fragment had detached from one of antral curettes. There was no postsurgical complications in this case, but a fistula closure failure could occur if the fragment had remained trapped in the cavity[11].

Another negative aspect is that the marking tape may not be permeable to all types of sterilizing agents, restricting the method of sterilization[22]. Regarding the characteristic of the marking tape, it must be porous to the vapor of sterilant gas. Therefore, if the tape is not porous, the sterilant will not penetrate the tape and will not sterilize under it[18,20,22]. An article from 1993[13] included in this research studied whether it is possible to sterilize with the flash cycle (3 minutes in 135°C heat) the

area below the marking tape when it is attached to surgical instruments. Motivation of this study came from a letter published in the AORN Journal, which stated that the area beneath the tape could not be sterilized. However, this conclusion was derived from intuitive reasoning, not an experimental evidence. In the experiment, *Bacillus stearothermophilus* spores discs were placed between the tape and the instruments. Since these spores are extremely resistant to heat, the lack of spores after sterilization would indicate that conditions are appropriate for complete sterilization. Instruments for the control and experimental groups were segregated. In the control group, the instruments have not gone through sterilization and, as expected, all spore discs that were in contact with the instruments and tape were positive for growth. In the experimental group, in which instruments were sterilized, no discs showed no growth[13]. However, this study has a degree of recommendation B (evidence level 3B).

Finally, on the acceptability of the use of the tapes, we found no positioning of SOBECC. On the other hand, AORN does not recommend nor condemns the use of these tapes, but provides good practices for the institution that opt for this method[16,20].

Positive aspects

Varied colors of marking tape are available on the market and this allows various combinations in the classification of surgical instruments. For example, instruments marked in red belong to the set of cardiology, and those marked with blue tape belong to the obstetrics boxes[23]. This positive aspect provides the organization of instrumental by box, by group of surgery, by surgeon, by department, etc. The scalability in the use of the tape is proportional to the creativity of the combinations that the nurse's management unit manages to obtain.

In general, the codification of instruments by means of marking with tape has made the job of sorting, organizing, and identifying instruments a task more manageable for both the nurses involved and for the support team, which may be less familiar with the surgical instruments[15]. Even employees who are not familiar with the instrumental can prepare efficient surgical boxes for sterilization[11].

In the survey, an article that specifically aimed at evaluating the marking tape functionality to avoid the risk of exchange of instruments of surgical cases and reduce their preparation time was found. For this, 15 surgical cases that had their surgical instruments identified with colored ribbons and 15 surgical cases that did not have the instruments identified with any method were used. The results were positive for the cases that had instruments marked with tape. There was a decrease in the time of preparation of cases and irregularities in the organization of them. Rapid identification of surgical instruments for its specialty facilitates their preparation and organization[19]. These benefits ultimately generate greater employee performance and optimization of working time spent at the stage of preparation of the surgical cases[19].

Regarding marking of surgical instruments with the tape, it is easy to be performed and it is not necessary to send the instrumental to a contractor to perform this service. Thus, there is a reduction of cost and downtime of the instruments, when compared to another method of labeling[22]. However, the benefits derived during the preparation of instruments are negligible when the patient is unnecessarily exposed to the risk of retention of a fragment of the tape[11].

On the analysis of risk, benefit and cost for use of marking tape, cost of tape has a low investment compared to other instruments' marking methods. As the tape is considered a porous material, time of sterilization may be increased, leading to an increase in the cost and time of inactivity of the instrument. Furthermore, the tape should be inspected so there is no risk to patients, and this will increase the time of decontamination and replacement of tapes, and thereby increasing the cost of labor[22].

Progress of studies related to the theme of this integrative review was not sufficient to affirm or deny that the use of tape for marking of surgical instruments is safe. Identified studies have low levels of evidence (some are old and without methodological rigor) and therefore cannot make recommendations as to the marking tapes use. New study proposals should be conducted to demystify the use of the tapes.

CONCLUSION

This integrative review allowed identifying that studies on the theme are scarce and the few existing articles

on the marking of surgical instruments through tapes have low levels of scientific evidence. Thus, they do not offer strong enough degrees of recommendation to support the decision-making process. Publications studied indicate that there are still differences between favorable and unfavorable studies. There are benefits arising from the use of instruments marked with tapes; however, there is also evidence indicating adverse events related to their fragmentation.

Considering safety as a fundamental condition for health practice, the results of this research show that more investment in rigorously constructed studies on the practice of using instrumental marking tapes are needed to contribute to the findings of this research. An institution that chooses to use the marking tapes as a method of managing the surgical instruments should adopt a constant supervision of the work attitude of each employee who works in the operating room, because the fragility of the process requires constant inspection at each stage of processing of materials as well as in the operating room. Such supervision work reflects and directly influences the feasibility of safe practice to surgical patients, even if indirectly, and allows identifying flaws in the process and developing preventive actions, resulting in quality and safety to surgical patients, something that has been pursued in our midst.

REFERENCES

1. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária (ANVISA). Resolução nº 15, de 15 de março de 2012. Dispõe sobre requisitos de boas práticas para o processamento de produtos para saúde e dá outras providências. Brasília; 2012 [acesso em 09 fev. 2015]. Disponível em: http://portal.anvisa.gov.br/wps/wcm/connect/7599770043e684468b198f45f4f7d4e4/rdc0015_15_03_2012.pdf?MOD=AJPERES

2. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária (ANVISA). Resolução nº 2, de 25 de janeiro de 2010. Dispõe sobre o gerenciamento de tecnologias em saúde em estabelecimentos de saúde. Brasília; 2010 [acesso em 09 fev. 2015]. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2010/res0002_25_01_2010.html

3. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária (ANVISA). Resolução nº 8, de 27 de fevereiro de 2009. Dispõe sobre as medidas para redução da ocorrência de infecções por Microbactérias de Crescimento Rápido - MCR em serviços de saúde [Internet]. Brasília; 2009 [acesso em 09 fev. 2015]. Disponível em: http://portal.anvisa.gov.br/wps/wcm/connect/3a2f9100441779c4b880b87fd74dce9e/rdc0008_27_02_2009.pdf?MOD=AJPERES

4. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária (ANVISA). Resolução nº 2606, de 11 de agosto de 2006. Dispõe sobre as diretrizes para elaboração, validação e implantação de protocolos de reprocessamento de produtos médicos e dá outras providências [internet]. Brasília; 2006 [acesso em 09 fev. 2015]. Disponível em: http://portal.anvisa.gov.br/wps/wcm/connect/d7e6dd80474588e592bcd63fbc4c6735/RE+N%C2%B0+2.606,+DE+11+DE+AGOSTO+DE+2006.pdf?MOD=AJPERES

5. Carvalho Junior DC. Interface do processamento de materiais na central de material e esterilização e a segurança do paciente em um hospital do sul do país [dissertação]. Florianópolis: Universidade Federal de Santa Catarina; 2012. Disponível em: https://repositorio.ufsc.br/handle/123456789/99339

6. Duarte NCM. Estudo da rastreabilidade nos processos de materiais consignados em um hospital de alta complexidade na cidade de Ribeirão Preto [trabalho de conclusão de curso]. Ribeirão Preto: Universidade de São Paulo; 2011. Disponível em: http://www.tcc.sc.usp.br/tce/disponiveis/81/810021/tce-12062013-091907/?&lang=br

7. Barbosa GS. Atualização e tendências em centro de material e esterilização (CME)/tecnologia da informação em CME. In: Carvalho R (coord). Enfermagem em centro de material, biossegurança e bioética. Barueri: Manole; 2015. p. 155-7.

8. Mendes KDS, Silveira RRCCP, Galvão CM. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem. Texto Contexto Enferm. 2008;17(4):758-64.

9. Ursi ES. Prevenção de lesões de pele no perioperatório: revisão integrativa da literatura [dissertação]. Ribeirão Preto: Universidade de São Paulo; 2005. Disponível em: http://www.teses.usp.br/teses/disponiveis/22/22132/tde-18072005-095456/pt-br.php

10. Phillips B, Ball C, Sackett D, Badenoch D, Straus S, Haynes B, et al. Oxford Centre for Evidence-Based Medicine: Levels of Evidence (March 2009) [Internet]. 2009 [acesso em 27 mar. 2016]. Disponível em: http://www.cebm.net/index.aspx?o=1025

11. Samit A, Dodson R. Instrument-marking tapes: an unnecessary hazard. J Oral Maxillofac Surg. 1983;41(10):687-88.

12. Kraayenbrink M, Baer ST, Jenkins JG, Moore-Gillon V. Serious hazard of plastic coding tape on surgical instruments. Br J Surg. 1987;74(8):696.

13. Kostyal DA ,Verhage JM , Beezhold DH, Beck WC. Flash sterilization and instrument tape--an experimental study. J Healthc Mater Manage. 1993;11(9):34-5.

14. Moss R. Hair found in sterile packages - scrub attire - nurse staffing levels - or air pressures - surgical coding tapes. AORN J. 1996;63(2):453-56.

15. Stewart C. Color-coding tapes. AORN J. 1996;64(1):21.

16. Conner R. OR documentation; discharging patients; color-coding tape; opening sterile supplies; cleaning equipment. AORN J. 1998;68(4):670,672-73.

17. Fogg D. Hand-rub agents - patient skin prep - smallpox vaccine - instrument tape - cardiac catheterization laboratory. AORN J. 2003;77(4):836,838,841-43. http://www.aornjournal.org/article/S0001-2092(06)60803-X/fulltext

18. Conner R. Aseptic technique; electrosurgical safety; abbreviations; instrument marking tape; medication security. AORN J. 2004;79(5):1021-4.

19. Bortolato DL, Martelli A, Acoria N, Martinez E, Gamarra J. El encintado como método de controldel instrumental quirúrgico. Med Infant. 2008;15(3):240-2.

20. Petersen C, Blanchard J. Clinical Issues – November 2010. AORN J. 2010;92(5):585-90.

21. Ipaktchi K, Kolnik A, Messina M, Banegas R, Livermore M, Price C. Current surgical instrument labeling techniques may increase the risk of unintentionally retained foreign objects a hypothesis. Paciente Saf Surg. 2013;7(31):1-4.

22. Burlingame BL. Clinical Issues – November 2013. AORN J. 2013;98(5):538-46.

23. Balcerek L. Instrument Marking Systems. Estados Unidos Purdue University: Aesculap Academy. Disponível em: https://www.distance.purdue.edu/training/cssp/cis/pdf/CIS229.pdf

KNOTED GUIDEWIRE IN PERIPHERALLY INSERTED CENTRAL CATHETERS (PICC): A RARE COMPLICATION

Enovelamento do fio guia em cateter central de inserção periférica (PICC): rara complicação

Enredado del alambre guía en el catéter central de la inserción periférica (PICC): complicación infrecuente

Sirlene Cristina de Almeida Santos[1], Ana Paula Rolim[1], Nicole Acácia Cabral Nunes[2], Elena Bohomol[3], Manoel Carlos Prieto Velhote[4]

ABSTRACT: Objective: To report the experience of a multiprofessional team on the management of an adverse event after the insertion of a peripherally inserted central catheter (PICC) because of the retention of the metallic guidewire. **Method:** An experience report concerning an occurrence at a general hospital in the city of Guarulhos, São Paulo, Brazil, in November 2015. **Results:** Description of the case of a 1-year-old infant, with hemophilia and neuropathy, who had its guidewire held after the insertion of a PICC 3F in the forearm without incidents, which made its removal impossible. Radioscopy revealed that the guidewire was curled up and had to be surgically removed. **Conclusion:** The surgical procedure was successful. There was no blood loss in the operating field. The infant recovered well, without any consequences detected because of the complication. The manufacturer was notified of the event. This case served as a learning experience for the multiprofessional team.

Keywords: Catheters. Complications. Surgical procedures, operative. Patient care team.

RESUMO: Objetivo: Relatar a experiência vivenciada por uma equipe multiprofissional referente ao gerenciamento de um evento adverso após a passagem de cateter central de inserção periférica (PICC) por retenção do fio guia metálico. **Método:** Relato de experiência ocorrida em hospital geral no município de Guarulhos, São Paulo, em novembro de 2015. **Resultado:** Descreve-se o caso de lactente de um ano de idade, hemofílico e neuropata, que, após a passagem de PICC 3F no antebraço sem incidentes, teve seu fio guia retido, impossibilitando sua retirada. A radioscopia revelou enovelamento do fio guia, com necessidade de remoção cirúrgica. **Conclusão:** O procedimento cirúrgico foi realizado com sucesso. Não houve perda sanguínea de monta no campo operatório. A criança se recuperou bem, sem consequências detectáveis pela intercorrência. Notificou-se o fabricante sobre o evento ocorrido. Este caso serviu como um aprendizado para a equipe multiprofissional.

Palavras-chave: Cateteres. Complicações. Procedimentos cirúrgicos operatórios. Equipe de assistência ao paciente.

RESUMEN: Objetivo: Reportar la experiencia pasada por un equipo multiprofesional en referencia al manejo de un evento adverso luego del paso del catéter central de la inserción periférica (PICC) por retención del alambre metálico. **Método:** Relato de una experiencia sucedida en un hospital general del municipio de Guarulhos (San Pablo, Brasil), en noviembre de 2015. **Resultado:** Se describe el caso de un lactante de un año, hemofílico y portador de neuropatía, lo cual, luego del paso de un PICC 3F por su antebrazo sin incidencias, sufrió una retención del alambre, que imposibilitaba retirarlo. La radioscopia mostró un enredado del alambre guía, que debió retirarse por vía quirúrgica. **Conclusión:** El procedimiento quirúrgico se llevó a cabo con éxito. No hubo pérdida sanguínea relevante en el acto quirúrgico. El niño se recuperó bien, sin consecuencias detectables que fueron motivadas por el evento. Se notificó al fabricante sobre el inconveniente acaecido. Este caso sirve como un aprendizaje para el equipo multiprofesional.

Palabras clave: Catéteres. Complicaciones. Procedimientos quirúrgicos operativos. Grupo de atención al paciente.

Nurse at the Neonatal Intensive Care Unit of Hospital Carlos Chagas. E-mail: sirlene.a@hcc.com.br
[2]Pediatrician at the Neonatal Intensive Care Unit of Hospital Carlos Chagas. E-mail: nnunes.direito@gmail.com
[3]Nurse. PhD at Escola Paulista de Enfermagem of Universidade Federal de São Paulo. E-mail: ebohomol@uol.com.br
[4]Pediatric Surgeon. PhD at the Children's Institute at Hospital das Clínicas, School of Medicine, Universidade de São Paulo. E-mail: mvelhote@uol.com.br.
Rua São Firmo, 81. Vila Ida, CEP: 05454-060. São Paulo (SP), Brasil.
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INTRODUCTION

The use of durable venous access in children has had great progress with the institution of the passage of catheters through percutaneous puncture using the Seldinger technique in caliber veins in the neck, thigh root, or subclavian region, instead of the traditional dissection.

The state of the art was achieved with the development of thinner catheters, which can be inserted into any peripheral vein, the peripherally inserted central catheter (PICC). These catheters can remain for a long time, being easy to maintain. They are associated with low incidence of bloodstream infections as long as they undergo a very strict insertion protocol[1].

The use of PICC has been recommended in patients requiring prolonged intravascular therapy, such as the administration of drugs and chemotherapy, blood transfusions, and parenteral nutrition, and it also enables hemodynamic monitoring[2].

Usually, PICCs are inserted at the bedside by nurses and doctors who are trained and qualified to perform the procedure. Although it is a safe procedure, studies show that complications may occur, whether they are related to the passage, presence, or removal of the catheter. The following were described: sepsis, obstruction, accidental removal, infiltration, edema, phlebitis, pleural effusion, pericardial effusion, catheter fracture, catheter migration, thrombosis, leakage, poor positioning of the catheter tip, difficulty of removal, and embolism[1,3-5]. However, the description of guidewire locking in its withdrawal after the passage of this type of catheter was not found in the literature.

OBJECTIVE

To report the experience of a multidisciplinary team in the management of an adverse event after the passage of PICC due to the retention of the guidewire.

METHOD

This is the report of an experience by nurses and doctors during the passage of a PICC in an accredited general hospital in the municipality of Guarulhos, São Paulo, which occurred in November 2015. The report concerns a rare case of complication in the passing of a PICC through the basilic vein in an infant, in which, after an uneventful access, the guidewire did not come out, getting stuck, twisted over itself, requiring surgical intervention for its extraction.

RESULTS

One-year-old male infant had been hospitalized for five months in the Neonatal and Pediatric Intensive Care Unit (ICU). The child was diagnosed with hemophilia and neurological sequelae of intracranial bleeding and he needed a new central access for the infusion of Factor VIII three times a week, as well as parenteral maintenance and antibiotics.

The nurse who was qualified to perform the procedure chose, according to the hospital's standard protocol, a 3F valved PICC, using the Seldinger technique due to its recognized benefits, such as long-term access[6].

After aseptic care and surgical scrub, the puncture was performed in the left basilic vein with good blood flow. During insertion of the catheter, there was no resistance, thereby allowing its adequate advance, until it reached a central position, as confirmed by radioscopy.

When performing the maneuver for the removal of the guidewire, it showed resistance, and its withdrawal was not possible. Limb positioning changes were performed, pulling the guidewire to a few centimeters; however, the team was still not able to remove the guidewire. The intensive care pediatrician was called on, and also made several attempts to pull the guidewire, to no avail.

Radioscopy showed one folding of the catheter, making it impossible to remove the catheter and the guidewire (Figure 1). The pediatric surgeon was called on for the removal of the catheter through surgical access.

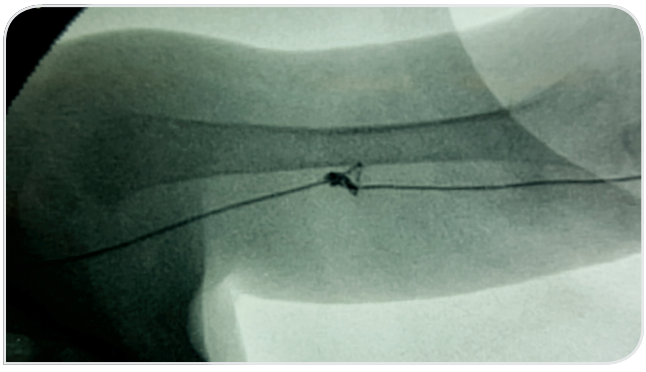

Figure 1. Radiography of the catheter folding at the middle third of the arm.

The pediatric surgeon located the position of the folding of the catheter, as suggested by the X-ray, at approximately the middle third of the left arm. Under local anesthesia, a longitudinal incision of approximately three centimeters was made on the medial side of the arm, and the brachial aponeurosis was open, the median nerve and the humeral artery were dissected and set apart proceeding then to locate the humeral vein with the blocked catheter. This was facilitated by the identification of the section of the exteriorized portion of the catheter against the skin and its mobilization (Figure 2).

Once the humeral vein with the catheter inside was identified, it was sectioned and the catheter was extracted by unregulated traction. The catheter was tangled, twisted over itself (Figure 3).

The same vein stump was used for the passing of a new catheter, which was uneventful, with the tip in a central position. The neurovascular structures were released and the incision was closed. Although the patient was a hemophiliac, there was no significant blood loss on the surgical site. The infant recovered well, without detectable consequences due to the complications. The manufacturer was notified of the event.

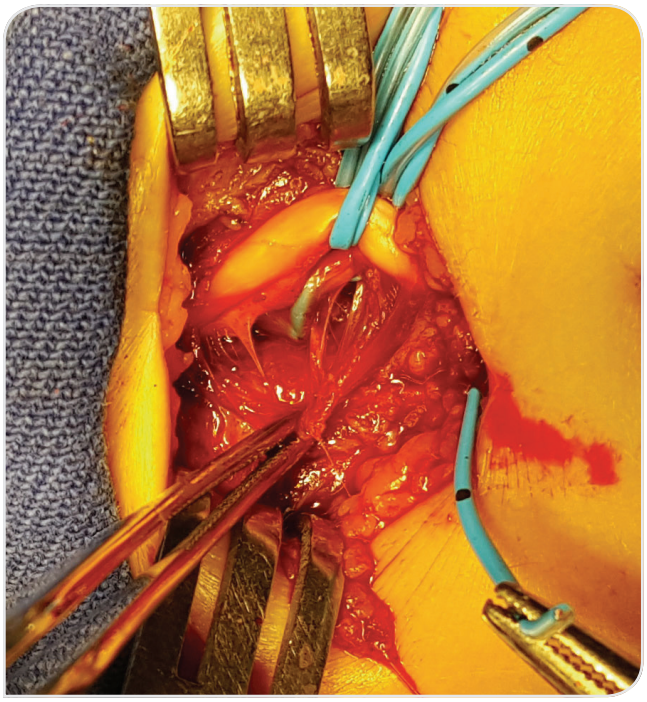

Figure 2. Dissection of the humeral vein. Median nerve and humeral artery identified with vessel loop. The peripherally inserted central catheter is stuck to the Halsted forceps.

DISCUSSION

Many cases of retention of the guidewire in the passage of non-PICC catheters in veins of large caliber are described in the literature. These veins have potential space for the twisting of the catheter, causing knots in both arteries used for hemodialysis[7] and veins[8,9].

In a search in PubMed, no case of guidewire retention in the passage of a PICC was found, although one study[10] conducted in 19 ICUs in Japan reported problems with 975 cases related to PICC, one for "difficulty in catheter removal." This study did not describe the problem in detail, or its relation to the guidewire. Another study[1], conducted with 2,574 passed PICCs in 1,807 children, reported complications requiring catheter removal in 20.8% (11.6 complications per thousand catheters/day), but no case was similar to that described in this study.

In a literature review to determine the PICC-related complications, there was no mention of guidewire retention during the passage of a catheter[5]. One study[11] reported a knot formed in the PICC catheter passed in the neonatal period, not mentioning the guidewire.

Thus, an explanation suggested for the occurrence of the event reported is the inadequate slip of the metallic wire at the time of removal of the guidewire, which was trapped in the catheter, deforming, and degloving it. Subsequent removal attempts by advancing and pulling the guidewire probably caused permanent folds in the metal, making it impossible to remove without causing further trauma to the vessel. Fortunately, the trapping of the guidewire occurred in the arm, which is more easily accessed by surgical procedure, which was performed easily and without major trauma to the artery and nerve structures there.

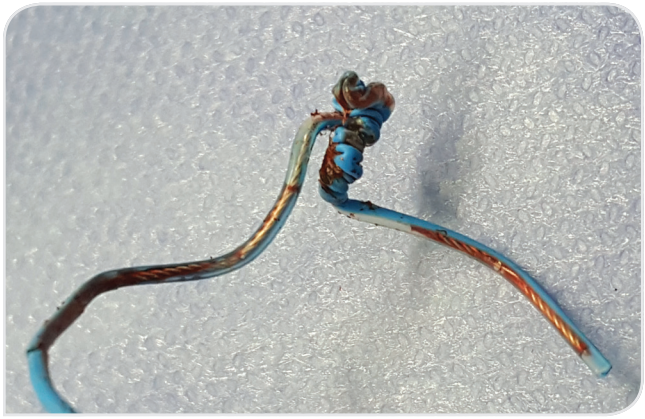

Figure 3. Image of the extracted guidewire.

After the procedure, the necessary care to the patient were prescribed and performed. In addition, the support staff prepared a report of the event, prompting the institution's management to notify the manufacturer, so that they could institute a quality control of the catheters made available to the institutions.

This report demonstrates the use of PICC as an advanced, specialized, and highly complex care practice, subject to risks for complications[12].

CONCLUSION

An unusual complication related to PICC was presented — the folding of the guidewire in the passage of the catheter —, requiring surgical intervention for their extraction.

It also shows the commitment of the team of nurses, intensive care physicians and pediatric surgeon, X-ray technicians and administrators, pooling efforts to resolve an unexpected complication and reduce any consequences to the patient.

REFERENCES

1. Wrightson DD. Peripherally inserted central catheter complications in neonates with upper versus lower extremity insertion sites. Adv Neonatal Care. 2013;13(3):198-204.
2. Baggio MA, Bazzi FCS, Bilibio CAC. Cateter central de inserção periférica: descrição da utilização em UTI neonatal e pediátrica. Rev Gaúcha Enferm. 2010;31(1):70-6.
3. Jumani K, Advani S, Reich NG, Gosey L, Milstone AM. Risk factors for peripherally inserted central venous catheter complications in children. JAMA Pediatr. 2013;167(5):429-35.
4. Pettit J. Assessment of infants with peripherally inserted central catheters: Part 1. Detecting the most frequently occurring complications. Adv Neonatal Care. 2002;2(6):304-15.
5. Secoli SR, Jesus VC. Complicações acerca do cateter venoso central de inserção periférica (PICC). Ciênc Cuid Saúde. 2007;6(2):252-60.
6. Conselho Regional de Enfermagem de São Paulo. Parecer Coren-SP CAT nº 006/2010. Técnica de Seldinger modificada para punção arterial. [acesso em 29 janeiro 2016]. Disponível em: http://portal.coren-sp.gov.br/sites/default/files/parecer_coren_sp_2010_6.pdf
7. Altıntaş G, Diken Aİ, Ulaş MM, Çiçek ÖF, Özen A, Ökten S, et al. Surgical removal of a knotted and entrapped subclavian hemodialysis catheter guidewire. Ann Vasc Surg. 2012;26(3):421.e17-9.
8. Khan KZ, Graham D, Ermenyi A, Pillay WR. Case report: managing a knotted Seldinger wire in the subclavian vein during central venous cannulation. Can J Anaesth. 2007;54(5):375-9.
9. Fiala A, Glodny B, Lorenz IH. Knotted Seldinger wire. Anaesthesist. 2016;65(1):42-5.
10. Ohki Y, Maruyama K, Harigaya A, Kohno M, Arakawa H. Complications of peripherally inserted central venous catheter in Japanese neonatal intensive care units. Pediatr Int. 2013;55(2):185-9.
11. Kurtom W, Degnan A, Quast D. Knot formation of a neonatal peripherally inserted central catheter: a rare complication of placement. J Vasc Access. 2016;17(1):e15-6.
12. Oliveira CR, Neve ET, Rodrigues EC, Zamberlan KC, Silveira A. Cateter central de inserção periférica em pediatria e neonatologia: possibilidades de sistematização em hospital universitário. Esc Anna Nery. 2014;18(3):379-85.

IMPLEMENTATION OF ALCOHOL-BASED SURGICAL HAND ANTISEPSIS: EXPERIENCE REPORT

Implantação de antissepsia cirúrgica alcoólica das mãos: relato de experiência

Implantación de uma antissepsia quirúrgica alcohólica de las manos: relato de experiencia

Juliana Prates[1], Ariane Batista Monteiro[2], Francyne Lopes[3], Diego Stumpfs[4], Gabrielli Guglielmi[5], Gabriel Narvaez[6], Roseli Cristofolini Bobsin[7], Rita Catalina Aquino Caregnato[8]

ABSTRACT: Objective: To describe the experience of surgical alcohol-based antisepsis on hand preparation of the surgical team. **Method:** Reporting the experience on deployment of alcohol solution for surgical hand antisepsis to replace brushing, during December 2014–July 2015. **Results:** Product was selected upon documentation analysis and application trial. Alcohol-based antisepsis was offered as alternative to the use of brushes impregnated with antiseptic. Scientific papers and advertising posters were available to the professionals. A total of 282 procedures were observed. The adherence rate to the alcohol solution ranged from 33% in the month of implementation to 54%, and compliance to the proper technique was observed in only 35.8% of cases. **Conclusion:** There was considerable adherence to the alcohol-based solution; it was observed as well economic impact and increasing of training demand for the right technique. There is a need to identify motivation factors and barriers for the successful implementation of this technology.

Keywords: Antisepsis. Infection. Nursing.

RESUMO: Objetivo: Relatar a experiência de implantação do antisséptico alcoólico para o preparo das mãos da equipe cirúrgica. **Método:** Relato de experiência de implantação de solução alcoólica para antissepsia cirúrgica das mãos em substituição a escovação, durante os meses de dezembro de 2014 a julho de 2015. **Resultados:** A escolha do produto baseou-se na análise de documentação e testes de utilização. O antisséptico alcoólico foi oferecido como alternativa à utilização das escovas impregnadas com antisséptico. Foram disponibilizados artigos científicos e cartazes para os profissionais. Observou-se 282 procedimentos. A taxa de adesão à solução alcoólica variou de 33% no mês da implantação a 54% e a adesão à técnica correta foi observada em apenas 35,8% das oportunidades. **Conclusão:** Houve considerável adesão à solução alcoólica e observou-se impacto econômico e demanda de capacitações para a técnica correta. Há necessidade de identificar fatores mobilizadores e barreiras para a implantação dessa tecnologia.

Palavras-chave: Antissepsia. Infecção. Enfermagem.

RESUMEN: Objetivo: Relatar la experiencia de implantación del antiséptico alcohólico para la preparación de las manos del equipo quirúrgico. **Método:** Relato de la experiencia de implantación de la solución alcohólica para la antisepsia quirúrgica de las manos en reemplazo del cepillaje, entre diciembre de 2014 a julio de 2015. **Resultados:** La elección del producto se fundamentó en el análisis de la documentación y ensayos. El antisséptico fue ofrecido como alternativa a los cepillos. Fueron disponible artículos científicos y carteles para los profesionales. Fueron vistos 282 procedimientos. La adhesion a la solución alcohólica varió del 33% en el mes de la implantación al 54% y la adhesión a la técnica correcta fue observada en 35,8%. **Conclusión:** Hubo considerable adhesión a la solución alcohólica y se observó un impacto económico y demanda de capacitaciones para la técnica correcta. Hay necesidad de identificar los factores mobilisadores y barreras para la implantación de esta tecnologia.

Palabras clave: Antisepsia. Infeccion. Enfermería.

[1]Nurse. Specialist in Health Management. Master Student in Health Education of the Professional Master's Program in Health Teaching (PPGENSAU) of the Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA). E-mail: jugilprates@gmail.com.
[2]Nurse in the Hospital Infection Control of the *Irmandade Santa Casa de Misericórdia* of Porto Alegre. E-mail: ariane.monteiro@santacasa.tche.br.
[3]Nurse, specialist in Nursing Services Management, nurse at the Hospital Infection Control Service of the *Hospital Mãe de Deus*. E-mail: francynelopes@yahoo.com.br.
[4]Nurse at the Hospital Infection Control Service of the *Hospital Mãe de Deus*. E-mail: diego.stumpfs@maededeus.com.br.
[5]Nurse at the Hospital Infection Control Service of the *Hospital Mãe de Deus*. E-mail: gabrielli.guglielmi@maededeus.com.br.
[6]Infectious Disease Physician at the Hospital Infection Control Service of the Hospital Mãe de Deus. E-mail: gabriel.narvaez@ maededeus.com.br.
[7]Nurse, specialist in Health Services Management. Coordinator of the Surgical Service. E-mail roseli.cristofolini.
[8]Nurse. PhD in Education. Permanent Professor of the Professional Master's Program in Health Teaching (PPGENSAU) of the Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA). E-mail: ritac.ufcspa@gmail.com.
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INTRODUCTION

Surgical infections are complications that may occur in surgical procedures, representing a relevant impact in morbidity and mortality of the patients, in addition to increasing hospital costs[1]. Preventive actions to avoid these events are indicated, such as the use of surgical scrubs[2], degermation, and hand antisepsis of the surgical team — this last one as the main measure. This recommendation takes on greater relevance from the knowledge that, at the end of the procedure, about 18% (varying from 5 to 82%) of surgical gloves have microperforations, and most part of the situations (80%) is not noticed by the surgeons[3]. Besides that, after two hours of surgery, 35% of gloves have perforations that may allow the passage of water and body fluids[4], which may double the risk of developing postsurgical infections. Thus, safe practices for hand sanitization by the surgical team are essential.

The use of brushes impregnated with antiseptics represents the traditional method for hand antisepsis before surgery[5]; however, the alcoholic preparations have been widely recommended[6]. The World Health Organization (WHO) [6] states that the preparations with high alcohol concentrations ensure such a drastic reduction of the microbial concentrations (resident flora) in the hands of the team that it would take more than six hours for the baseline levels to be reached[6]. This fact would make the discussions comparing the residual effect of alcohol with antiseptic soaps superfluous. Besides, the WHO[6] emphasizes other advantages of the use of these alcoholic agents, such as less time spent in presurgical hands preparation, less dermatological effects, economy in the use of resources such as water and compresses, in addition to less production of waste. Moreover, the Centers for Disease Control and Prevention (CDC) recommends the use of alcoholic solutions emphasizing the same benefits[7].

The alcoholic preparations are used in Europe for at least 30 years[8]. In addition to the European continent, in the United States of America, there are also standardized tests to measure the antimicrobial spectrum of the alcoholic solutions[9]. Despite all the favorable evidences, in Brazil, the use of alcoholic solutions to replace the brushing of hands is not widely used, whether by the preparatory ritual it represents or by the impression that a vigorous brushing is needed in order to eliminate the microbial flora[9].

Acting out in a private hospital striving for excellence, innovations, and owing to the reasons exposed previously, the teams of the Surgical Center (SC) and the Infections Control Service (HICS) agreed to implement the alcohol-based antiseptics for preoperative preparation of the hands to substitute brushing. Owing to its being a practice with evident benefits, however recent and still little inserted in the institutions of the country, there is a need to encourage the discussion on this alternative assistance. For such, there is the purpose of this study, which was focused on reporting how the process happened and what are the economic impacts of the implementation of the alcohol-based surgical antiseptics in a private institution.

OBJECTIVE

Reporting the experience of implementing the alcohol-based surgical hand antisepsis of the surgical team.

METHOD

This is a report of the experience of implementing the alcohol-based surgical hand antisepsis of the surgical team to replace brushing. The setting of this experience was the SC of a private hospital in Southern Brazil, with an open clinical body, with 13 operating rooms and which performs, on average, 1,500 anesthetic-surgical procedures per month. Approximately 100 surgeons (20% of the professionals registered) account for 80% of the production of the SC, and count on 7 nurses and 100 nursing technicians.

The implementation process of the alcohol-based solution occurred between the months of December 2014 and July 2015. The antisepsis selected consisted of ethylic alcohol at 70% (p/p) in gel form.

Professionals working in the SC of the institutions were involved in this process (surgeons and scrub nurses) and they were trained by the technician of the supplying company of alcohol-based solution for the execution of the technique, under the supervision of the HICS.

After the implementation of the alcohol-based solution for antisepsis, the HICS collected data on the adherence to the technique, by means of the direct observation of the procedure (preoperative hand antisepsis), performed by the academic nursing interns working in the HICS, using a data collection form (Appendix 1).

The variables considered in the observation were: professional category, product chosen for hand antisepsis, duration of the procedure, and technique used. In order to be considered appropriate, the procedure with alcohol-based solution should last 2–3 minutes and with brushes, three–five minutes.

The guided technique for the alcohol-based surgery antisepsis followed the recommendations from the WHO[6], meaning, at least the six basic steps for simple hand hygiene, in addition to the additional steps to contemplate the forearms. Besides, hands should be kept moist during the frictioning and, for such, there should be ensured the necessary amount of product, about 15 mL. For the procedure with the brushes impregnated with antiseptics, the brushing should reach all the areas of the hands, including finger nails, and forearms, keeping them above elbows.

Information on the economic impact was obtained from institutional reports.

REPORTING ON THE IMPLEMENTATION OF ALCOHOL-BASED SURGICAL ANTISEPSIS

The use of the traditional method of brushing does not have a negative impact on the rates of surgical infection; however, some professionals with experiences in foreign countries, especially Europeans, reported using an alcohol-based solution and suggested its adoption. Besides, the institutional development of strategies for the rational use of environmental resources mobilized the management of the SC and the HICS, which identified in the use of this alcohol-based solution an opportunity which would meet these objectives, especially the potential saving of water. The perspective of financial savings, from the comparison of costs of the alcohol-based solution and the brushes, also motivated the managers of SC for the replacement process.

In order to choose the product, the following variables were analyzed: documentation, records, and tests for antimicrobial efficacy presented by the representatives, economic viability, and usage test by the SC professionals. After the evaluation of the documentation, two alcohol-based products were tested, and the choice of the product for implementation was based on the reports of professionals who tested them, considering the sensation after the applications and the easiness of the execution of the technique. All the analysis mentioned earlier was conducted according to the principles of the institutional protocol for product standardization, managed by the sectors of pharmacy, governance, SC, and HICS.

Strategically, it was chosen for including the alcohol-based antiseptic as an alternative to the use of brushes impregnated with chlorhexidine, although without restricting their use. In contrast, there was a sensitization movement for the use of the alcohol-based antiseptic, providing scientific articles, banners, and performing all the discussions with the professionals, presenting their advantages over brushes. For the initial implementation, dispensers of alcohol-based solution in all the SC lavatories were available together with banners containing guidelines on the correct technique.

In the period analyzed, 282 surgical antisepsis procedures were evaluated, being 203 (72%) of them performed by surgeons and 79 (28%) of them by scrub nurses.

In relation to the product used, 106 (38.1%) professionals chose to use the alcohol-based solution for surgical antisepsis in comparison to 172 (61.9%) professionals who chose to use brushes impregnated with degerming chlorhexidine. The adherence rate to alcohol-based solution varied from 33% in April 2015 (month of the implementation) to 54% in July 2015.

By professional category, the mean adherence to the use of the alcohol-based solution by the surgeons was of 33.5% (67/200), with a variation between 18% in June 2015 and 50% in July 2015. On the other hand, the mean adherence of scrub nurses was 50% (39/78), being observed an increasing growth during the evaluated months, varying from 25% in April to 64% in July 2015.

In order to indentify the adherence to the correct technique (procedure and time) of surgical antisepsis with alcohol-based solution and with impregnated brushes, a direct observation of the HICS process was performed, especially in relation to the time of duration and the procedures used. The adherence to the correct technique with the use of the alcohol-based solution was 35.8% (38/106) and with the use of brushes, 30.8% (53/172).

The surgeons performed the correct technique more often when using the alcohol-based solution (34.3%) in comparison to the brush (31.5%). This result was also observed among scrub nurses who reached 33.3% with alcohol-based solution and 25.6% using brushes.

Duration of friction was the main observed failure (94.2%) among the variables evaluated with the objective to classify the alcohol-based process as appropriate, followed by incorrect procedure (28.5%). This inadequacy was also observed in brushing with chlorhexidine, being the duration of brushing the most frequent flaw (97.4%), followed by incorrect procedure (7.5%).

An average of 6,500 units of impregnated brushes has been used until the implementation of the alcohol-based antisepsis to serve an average of 1,500 surgical procedures. The unitary cost of the brushes represents R$ 1.12, totaling a mean monthly cost of R$ 7,280.00. The alcohol-based antisepsis represents a cost of R$ 144.59 per refill and a total of

R$ 2,747.21 in the first month. From the incorporation of the alcohol-based antiseptics, there was a reduction in the consumption of 3,000 brushes, representing a cost reduction of R$ 3,360.00 and alcohol-based solution consumption of six refills costing R$ 867.54 — meaning, there was a reduction of cost of R$ 2,500.00 in the first month.

After the first month of implementation, the financial results were satisfactory, with a progressive reduction in the consumption of brushes.

DISCUSSION

The surgical hand antisepsis has been part of a ritualistic process of the surgical act recommended since the studies by Joseph Lister in 1865. At that time, surgical gloves were not yet in use, which made this practice even more imperative[3].

During the period of the study, there was a mean adherence to the alcohol-based solution of only 38.1%, which may be explained by the tradition of using brushes, added to the fact that they remain available. However, 54% of the procedure was performed with an alcohol-based solution during the month with the highest adherence. The acceptance of surgeons, which reached 50%, was attributed to the access of these professionals to publications about the broad use of the alcohol-based solution and the previous experiences with the product in hospitals in Europe and the United States of America. Evidence showed that when alcohol-based solutions are used by surgeons in the preoperative preparation of the hands, they reduce the bacterial counting faster and more effectively than the common or the antibacterial soap[10].

The introduction of surgical antiseptics without the use of water also provides opportunities to the surgical teams to improve their performances without compromising patient safety by means of the reduction of the time spent on hand preparation, with less skin damage and reduction of microbial burden[11]. In the evaluations performed in this study in relation to the technique and time to perform the surgical hand antisepsis process, it was identified that when using the alcohol-based solution, only 35.8% of the team performed the process correctly, considering frictioning duration as the most frequent inadequacy, which occurred in 94% of observations. The WHO[6] recommends that the antisepsis with alcohol-based solution for 2–3 minutes has microbial burden reduction in acceptable levels; however, it mentions that, in a recent study, 90 seconds of friction would equal 3 minutes, depending on the solution composition.

Being a newly available product in Brazil and yet little known by professionals, failures in the process were expected, what was evidenced during the observations. This fact is not in agreement with the findings in the literature where the use of alcohol-based solutions is reported as favorable to a better adequacy to the technique, in addition to the time reduction to perform the procedure and lower irritability of the skin, due to the addition of moisturizing and emollient substances in the formulations, contributing for the integrity of the epidermis[11].

Considering that the bushing process was carried out in the institutions for a long time, it was not expected the occurrence of failures in the technique. However, during the implementation process, it became necessary to compare the new method to the traditional one, and the adequacy of the technique of surgical brushing started to be observed. It was identified only 30% of compliance, compared with 35.8% of the alcohol-based solution. Randomized study[12], which evaluated the infection rates of the surgical site during 30 days with the use of the traditional brushing method *versus* the use of friction with alcohol-based solution, demonstrated compliance rates in relation to the duration of the procedure were inappropriate for both protocols; however, it was significantly better in the protocol of alcohol-based solution use than in the traditional brushing protocol (44 *versus* 28%, respectively; $p = 0.008$)[12].

The economic impact for the head institution of this study was noticed from the considerable reduction in the consumption of brushes. In a research in which the costs were measured with the use of the alcohol-based solution in comparison to brushing, it was demonstrated that the savings could reach 47%[4].

FINAL CONSIDERATIONS

This article allowed the reporting of the experience of a SC that carried out the replacement of the surgical brush by the use of the alcohol-based solution for hand antisepsis of the surgical team. This replacement corroborates with international evidence of benefits and brought advantages in terms of time saving, consumption of resources, and costs. Despite that, it was possible to observe that opting for this technique is not natural inside the teams and it deserves

efficient institutional mechanisms in order to raise awareness and develop the professionals. Based on this report, it became essential to identify, in subsequent studies, the profile of the professionals who chose the alcohol-based solution over brushes, in order to identify the mobilizing factors and barriers for the implementation of this technology.

With regard to the technique, the conduction of this implementation allowed the monitoring of the procedure with alcohol-based solutions and the conventional brushing, being possible to identify important failures in both procedures, reinforcing the demand for attention and recurrent training, in order to ensure patient safety.

The alcohol-based solution is not widely used in Brazilian institutions, and the predisposing factors for this reality should be further investigated. In this implementation report, it was not possible to properly evaluate the impact in all positive variables mentioned earlier, especially in relation to the quality results and social and environmental impacts. The identification of these effects is a priority as it supports the option for this recently available technology to hospital institutions.

REFERENCES

1. Anderson DJ, Podgorny K, Berríos-Torres SI, Bratzler DW, Dellinger EP, Green L, et al. Strategies to prevent surgical site infections in acute care hospitals: 2014 update. Infect Control Hosp Epidemiol. 2014;35(6):605-27.
2. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. The hospital infection control practices advisory committee. Guideline for prevention of surgical site infection. Infect Control Hosp Epidemiol. 1999;20(4):247-80.
3. Widmer AF, Rotter M, Voss A, Nthumba P, Allegranzi B, Boyce J, et al. Surgical hand preparation: state-of-the-art. J Hosp Infect. 2010;74(2):112-22.
4. Graf ME, Machado A, Mensor LL, Zampieri D, Campos R, Faham L. Antissepsia cirúrgica das mãos com preparações alcoólicas: custo-efetividade, adesão dos profissionais e benefícios ecológicos no cenário da saúde. J Bras Econ Saúde. 2014;6(2):71-80.
5. Agência Nacional de Vigilância Sanitária. Ministério da Saúde. Manual de segurança do paciente: higienização das mãos em serviços de saúde. Brasília: Anvisa/MS; 2008 [acesso em 2015 out 30]. Disponível em: http://bvsms.saude.gov.br/bvs/publicacoes/seguranca_paciente_servicos_saude_higienizacao_maos.pdf
6. World Health Organization. WHO guidelines on hand hygiene in health care. First global patient safety challenge clean care is safer care. Geneva: WHO; 2009 [acesso em 2015 out. 20]. Disponível em: http://apps.who.int/iris/bitstream/10665/44102/1/9789241597906_eng.pdf
7. Boyce JM, Pittet D; Healthcare Infection Control Practices Advisory Committee; HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force.. Guideline for hand hygiene in health-care settings: recommendations of the Healthcare Infection Control Practices Advisory Committee and HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. MMWR Recomm Rep. 2002;51(RR-16):1-45.
8. Gruendemann BJ, Bjerke NB. Is ti time for brushless scrubbing with an alcohol-bases agent? AORN J. 2001;74(6):859-73.
9. Gonçalves KJ, Graziano KU, Kawagoe JY. Revisão sistemática sobre antissepsia cirúrgica das mãos com preparação alcoólica em comparação aos produtos tradicionais. Rev Esc Enferm USP. 2012;46(6):1484-93.
10. Allegranzi B, Nejad SB, Combescure C, Graafmans W, Attar H, Donaldson L, et al. Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. Lancet. 2011;377(9761):228-41.
11. Olson LK, Morse DJ, Duley C, Savell BK. Prospective, randomized in vivo comparison of a dual-active waterless antiseptic versus two alcohol-only waterless antiseptics for surgical hand antisepsis. Am J Infect Control. 2012;40(2):155-9.
12. Parienti JJ, Thibon P, Heller R, Le Roux Y, von Theobald P, Bensadoun H, Bouvet A, et al. Antisepsie Chirurgicale des mains Study Group. Hand-rubbing with an aqueous alcoholic solution vs traditional surgical hand-scrubbing and 30-day surgical site infection rates: a randomized equivalence study. JAMA. 2002;288(6):722-7.

Appendix 1. Data collection form about surgical hand antisepsis

Hospital infection control service

Instrument of adherence to hand degermation

SURGICAL BLOCK

Evaluator: ______________________________

Date: / / Shift: ______________________

Oport.		Hand degermation		Action		Technique		Flaw	
	Surg		Yes		Brush		Appropriate		Technique
	Instr		No		Alcohol		Inappropriate		Time
									Repetition

Oport.		Hand degermation		Action		Technique		Flaw	
	Surg		Yes		Brush		Appropriate		Technique
	Instr		No		Alcohol		Inappropriate		Time
									Repetition

Oport.		Hand degermation		Action		Technique		Flaw	
	Surg		Yes		Brush		Appropriate		Technique
	Instr		No		Alcohol		Inappropriate		Time
									Repetition

Oport.		Hand degermation		Action		Technique		Flaw	
	Surg		Yes		Brush		Appropriate		Technique
	Instr		No		Alcohol		Inappropriate		Time
									Repetition