

Knowledge about oral anticoagulation of patients after surgical correction of valve diseases: integrative review

Conhecimento sobre anticoagulação oral de pacientes após correção cirúrgica de valvopatias: revisão integrativa

Conocimiento sobre la anticoagulación oral de los pacientes después de la corrección quirúrgica de valvulopatías: revisión integradora

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ABSTRACT: Objective: To verify the existence of scientific evidence in the literature on patients regarding the use of oral anticoagulants after implantation of a metallic heart valve. **Method:** Integrative review carried out in the Embase, Scopus, Web of Science, and Online Medical Literature Search and Analysis System (MEDLINE)/PubMed databases, using controlled and uncontrolled descriptors, without temporal delimitation regarding publication, in Portuguese, English, and Spanish. The search took place in June 2022, by two researchers independently. **Result:** There were gaps in patients' knowledge about adverse effects related to the use of oral anticoagulants, drug interactions, food interactions, factors that interfere with international normalized ratio levels and what should be done in case of forgetting the daily doses. **Conclusion:** The synthesis elaborated emphasizes the need for greater focus on patient guidance on anticoagulants and their implications related to daily life habits.

Keywords: Anticoagulants. Knowledge. Heart valve prosthesis implantation. Perioperative nursing.

RESUMO: Objetivo: Verificar a existência de evidências científicas na literatura sobre o conhecimento dos pacientes em relação ao uso do anticoagulante oral após o implante de valva cardíaca metálica. **Método:** Revisão integrativa realizada nas bases de dados Embase, Scopus, Web of Science e Sistema Online de Busca e Análise de Literatura Médica (MEDLINE)/PubMed, utilizando descritores controlados e não controlados, sem delimitação temporal quanto à publicação, nos idiomas português, inglês e espanhol. A busca ocorreu em junho de 2022, por duas pesquisadoras de forma independente. **Resultado:** Verificou-se a existência de lacunas no conhecimento dos pacientes sobre os efeitos adversos relacionados ao uso dos anticoagulantes orais, às interações medicamentosas, às interações alimentares, aos fatores que interferem nos níveis de *international normalized ratio* e ao que deve ser feito em caso de esquecimento das doses diárias. **Conclusão:** A síntese elaborada enfatiza a necessidade de maior enfoque nas orientações aos pacientes sobre os anticoagulantes e suas implicações relacionadas aos hábitos de vida diária.

Palavras-chave: Anticoagulantes. Conhecimento. Implante de prótese de valva cardíaca. Enfermagem perioperatória.

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RESUMEN: **Objetivo:** Verificar la existencia de evidencia científica en la literatura sobre el conocimiento de los pacientes sobre el uso de anticoagulantes orales después del implante de una válvula cardíaca metálica. **Método:** Revisión integradora realizada en las bases de datos Embase, Scopus, Web of Science y MEDLINE/PubMed, utilizando descriptores controlados y no controlados, sin delimitación temporal con respecto a la publicación, en portugués, inglés y español. La búsqueda tuvo lugar en junio de 2022, por dos investigadores de forma independiente. **Resultado:** Hubo lagunas en el conocimiento de los pacientes sobre los efectos adversos relacionados con el uso de anticoagulantes orales, interacciones medicamentosas, interacciones alimentarias, factores que interfieren con los niveles de la razón internacional normalizada y qué se debe hacer en caso de olvido de las dosis diarias. **Conclusión:** La síntesis elaborada enfatiza la necesidad de un mayor enfoque en la orientación del paciente sobre los anticoagulantes y sus implicaciones relacionadas con los hábitos de la vida diaria.

Palabras clave: Anticoagulantes. Conocimiento. Implantación de prótesis de válvulas cardíacas. Enfermería perioperatoria.

INTRODUCTION

In Brazil, valvopathies represent a significant portion of hospitalizations due to cardiovascular diseases. Due to the adaptive mechanisms of hypertrophy and dilation of the cardiac atria and ventricles, the heart manages to maintain adequate cardiac output, accommodating the regurgitant volume. Thus, patients remain asymptomatic for years¹.

In the decompensation phase, dyspnea, weakness, cough, and palpitation are the most common symptoms. Through the identification of these signs and symptoms and the clinical diagnosis, the appropriate treatment is directed to the patient, and it can be pharmacological, by percutaneous or by surgical intervention².

For surgical indication to occur, the manifested clinical indicators, left ventricular function, history of atrial fibrillation, signs of pulmonary artery hypertension, and valve anatomy must be evaluated^{2,3}.

Surgical intervention consists of reconstruction or replacement of the affected valve by means of valve prosthesis implants. Prior to the pandemic period, 7,891 cardiac valve surgeries were performed in 2019 in Brazil, of which 613 valve repairs and 7,278 valve prosthetic implants⁴, however, this number suffered an abrupt reduction due to the interruption of elective surgeries in Brazilian public services.

When the recommended procedure is valve replacement, it is necessary to choose the type of valve to be implanted: biological or metallic. The choice should be based on clinical evaluation and patient preference, but some factors are important in this decision⁵⁻⁷.

Biological prostheses are mainly recommended for patients who have contraindications to the use of oral anticoagulants, since patients with metal prostheses need antithrombotic prevention for life. On the other hand, metallic valves have greater durability when compared to biological

ones^{5,7}. According to the recommendations established by the American College of Cardiology and the American Heart Association, the main indication for valve replacement with a metal prosthesis is long patient survival⁸.

Patients with metallic cardiac prostheses, regardless of the implantation site and their cardiac rhythm, need antithrombotic prevention. When the valves are implanted in the aortic position and the heart rhythm is sinus, with no other risk factors for thromboembolism, the international normalized ratio (INR) should be between 2 and 3.

Patients who receive metallic cardiac prostheses will have their first contact with oral anticoagulants in the perioperative period, more effectively in the immediate postoperative period. The main pharmacological class of anticoagulants prescribed is vitamin K antagonists, although there are still disadvantages, such as the great food and drug interaction, resulting in a greater possibility of bleeding and/or thrombus formation⁹.

In addition to medications, other determinants that may favor bleeding and/or thrombus formation were found, such as the intensity and duration of anticoagulation and patient characteristics. Age greater than 75 years, cancer, high blood pressure, cerebrovascular disease, severe heart disease, kidney failure, liver disease, and alcoholism are also risk factors for bleeding⁹.

Although other classes of oral anticoagulants are currently available with numerous advantages when compared with vitamin K antagonists, the new oral anticoagulants also have two drawbacks. The first is the price, which is much higher than that of vitamin K antagonists, even after accounting for the costs of INR monitoring. The second is the lack of antidotes that reverse its anticoagulant effect¹⁰.

The findings found in the literature show that, when initiating the use of oral anticoagulants, it is essential that the patient is guided by nursing professionals on the mechanisms

and possible complications inherent to this therapy, aiming at adherence to treatment, reduction of risk factors, and prevention of bleeding and/or thrombi. However, the measurement of knowledge about oral anticoagulation in individuals who have undergone surgical correction of valvular heart disease using a metallic (mechanical) prosthesis is still incipient. Furthermore, it is essential to guide them about the INR, since this test is essential for therapeutic monitoring, in addition to maintaining the use of oral anticoagulation therapy.

OBJECTIVES

To verify the existence of scientific evidence in the literature on the knowledge of patients regarding the use of oral anticoagulants after implantation of a metallic heart valve.

METHOD

This is an integrative literature review whose stages are: construction of the research question; implementation of inclusion and exclusion criteria; search for studies in the literature; data extraction; evaluation of previously selected studies; interpretation and synthesis of results; and review presentation¹¹⁻¹³.

For the preparation of the guiding question of the study, the PIO strategy, an adaptation of the PICO¹⁴ strategy, was adopted — P refers to patients, I to metallic heart valve implantation, C was not applied, and O to knowledge about the therapy of oral anticoagulation. Thus, the following question was asked: what is the knowledge of patients about oral anticoagulation therapy after cardiac surgery for metallic heart valve implantation?

The searches were carried out in the databases Embase; Online Medical Literature Search and Analysis System (MEDLINE), via PubMed; Scopus, via Elsevier; and Web of Science. Prior to the search, controlled descriptors from Medical Subject Headings (MeSH) were selected for the search in MEDLINE, Emtree for the search in Embase, in addition to uncontrolled descriptors in the Web of Science and Scopus databases. All controlled and uncontrolled descriptors were combined with Boolean AND and OR operators.

Two researchers carried out the searches, in June 2022, independently. The following combinations were used:

- Embase: “Cardiac patient” AND “Heart valve prosthesis” AND “Knowledge” OR “Anticoagulant agent” OR “Anticoagulant therapy”;
- MEDLINE: “Patients” AND “Heart valve prosthesis” AND “Knowledge” OR “Anticoagulants”;
- Scopus: “Patients” AND “Heart valve prosthesis” AND “Knowledge”;
- Web of Science: “Patients” AND “Heart valve prosthesis” AND “Knowledge” OR “Anticoagulants”.

Data selection and extraction was done using the free single-version web review program Rayyan, from the Qatar Computing Research Institute¹⁵.

For the eligibility process, the following criteria were adopted: original articles that helped answer the research question, without time restriction, in Portuguese, English or Spanish. Original articles that revealed knowledge using a qualitative approach, that addressed other types of valve implants using a minimally invasive technique, and that did not show knowledge analysis as a primary outcome were excluded.

The characterization and knowledge synthesis charts were adapted from two Brazilian studies^{16,17}, including the following information: authors' names, year of publication, country, language of publication, level of evidence, objective, sample of participants, instrument used for data collection and the main results found.

With regard to the hierarchy of evidence, the selected articles were classified according to the Oxford Center for Evidence-Based Medicine, sequentially, according to the following levels:

1. Scientific evidence from a systematic review of randomized controlled trials or randomized clinical trials;
2. Scientific evidence from individual or observational randomized systematic reviews;
3. Scientific evidence from non-randomized, cohort or follow-up studies;
4. Scientific evidence derived from case-control, case-study, and longitudinal studies;
5. Evidence from descriptive studies¹⁸.

The analysis of the articles that made up the final sample of this review was anchored in a Brazilian study¹⁹ in which the authors proposed thematic axes during the construction of the instrument for assessing knowledge about oral anticoagulants, highlighting relevant items for measuring knowledge about oral anticoagulants in the Brazilian scenario: data

inherent to the drug itself (identification, indication, duration of treatment, posology, and dosage); data inherent to the INR (monitoring and therapeutic range); presence of symptoms and signs of complications; drug interactions; food interactions; interactions with alcoholic beverages; conducts in the face of interruption of use; importance of informing health services about the use and the imminence of trips. To understand the knowledge construct, all the thematic axes already presented were used, corroborating the therapeutic and adverse effects of the pharmacological group in question.

Based on this, a descriptive analysis of the findings was carried out, with the objective of listing the knowledge of individuals with valvopathies about the use of oral anticoagulants after implantation of a metallic valve.

The protocol of the revision in question is available in the Figshare repository²⁰.

RESULTS

After independent searches, 3,341 publications were found in the databases. After applying the eligibility criteria, seven articles were considered eligible and made up the final sample of this review, as shown in Figure 1, using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Prisma)²¹ to report the searches.

It is important to highlight that no studies were found that revealed knowledge through a qualitative approach or

that dealt with other types of valve implants through a minimally invasive technique. Therefore, such exclusion criteria were not included in Figure 1.

In the study selection phase, two researchers worked independently. Two consensus meetings were held for conflict resolution with the presence of a third researcher, with the aim of reaching the final sample of studies according to the eligibility criteria adopted.

Chart 1²²⁻²⁸ presents an overview of the articles included here, including baseline characteristics that allowed the identification of studies throughout the manuscript, such as: code assigned by researchers to each eligible article, authors' names, year of publication, country where the study was developed, the language in which the article was published and classification regarding the level of evidence.

Regarding the characterization of the eligible studies, it was noticed that they were published in the last two decades, six of them in English and only one in Portuguese. As for the geographic location, three studies developed in the Asian continent (Turkey, Saudi Arabia, and China), two in the American continent (Canada and Brazil) and two in the European continent (Belgium and Poland) were identified, and all have level of evidence IV, since they are observational studies.

Chart 2²²⁻²⁸ contains a summary of the findings, highlighting: objective, number of participants in the respective studies (sample), instruments used to verify knowledge and main results, which denote the summary of knowledge about the subject in question descriptively, without the adoption of scores to qualify this knowledge.

Prior to the main results, it is important to highlight that six of the selected studies had the same objective: to assess patients' knowledge about oral anticoagulation after metallic heart valve implantation²²⁻²⁷. One of the studies consists

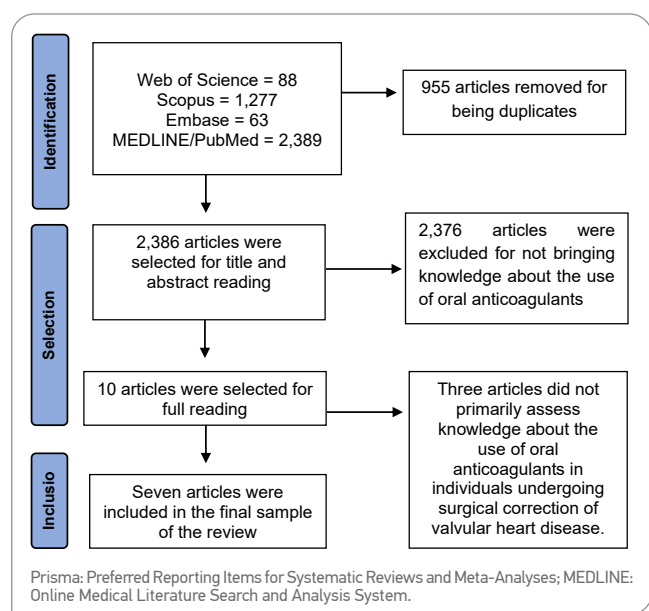


Figure 1. Adapted Prisma Flowchart, Ribeirão Preto, São Paulo, 2022.

Chart 1. Characterization of eligible articles to compose the final sample, Ribeirão Preto (SP), Brazil, 2022.

Authors	Year	Country	Language
Hu et al. ²²	2006	Canada	English
Rocha et al. ²³	2010	Brazil	Portuguese
Van Demme et al. ²⁴	2011	Belgium	English
Korkmaz et al. ²⁵	2015	Turkey	English
Mayet ²⁶	2015	Saudi Arabia	English
Parys et al. ²⁸	2019	Poland	English
Cao et al. ²⁷	2020	China	English

Source: Survey data.

Chart 2. Main results of eligible articles to compose the final sample, Ribeirão Preto (SP), Brazil, 2022.

Authors	Objective	Sample and instrument	Main results
Hu et al. ²²	To determine the influence of teaching practices in the hospital, as well as socioeconomic status and demographic variables on the knowledge of patients using mechanical prostheses about warfarin therapy	100 Questionnaire evaluated the patient's knowledge level of warfarin	Knowledge needs to be implemented regarding the consumption of foods rich in vitamin K and its effect concomitantly with the continuous use of oral anticoagulants
Rocha et al. ²³	To check the knowledge of patients with mechanical valve prosthesis about oral anticoagulation therapy	110 Questionnaire survey of patients attending anticoagulation clinics	Knowledge needs to be implemented in the following aspects: information about the side effects of anticoagulants, drug interactions (anticoagulants and other drugs), influence of a diet rich in vitamin K on anticoagulant effects, and necessary care before invasive procedures
Van Demme et al. ²⁴	To determine the level of knowledge that patients with mechanical heart valves have about oral anticoagulation therapy and its adherence	57 Knowledge of Oral Anticoagulation Tool (KOAT)	Knowledge needs to be implemented in the following aspects: existence of drug interactions; appearance of symptoms may indicate potential complications in relation to INR; consumption of alcoholic beverages concomitant to the treatment; influence of vitamin K on the effect of the drug in question; sports that should be avoided; and what should be done in case of forgetting the daily dose
Korkmaz et al. ²⁵	To determine the level of knowledge regarding warfarin therapy and adherence to it after mechanical heart valve implantation	114 Questionnaire prepared by the authors themselves and submitted to the evaluation of experts	Knowledge needs to be implemented in the following aspects: need for periodic verification of the INR and possible bleeding episodes and food interaction, focusing on the influence of vitamin K on the drug effect
Mayet ²⁶	To assess the level of knowledge about warfarin therapy and anticoagulation control based on demographic data and other characteristics of patients using a mechanical prosthesis	105 Questionnaire evaluated the patient's knowledge level of warfarin	Knowledge about the need for INR control needs to be implemented
Parys et al. ²⁸	To develop and validate a new questionnaire, the Silesian Center for Heart Diseases Mechanical Valve Knowledge Questionnaire	62 Silesian Centre for Heart Diseases Mechanical Valve Knowledge Questionnaire (SCHDMVKQ)	The participants had satisfactory knowledge about the name and dosage of the anticoagulant and the influence of drugs, food, and alcohol consumption in the treatment. Furthermore, they were able to identify symptoms of drug intoxication. This occurred through the delivery of an information booklet to help them understand post-surgery care
Cao et al. ²⁷	Evaluate knowledge about warfarin using the Knowledge Assessment Questionnaire on oral anticoagulation of patients using mechanical prostheses	383 Anticoagulation Knowledge Assessment Questionnaire	Knowledge needs to be implemented regarding the following information: duration of drug treatment; food rich in vitamin K and its interaction with the drug in question; and interaction of the anticoagulant with other medications for continuous use

INR: international normalized ratio.

Source: Survey data.

of a methodological study, with the purpose of validating an instrument to measure knowledge about oral anticoagulation therapy among the referred public and, concomitantly, to evaluate the knowledge itself²⁸.

DISCUSSION

Based on the results found, it was observed that patients undergoing metallic heart valve implantation have knowledge about the use of oral anticoagulants, but the classification of this knowledge through scales that denote scores for the construct was not possible to be verified due to the diversity of instruments found and the lack of a gold standard measure for this.

Regarding the sample number presented by the authors, it was noticed that, although all articles come from cross-sectional studies, the number of participants in the studies was divergent, contemplating 57 individuals in the study with the smallest number of patients and 383 individuals in the study with the highest number of patients.

With regard to the use of validated instruments, it was found that only one study²⁷ had face and content validation restricted only to a committee of judges, experts in the subject; the others presented the respective psychometric properties, which conferred the validity of the instruments, important data for measuring the investigated construct^{22-26,28}.

Regarding the main results, the existence of knowledge about the use of oral anticoagulants by the target population of the studies was noted, however the authors highlighted relevant weaknesses regarding adverse effects of the use of the medication, interactions with other medications, food interactions, factors that interfere with INR levels and what should be done in case of forgetting the daily doses.

However, due to the lack of consensus related to the classification of the evaluated construct that would allow the comparison between the scores attributed to the studied populations, it was decided to discuss the findings mediated by the Brazilian reference already mentioned¹⁹, in order to highlight points that need to be implemented in the perioperative care to improve the quality of life after the surgery in view of the continuous use of the drug in question.

Despite the difficulty of measuring knowledge about oral anticoagulation, it was possible to detect, through the items of the instruments, points that need to be implemented in perioperative care for patients undergoing implantation of a metallic heart valve: general information about how the

medication works²²⁻²⁸, actions to be taken in case of forgetting the daily dose^{26,27}, interactions with food ingested during therapy²²⁻²⁷, interactions with other medications for continuous or sporadic use^{22-24,26,27}, impact of alcohol consumption²⁴, importance of INR control^{24,25}, and the need to inform about the continuous use of oral anticoagulants when assisted at health services²⁴⁻²⁶.

Through the descriptive analysis of the studies, it was seen that the consumption of alcoholic beverages, drug interactions and food interactions are factors that interfere with the maintenance of the therapeutic range of the INR. In this perspective, guiding patients in the preoperative period and at the time of discharge becomes important so that they can maintain control of the INR.

With regard to INR control, there was an emerging need to implement knowledge about maintaining the continuous use of oral anticoagulants and about symptoms and signs that denote possible complications, since this knowledge can prevent hospitalizations with other medications during therapy and, consequently, improve the quality of life of patients.

Knowing these aspects is essential for the stability of anticoagulation, since the aforementioned factors can interfere with the pharmacokinetics and pharmacodynamics of the drug, that is, alter the absorption, transport and/or metabolism of the drug, in addition to potentiating or reducing the effect of oral anticoagulants²⁹. Therefore, there is a change in the INR value, leading to risks of thrombus formation or bleeding²⁹.

Therefore, guiding patients about the actions and possible complications inherent to the use of oral anticoagulants and training them for their daily use are essential actions to be performed by nursing. It is up to nursing professionals to plan, implement, and systematically analyze the assistance offered to individuals who use such drugs; to be able to recognize signs and symptoms; to develop strategies to prevent adverse events; and, if necessary, to manage these events quickly, ensuring qualified assistance³⁰.

In addition, to avoid adverse effects associated with the use of oral anticoagulants, periodic outpatient follow-up and monitoring of blood clotting levels of patients are necessary, especially in the first months of treatment, a crucial period of adaptation¹⁹.

Control of blood clotting is done by checking the prothrombin time, standardized by the INR. Values that differ from those mentioned above are associated with thrombotic or hemorrhagic episodes^{19,31}. In addition to INR monitoring, outpatient follow-up is of great importance to confirm patients'

adherence to drug therapy, as non-adherence to treatment favors the destabilization of patients' condition, which may lead to an increased risk of thromboembolism or bleeding³².

It is known that patients who use the medication must be the central characters of the assistance, since it is responsible for the prevention of adverse effects, as well as for their family. Thus, carrying out guidelines and preparing booklets or informational folders about the care needed when starting treatment with oral anticoagulants are important attitudes for the recipient of care to create autonomy regarding their treatment, being able to identify symptoms of possible adverse events³⁰. The effectiveness of the guidelines and educational material is observed in the results presented by the authors of one of the selected studies²⁸, in which the participants demonstrated satisfactory knowledge about oral anticoagulation therapy due to an informative booklet about the necessary care after metallic heart valve implantation.

It is noteworthy that, although the knowledge of patients undergoing metallic heart valve implantation about oral anticoagulation has been verified and the objective of the study has been fulfilled, some limitations were identified throughout the construction of the review, such as the number of studies found available for free. Such criterion may have omitted studies that could give robustness to the presented findings. Likewise, the language limitation may have favored the automatic exclusion of articles in the first phase of eligibility criteria.

CONCLUSION

The findings revealed a deficit in the knowledge of patients using oral anticoagulants regarding maintenance of INR and the need for changes in daily life habits. The studies highlighted the need for outpatient follow-up by the multidisciplinary team and suggested the use of educational strategies focused on comprehensiveness, with the aim of favoring the process of apprehending the guidelines and, consequently, adherence to drug therapy. However, although the findings reaffirm the importance of educational guidelines, it is

essential to carry out intervention studies that actually test different ways of informing patients about oral anticoagulation and its peculiarities.

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CONFLICT OF INTERESTS

The authors declare no conflict of interests.

AUTHOR'S CONTRIBUTIONS

ITL: Project management, Formal analysis, Conceptualization, Data curation, Investigation, Methodology, Resources, Writing — original draft, Writing — review & editing, Software, Supervision, Validation, Visualization. SROM: Project management, Formal analysis, Conceptualization, Data curation, Investigation, Methodology, Resources, Writing — original draft, Writing — review & editing, Software, Supervision, Validation, Visualization. PAF: Project management, Formal analysis, Conceptualization, Data curation, Investigation, Methodology, Resources, Writing — original draft, Writing — review & editing, Software, Supervision, Validation, Visualization. GFS: Project management, Formal analysis, Conceptualization, Data curation, Investigation, Methodology, Resources, Writing — original draft, Writing — review & editing, Software, Supervision, Validation, Visualization. CAMD: Project management, Formal analysis, Conceptualization, Data curation, Investigation, Methodology, Resources, Writing — original draft, Writing — review & editing, Software, Supervision, Validation, Visualization.

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