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### Review

## Current trends in the preoperative management of patients receiving warfarin for anticoagulation

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#### ABSTRACT

**Introduction:** The perioperative management of patients receiving chronic treatment with warfarin and scheduled for invasive, elective or emergency procedures is a difficult and frequently arising problem in clinical practice. The lack of clear management guidelines and the indiscriminate use of the temporary replacement with unfractionated heparin creates delays, increases costs and unnecessarily prolongs the length of hospital stay.

**Objectives:** To review current trends and their supporting evidence of temporary replacement ("bridging") during the pre-operative period, emphasizing the use of low-molecular-weight heparins on an outpatient basis.

**Methodology:** PubMed search of evidence-based management guidelines, expert consensus and original trials.

**Results:** Three evidence-based clinical practice guidelines, together with multiple narrative expert reviews, four of them recently published, were identified. Clinical trials found in the surgical setting were purely observational. Although there are comparative studies, none of them apply to the surgical setting.

**Discussion:** Management evidence is limited and expert consensus guidelines are inconsistent.

**Conclusions:** There is suggestive, though non-conclusive evidence supporting the use of low-molecular-weight heparins for temporary replacement ("bridging") of pre-operative anticoagulation on an outpatient basis. There is a need to conduct well-designed comparative studies in the perioperative setting. Guidelines for anticoagulation management in elective and emergency cases are proposed on the basis of the information available, expressed in the form of a simple and innovative graphic algorithm applicable to the Colombian situation.

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## Tendencias actuales en el manejo preoperatorio de pacientes anticoagulados con warfarina

### R E S U M E N

#### Palabras clave:

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**Introducción:** El manejo de la anticoagulación perioperatoria en pacientes tratados crónicamente con warfarina y programados para procedimientos invasivos, electivos y urgentes es un problema clínico frecuente y de difícil manejo. La ausencia de esquemas de manejo claros y el uso indiscriminado de remplazo transitorio con heparina no fraccionada genera demoras, sobre costos y días de hospitalización innecesarios.

**Objetivos:** Revisar las tendencias actuales y evidencia que las soporta, concerniente al remplazo transitorio de la anticoagulación en el preoperatorio ("puenteo"), con énfasis en el uso de heparinas de bajo peso molecular, de manera ambulatoria.

**Metodología:** Se realizó una búsqueda en PubMed de las guías de manejo basadas en la evidencia, consensos de expertos y estudios originales al respecto.

**Resultados:** Se identificaron tres guías de práctica clínica, basadas en la evidencia y múltiples revisiones narrativas por expertos, cuatro de ellas recientes. Los estudios clínicos encontrados en ámbito quirúrgico, son puramente observacionales. Existen estudios comparativos, pero en escenarios no quirúrgicos.

**Discusión:** La evidencia respecto al manejo es limitada y las guías por consenso de expertos son inconsistentes.

**Conclusiones:** Existe evidencia sugestiva, aunque no concluyente, que soporta la utilidad de las heparinas de bajo peso molecular; en el remplazo transitorio y ambulatorio de la anticoagulación en el preoperatorio ("puenteo"). Se necesitan estudios comparativos, bien diseñados, realizados en el ámbito perioperatorio. Con base en la información disponible, se proponen algunos lineamientos con respecto al manejo de anticoagulación en casos electivos y urgentes, expresándolos gráficamente en un algoritmo novedoso y sencillo.

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## Impact of the problem

Approximately 1.4% of the adult population requires continuous oral anticoagulation,<sup>1</sup> and this percentage may increase in the future.<sup>2</sup> Moreover, at least 10% of this population faces the possibility of a surgical intervention every year.<sup>3</sup> Maintaining the anticoagulation effect until the time of surgery or during the procedure may result in excess bleeding;<sup>3,4</sup> on the other hand, interrupting the treatment during the perioperative period increases the risk of thromboembolic events.<sup>5,6</sup> This creates a very common and difficult clinical problem that has already been the focus of attention in this journal.<sup>7,8</sup>

In order to overcome the problem, warfarin is usually interrupted several days prior to the intervention and replaced with the temporary use of anticoagulants of shorter action in order to minimize the time without anticoagulation effect. This bridging practice has been based traditionally on the use of unfractionated heparin (UH) as an intravenous infusion; however, this involves unnecessary hospitalizations and additional costs for patients, institutions and health systems alike.

A recent trend consists of the use of low-molecular-weight heparins (LMWH). Given the ease of subcutaneous administration and the predictability of their effect, they may be used on an outpatient basis and reduce costs and hospital stay. However, there are doubts and some confusion among

clinicians involved in perioperative management regarding their effectiveness, safety and form of use.

Some scientific societies worldwide have gathered the literature available in an attempt at formulating management schemes in the form of evidence-based clinical guidelines,<sup>9-11</sup> and there are also numerous expert narrative reviews on the subject.<sup>12-15</sup> Unfortunately, there is no consensus regarding the recommendations, and the proposed schemes tend to be exceedingly complex or inapplicable.

The aim of this paper is to mention the most relevant evidence supporting current management trends for elective and emergency cases in the preoperative period that usually involve the treating anesthetist, and to propose a simple algorithm (fig. 1) that tries to summarize the international recommendations, and that may be applicable in the Colombian setting.

## Considerations of the variables and risks

Among multiple factors that need to be considered, the two most important variables in decision-making during the preoperative period are the risk of bleeding associated with the procedure, and the risk of thromboembolic events associated with the patient. The former determines the need for timely interruption of warfarin, and the latter affects the relevance of bridging and the dose.

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