



Evaluation of thromboembolic prophylaxis in perioperative patients

Avaliação de profilaxia tromboembólica em pacientes no perioperatório

DOI: 10.56238/isevjhv2n4-021

Receiving the originals: 21/07/2023

Acceptance for publication: 14/08/2023

Joyce Saab

Residency in Surgery at the Presidente Prudente Regional Hospital

Bruno Aparecido Lourenço de Marqui

Vascular Surgeon, member of the clinical staff of the Vascular Surgery Department of the Presidente Prudente Regional Hospital

Andrey Junior de Avila Magalhães

Residency in Surgery at the Presidente Prudente Regional Hospital

Vinicius Denepotti Nogueira

Residency in Surgery at the Presidente Prudente Regional Hospital

Rodrigo Tavore Strasser

Residency in Surgery at the Presidente Prudente Regional Hospital

ABSTRACT

The occurrence of postoperative thromboembolic events is among the most common complications in patients admitted to surgeries, especially when there is a diagnosis of malignancy. Knowing this, several studies were carried out with the aim of defining the best way to avoid the occurrence of thrombosis, as well as identifying which patients would benefit most from prophylactic measures. The present study consists of conducting a narrative review of the most recent studies on prophylactic measures for thromboembolism in the respiratory setting.

OBJECTIVE: To define the indications for pre- and post-operative anticoagulation as prophylaxis for acute thromboembolic events.

METHODS: The study will be based on information collected from online databases, allowing an up-to-date perception of the best evidence on the application of anticoagulant methods in patients scheduled for surgery.

Keywords: Anticoagulation, Post-surgery, Venous thromboembolism, Deep vein thrombosis, Pulmonary thrombosis.

1 INTRODUCTION

Thrombotic events are known to be one of the main causes of death in post-operative patients, especially those with malignant neoplasms, so appropriate treatment with anticoagulant therapy is fundamental for the management of this population. Venous thromboembolism (VTE)



includes deep vein thrombosis (DVT) and pulmonary embolism (PE), the latter being perceived as one of the most common preventable causes of in-hospital deaths after surgery.

The risk of post-operative thromboembolic events should be assessed before the surgical procedure and the patient stratified into risk groups so that an appropriate VTE prevention method can be applied.

It is important to note that the risk of VTE is largely associated with the procedure, such as the duration of surgery, surgical positioning, the need for postoperative immobilization and the surgical site (DOUKETIS J. C and MITHOOWANI S., 2023), but patient-related factors also play a significant role, particularly advanced age, obesity, a history of previous thromboembolic events and hereditary thrombophilias (KENNET A. B, 2023).

It is also known that there is a strong association between thromboembolic events and malignant neoplastic diseases, with thromboembolic events being the second leading cause of death in cancer patients (KHORANA, A. A, 2007). On the other hand, these individuals have a higher risk of bleeding with anticoagulation, which deepens the discussion about the use of anticoagulants in this population (KENNET A. B, 2023).

Several models have been tested to objectively quantify the risk of thromboembolic events, but the Modified Caprini Risk Assessment Model (ANNEX I) is the most widely used and recognized. This model aims to stratify patients undergoing surgical procedures as follows:

- Very low risk: Caprini 0 - corresponds to an Estimated Baseline Risk (EBR) for VTE of less than 0.5%;
- Low risk: Caprini 1 - 2 - corresponds to an RBE of approximately 1.5%;
- Moderate risk: Caprini 3 - 4 - corresponds to an RBE of around 3%;
- High risk: Caprini greater than or equal to 5, corresponding to an RBE of at least 6%.

Based on the recommendations of the American Society of Hematology (ASH), the American College of Chest Physicians (ACCP) and the Asian Venous Thrombosis Forum, the prophylaxis methods that should be used to reduce thromboembolic events include early ambulation; mechanical methods of thromboprophylaxis which include intermittent pneumatic compression (IPC), graduated compression stockings (GCS) and venous foot pump (VFP), with IPC showing the best efficacy; as well as pharmacological methods, with low molecular weight heparin (LMWH) being preferred based on randomized studies that report superior or similar efficacy with unfractionated heparin (UFH) or Fondaparinux.

Secondary prophylaxis methods such as inferior vena cava filters and surveillance imaging are not recommended for VTE prevention in this population.



2 OBJECTIVE

2.1 GENERAL OBJECTIVE

Define the indications for anticoagulation before and after surgery as prophylaxis for acute thromboembolic events.

2.2 SPECIFIC OBJECTIVE

To demonstrate the importance of the correct introduction of anticoagulation in the surgical setting in order to reduce the incidence of thromboembolic events in this population, as well as to define, based on the most up-to-date studies, the best way to quantify the risk of thromboembolic events and the prophylactic measure established.

It also compares drugs with anticoagulant action and their applicability in the surgical population.

3 BACKGROUND

The aim of this study is to evaluate a very important topic, since thromboembolic events are recognized as one of the main causes of mortality in post-operative patients and in those with malignant neoplasms. Therefore, recognizing the correct indication and choice of anticoagulant drugs becomes indispensable in clinical practice, and can often be a decisive factor in a patient's treatment.

4 METHOD

4.1 STUDY DESIGN

This study aims to provide a narrative review of the literature on anticoagulation in the surgical context, particularly its indication, as well as the application of other applicable methods in order to prevent the occurrence of thromboembolic events. It is important to emphasize that through a narrative review it is possible to evaluate and process the most recent studies and compare them with each other in order to obtain the best evidence for clinical practice.

Studies on anticoagulation will be included, selected from databases such as UpToDate and Pubmed, which were selected in the period January and February 2023. The selected articles were then subjected to inclusion criteria: articles in the English language, referring to the adult population in perioperative status, published in the last 5 years. Studies that did not meet these criteria were excluded. Abstracts, opinion pieces, letters and editorials were not included.



5 CONCLUSION

Post-operative thromboembolic events are common among patients undergoing non-orthopaedic surgery, including abdominal, bariatric, vascular, plastic, cardiac, thoracic, neurosurgery and patients admitted with severe trauma.

It is important to emphasize that the VTE risk assessment should be carried out before the surgical intervention, so that the individual's risk category and the best prophylactic regimen can be defined.

In order to define the best proposal for prophylaxis, it is necessary to assess the risk of thrombosis, which is due to factors related to the procedure, such as the duration of the surgery, the anatomical location of the surgical site, the need for post-operative immobilization, as well as risk factors related to the patient, such as advanced age, previous VTE, and the presence of malignancy.

For individuals at very low risk, pharmacological or mechanical methods of thromboprophylaxis are usually not necessary, and early ambulation is the preferred method to be used in this population.

For patients at low risk, mechanical methods of VTE prophylaxis are recommended, such as intermittent pneumatic compression (IPC) devices or graduated compression stockings (GCS).

For patients at moderate risk of VTE, pharmacological prophylaxis is recommended, preferably with Low Molecular Weight Heparin (LMWH), rather than no thromboprophylaxis at all.

Finally, for high-risk patients, at least pharmacological prophylaxis is recommended, preferably with LMWH, with the combination of pharmacological and mechanical methods being the most recommended form of prophylaxis.

It is important to remember the use of unfractionated Heparin (UFH), which is preferred in individuals with severe renal insufficiency, while Fondaparinux is prioritized in cases of heparin-induced thrombocytopenia. In addition, it should be noted that oral agents such as Warfarin, Aspirin and direct oral anticoagulants have not been sufficiently studied in the non-orthopedic postoperative population, so their use is not usually recommended.

The decision on when to start thromboprophylaxis should be individualized: for patients with a low risk of bleeding, LMWH should be administered between 2 and 12 hours before surgery, and in the post-operative period, it should be started within 24 hours of surgery, usually 6 to 8 hours after or on the morning of the day after surgery. If the patient is taking Fondaparinux, it is usually only started 6 to 8 hours after skin closure.



Finally, it is recommended that prophylactic measures be used until the patient becomes fully ambulatory or until discharge from hospital, i.e. prolonged pharmacological prophylaxis for VTE after discharge is not routinely recommended, being restricted to individuals with malignant neoplasms and in the post-operative period of major abdominal and pelvic surgery, for this group pharmacological prophylaxis for four weeks is recommended.



REFERENCES

JAMES D DOUKETIS. Up To Date. Prevention of venous thromboembolic disease in adult nonorthopedic surgical patients. [S.l.]. Up To Date, 2023. Disponível em: <https://www.uptodate.com/contents/prevention-of-venous-thromboembolic-disease-in-adult-nonorthopedic-surgical-patients>. Acesso em: 24 jan. 2023.

KENNETH A BAUER. Up To Date. Anticoagulation therapy for venous thromboembolism (lower extremity venous thrombosis and pulmonary embolism) in adult patients with malignancy. [S.l.]. Up To Date, 2023. Disponível em: <https://www.uptodate.com/contents/anticoagulation-therapy-for-venous-thromboembolism-lower-extremity-venous-thrombosis-and-pulmonary-embolism-in-adult-patients-with-malignancy>. Acesso em: 24 jan. 2023.

KHORANA AA, Francis CW, Culakova E, Kuderer NM, Lyman GH. Frequency, risk factors, and trends for venous thromboembolism among hospitalized cancer patients. *Cancer*. 2007 Nov 15;110(10):2339-46. doi: 10.1002/cncr.23062. PMID: 17918266. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/17918266/>. Acesso em: 24 jan. 2023.

GREGORY YH LIP. Up To Date. Overview of the treatment of proximal and distal lower extremity deep vein thrombosis (DVT). [S.l.]. Up To Date, 2023. Disponível em: <https://www.uptodate.com/contents/overview-of-the-treatment-of-proximal-and-distal-lower-extremity-deep-vein-thrombosis-dvt>. Acesso em: 25 jan. 2023.

JAMES D DOUKETIS. Up To Date. Perioperative management of patients receiving anticoagulants. [S.l.]. Up To Date, 2023. Disponível em: <https://www.uptodate.com/contents/perioperative-management-of-patients-receiving-anticoagulants>. Acesso em: 26 jan. 2023.

KENNETH A BAUER. Up To Date. Risk and prevention of venous thromboembolism in adults with cancer. [S.l.]. Up To Date, 2023. Disponível em: https://www.uptodate.com/contents/risk-and-prevention-of-venous-thromboembolism-in-adults-with-cancer/print?search=tromobose%20venosa%20p%C3%B3s%20cirurgia&source=search_result&selectedTitle=8~150&usage_type=default&display_rank=8. Acesso em: 23 jan. 2023.

ANNEX I

Acrescente 1 ponto para cada situação que se aplique	
Idade 41-60 anos	Infarto agudo do miocárdio
Edema MMII	Insuficiência cardíaca congestiva (<1 mês)
Veias varicosas visíveis	Cirurgia maior realizada no último mes
Cirurgia menor planejada	História de doença inflamatória intestinal
Sepse (<1 mês)	Função pulmonar anormal (DPOC)
Sobrepeso ou obesidade (IMC > 25)	Doença pulmonar grave, como pneumonia
Acamado ou com restrição mobilidade, incluindo ortese imobilizador de MI por menos de 72h	
Uso de pílula anticoncepcional ou terapia de reposição hormonal	
Gravidez ou parto no último mes	
História de bebe natimorto, aborto espontaneo recorrente (mais de 3), bebe prematuro com toxemia ou bebe com restrição de crescimento	
Outros fatores de risco (1 ponto cada)***	

Acrescente 5 pontos para cada situação que se aplique	
AVC (<1 mês)	
Politraumatismo (<1 mês)	
Artroplastia de membros inferiores	
Fratura de quadril, femur e pema (<1 mês)	
TRM (paralisia) (<1 mês)	

Acrescente 2 pontos para cada situação que se aplique	
Idade 61-74 anos	
Cancer atual ou no passado	
Cirurgia maior planejada estimada em mais de 45 minutos (incluindo laparoscopia)	
Bota gessada ou outro dispositivo não removível (<1 mês)	
Cateter venoso central	
Artroscopia	
Acamado ou com restrição mobilidade por mais de 72h	

Acrescente 3 pontos para cada situação que se aplique	
Idade 75 anos ou mais	
Trombose previa (TVP ou embolia pulmonar)	
História familiar de trombose	
Fator V de Leiden positivo	
Protrombina positivo	
Anticoagulante lúpico positivo	
Trombocitopenia induzida por heparina	
Homocisteína sérica elevada	
Anticorpos anticardiolipina elevados	
Outra trombofilia adquirida ou congênita	