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Prevention of Venous Thrombo-Embolism in Non-surgical Hospitalized Patients

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ABSTRACT

Background: The literature on the prevention of venous thromboembolism (VTE) in non-surgical hospitalized patients reveals a multifaceted approach to addressing this significant health concern. VTE, which includes deep vein thrombosis (DVT) and pulmonary embolism (PE), is a leading cause of preventable morbidity and mortality within this population. The urgency for effective preventive measures is underscored by the fact that a substantial percentage of hospitalized patients are at risk due to factors such as immobility, obesity, and advanced age (Forgerini et al., 2019). **Literature Review:** The literature also reveals significant gaps in adherence to prophylaxis protocols. Studies indicate that while evidence-based measures are critical for reducing VTE incidence, adherence remains inconsistent. The need for systematic risk assessment models (RAMs) is emphasized, as these tools can help identify high-risk patients and tailor prophylactic strategies accordingly. Moreover, the literature discusses the importance of integrating clinical decision support systems to enhance the implementation of VTE prophylaxis protocols. **Conclusion:** In conclusion, the literature underscores the complexity of VTE prevention in non-surgical hospitalized patients, emphasizing the need for improved adherence to prophylactic measures, effective risk assessment strategies, and the integration of clinical decision support systems. The current gaps in practice highlight the necessity for ongoing education and training for healthcare providers, as well as the implementation of comprehensive strategies to enhance patient outcomes and reduce the incidence of VTE.

Keyword: Prevention, Venous Thrombo-Embolism, Non-surgical Hospitalized Patients

INTRODUCTION

The prevention of venous thromboembolism (VTE) in non-surgical hospitalized patients has emerged as a critical area of focus in contemporary medical literature. VTE, comprising deep vein thrombosis (DVT) and pulmonary embolism (PE), represents a leading cause of preventable morbidity and mortality in hospitalized individuals (Francisco Cardoso et al., 2016). The urgency of addressing VTE risk is underscored by the fact that half of hospitalized patients are susceptible to developing this condition, particularly those with acquired risk factors such as immobility, obesity, and advanced age (Forgerini et al., 2019).

The literature reveals a consensus on the importance of ambulation as a preventive measure against VTE. (Chiara Chindamo & Arêas Marques, 2019) highlight that loss of mobility can significantly elevate the risk of VTE, emphasizing the necessity of physical activity for at-risk patients. Despite the recognized benefits of pharmacological prophylaxis, its utilization remains insufficient, with ambulation often being the sole criterion for discontinuing thromboprophylaxis (Chiara Chindamo & Arêas Marques, 2019).

Further examination of adherence to prophylaxis protocols reveals a concerning gap in practice. (Forgerini et al., 2019) argue that the application of evidence-based measures is crucial for reducing VTE incidence. The authors advocate for the use of unfractionated heparin (UFH) and low-molecular-weight heparin (LMWH) as standard prophylactic agents, yet adherence to protocols remains inconsistent. The effectiveness of these prophylactic strategies is further supported by (Nicholson et al., 2020), who note that while routine thromboprophylaxis is recommended, the balance between reducing VTE and the risk of bleeding remains a contentious issue.

The need for systematic risk assessment models (RAMs) is emphasized across multiple studies. (Chiara Chindamo & Arêas Marques, 2021) argue for the dual assessment of VTE and bleeding risks, advocating for a comprehensive approach to thromboprophylaxis.

This sentiment is echoed by (Forgo et al., 2021) who call for global strategies to enhance the implementation of RAMs to identify high-risk patients effectively. Despite the development of these models, (Tsaftaridis et al., 2024) highlight that the integration of such assessments into clinical practice is still lacking, leading to suboptimal use of thromboprophylaxis.

The literature collectively underscores the complexity of VTE prevention in hospitalized patients, revealing a pressing need for improved adherence to prophylactic measures, effective risk assessment strategies, and the integration of clinical decision support systems to enhance patient outcomes.

LITERATURE REVIEW

The article "Results of a venous thromboembolism prophylaxis program for hospitalized patients" by (Francisco Cardoso et al., 2016) provides a comprehensive examination of the implementation and outcomes of a prophylaxis program aimed at preventing venous thromboembolism (VTE) in hospitalized patients. The authors underscore the significance of VTE as a leading cause of preventable death within this demographic, highlighting the urgent need for effective preventive measures.

The study presents a well-structured prophylaxis program that includes both pharmacological and non-pharmacological interventions. The authors detail the criteria for patient selection, emphasizing the importance of a risk assessment protocol to identify individuals at elevated risk for VTE. This approach aligns with contemporary guidelines that advocate for individualized patient care based on risk factors such as immobility, history of VTE, and underlying medical conditions.

The results of the program indicate a marked reduction in the incidence of VTE among participants, showcasing the efficacy of systematic prophylaxis in a hospital setting. The authors provide statistical evidence to support their claims, demonstrating a significant decrease in VTE events post-implementation of the program. This empirical data not only strengthens the argument for routine VTE prophylaxis but also serves as a

critical reminder of the potential consequences of neglecting such measures.

Additionally, the article discusses the challenges encountered during the program's implementation, including staff compliance and the need for ongoing education and training. These insights are crucial, as they reflect the multifaceted nature of healthcare delivery and the necessity of fostering a culture of safety and vigilance among healthcare professionals.

The article titled "Role of ambulation to prevent venous thromboembolism in medical patients: where do we stand?" by (Chiara Chindamo & Arêas Marques, 2019) provides a comprehensive examination of the significant role that ambulation plays in preventing venous thromboembolism (VTE) among hospitalized medical patients. The authors emphasize that VTE remains the leading cause of preventable mortality within this population, highlighting the critical need for effective preventive strategies.

Chindamo and Marques identify a range of risk factors contributing to VTE, including both acquired and inherited conditions such as obesity, prior thrombosis, and advanced age, as well as specific medical conditions like cancer and acute infections. Notably, they underscore immobility as a prevalent acquired risk factor that can increase the incidence of VTE by two to five times compared to patients who maintain normal mobility. This insight is particularly relevant for medical patients, who often experience restricted mobility due to the acute illnesses that necessitate their hospitalization.

The article points out that despite the clear association between immobility and VTE risk, pharmacological prophylaxis remains underutilized in clinical practice. This discrepancy raises important questions regarding the assessment and management of VTE risk, particularly in medical patients who may not meet the criteria for surgical prophylaxis. The authors note a lack of consensus on the definitions of immobility used in existing studies, which complicates the evaluation of

VTE risk and the effectiveness of early mobilization as a preventive measure.

Furthermore, Chindamo and Marques advocate for increased awareness and education among healthcare providers regarding the importance of ambulation and early mobilization as protective factors against VTE. They argue that promoting mobility should be a fundamental component of VTE prevention protocols, particularly in non-surgical hospitalized patients who are at risk due to their medical conditions.

The article "Assessment of the adherence to and costs of the prophylaxis protocol for venous thromboembolism" by (Forgerini et al., 2019) provides a comprehensive analysis of the adherence to prophylactic measures against venous thromboembolism (VTE) in hospitalized patients. The authors effectively highlight the significant risk that VTE poses during hospitalization, noting that approximately half of hospitalized patients are susceptible to developing this condition, which encompasses both deep venous thrombosis (DVT) and pulmonary thromboembolism (PTE).

The main thrust of the article is the critical importance of adequate prophylactic measures, such as unfractionated heparin (UFH) and low-molecular weight heparin (LMWH), which have been shown to significantly mitigate the incidence of VTE. The authors underscore that while these prophylactic strategies are effective, their success hinges on the adherence to established protocols. This is a vital point, as it indicates that the mere presence of prophylactic measures is insufficient; rather, consistent and appropriate application is necessary to achieve desired outcomes.

Forgerini et al. also delve into the economic implications of VTE prophylaxis, assessing the costs associated with adherence to prophylactic protocols. This aspect is particularly relevant in the context of healthcare resource management, as understanding the financial burden of VTE can inform policy decisions and resource allocation. The authors advocate for the implementation of

quality management tools that monitor adherence to these protocols, suggesting that such measures can promote a more rational use of prophylactic therapy and ultimately enhance patient outcomes.

Critically, the article raises important questions about the barriers to adherence and the potential consequences of non-compliance. While the authors provide a solid foundation for understanding the necessity of prophylaxis, further exploration into the specific factors that influence adherence—such as staff education, patient factors, and institutional policies—could enrich the discussion. Additionally, the article could benefit from a more detailed exploration of the outcomes associated with varying levels of adherence to the prophylaxis protocols.

The article "Prevention of Venous Thromboembolism in 2020 and Beyond" by (Nicholson et al., 2020) provides a comprehensive overview of the current state of venous thromboembolism (VTE) prophylaxis in non-surgical hospitalized patients. The authors critically analyze the results from randomized controlled trials, highlighting that the detection of asymptomatic and distal deep vein thrombosis (DVT) largely drives these outcomes. This raises important questions regarding the clinical significance of these findings, particularly in terms of mortality reduction, which remains a contentious issue within the field.

One of the key insights from the article is the acknowledgment that while pharmacologic VTE prophylaxis has been associated with improved mortality in critically ill patients, the potential benefits must be weighed against the inherent risks of bleeding associated with anticoagulant therapy. This is particularly pertinent in the context of hospitalized medical patients, where the decision to implement prophylaxis should be individualized based on the patient's risk profile. The authors emphasize that in the absence of contraindications, the administration of low-molecular-weight heparin, unfractionated heparin, or fondaparinux has become the standard of care for at-risk medical inpatients.

The article also discusses the role of scoring systems in personalizing VTE prophylaxis. These systems consider various risk factors that contribute to an individual patient's likelihood of developing VTE, thus facilitating a more tailored approach to thromboprophylaxis. The implementation of standardized VTE Risk Assessment Models, as mandated by the NHS in England and the Center for Medicare and Medicaid Services in the US, underscores the importance of systematic risk assessment in optimizing patient outcomes.

Moreover, the authors highlight the effectiveness of computer alert interventions and other systemic measures in enhancing the uptake of VTE prophylaxis, which is crucial in reducing preventable VTE cases. This proactive approach is particularly vital given that the risk of VTE is markedly elevated immediately following hospitalization and can persist for up to three months post-admission.

However, the article cautions against the routine use of extended thromboprophylaxis after discharge without a thorough individualized risk assessment. This is a critical point, as the indiscriminate application of prophylactic measures could lead to unnecessary treatment in low-risk patients, potentially resulting in adverse outcomes.

The article "Bleeding risk assessment for venous thromboembolism prophylaxis" by (Chiara Chindamo & Arêas Marques, 2021) provides a comprehensive overview of the critical interplay between venous thromboembolism (VTE) risk and bleeding risk in hospitalized patients. The authors effectively underscore VTE as a significant contributor to morbidity and mortality in hospital settings, with fatal pulmonary embolism often being the first manifestation of VTE. This alarming statistic, indicating that pulmonary embolism can account for up to 10% of in-hospital mortality, establishes the urgent need for effective prophylactic measures.

The article thoroughly reviews various risk factors associated with VTE, including both acquired and hereditary conditions such as obesity, cancer, previous VTE

incidents, and immobility, among others. This comprehensive risk categorization is crucial for healthcare providers to identify patients who may benefit from prophylactic interventions. The authors point out that national and international guidelines advocate for the use of risk assessment models (RAM) to guide the selection of appropriate pharmacological or mechanical prophylaxis, highlighting the necessity of a systematic approach to VTE prevention.

A notable contribution of this article is its emphasis on the concurrent assessment of bleeding risk alongside VTE risk. The authors argue that the risk of bleeding, which can be exacerbated by anticoagulant therapies, must be evaluated to ensure the safe and effective use of thromboprophylaxis. This dual consideration is particularly pertinent given the global underutilization of pharmacological prophylaxis, often driven by the fear of hemorrhagic complications. The authors advocate for the identification of conditions that increase bleeding risk and the implementation of RAM to facilitate informed decision-making regarding thromboprophylaxis strategies.

The article "Analysis of Adherence to Thromboprophylaxis and Incidence of Venous Thromboembolism After Lower Limb Orthopaedic Surgery" by (W Benjamin et al., 2021) presents a comprehensive examination of the adherence to thromboprophylaxis guidelines and the incidence of venous thromboembolism (VTE) in patients undergoing lower limb orthopaedic surgery. The authors emphasize the critical nature of VTE as a common complication during and after hospitalization, particularly highlighting its impact on patient mortality, with pulmonary embolism accounting for 5% to 10% of deaths in hospitalized patients without appropriate prophylaxis.

The study underscores the significance of post-discharge prophylaxis, noting that many patients remain at risk for VTE even after leaving the hospital. This observation aligns with the article's assertion that adherence to national and international thromboprophylaxis guidelines is suboptimal, with only

40% to 50% of medical patients and 60% to 75% of surgical patients receiving adequate thromboprophylaxis. This low adherence rate is particularly concerning among patients undergoing orthopaedic surgery, who are identified as being at heightened risk for VTE complications.

The authors advocate for the use of pharmacological thromboprophylaxis, specifically recommending low molecular weight heparin (LMWH) or fondaparinux for patients with lower limb immobilization when the risk of VTE significantly outweighs the risk of bleeding. The effectiveness of such prophylactic measures is supported by evidence indicating a 60% reduction in symptomatic and asymptomatic VTE rates when compared to placebo. This is further corroborated by a Cochrane review which found a similar risk reduction in symptomatic DVT among patients with lower leg immobility receiving daily prophylaxis with LMWH.

A critical evaluation of the article reveals its strengths in presenting robust data regarding the effectiveness of thromboprophylaxis and the dire consequences of non-adherence to guidelines. However, it also highlights a gap in practice, as adherence remains limited despite the clear recommendations and demonstrated benefits. The authors do not delve deeply into the underlying reasons for this non-adherence, which could provide valuable insights for improving clinical practice. Understanding the barriers that prevent adherence, such as patient-specific risk factors or systemic healthcare challenges, could enhance the implementation of thromboprophylaxis protocols.

The article "An update on the global use of risk assessment models and thromboprophylaxis in hospitalized patients with medical illnesses from the World Thrombosis Day steering committee: Systematic review and meta-analysis" by (Forgo et al., 2021) provides a comprehensive overview of the current landscape of venous thromboembolism (VTE) prevention among non-surgical hospitalized patients. It underscores VTE as a significant contributor to morbidity and mortality, particularly in

hospitalized patients, and highlights the importance of effective risk assessment and thromboprophylaxis strategies.

The authors emphasize that VTE events predominantly occur during hospitalization or shortly after discharge, indicating a critical window for intervention. They discuss various risk assessment models developed to identify patients at high risk for VTE, which is essential for implementing targeted thromboprophylaxis. Despite the existence of these models, the article points out a concerning gap between the identification of high-risk patients and the actual implementation of appropriate prophylactic measures. The authors note that while some countries have successfully integrated national health care strategies into routine practices, resulting in reduced VTE-related deaths and costs, these strategies are not universally applied, leading to inconsistencies in care.

One of the key insights from the article is the recognition of a substantial proportion of high-risk hospitalized patients who do not receive adequate thromboprophylaxis. This discrepancy highlights the need for enhanced education and training for healthcare professionals regarding VTE prevention protocols. The authors advocate for systematic strategies that not only identify at-risk patients but also ensure the implementation of effective thromboprophylaxis measures.

Furthermore, the article discusses the role of the World Health Organization and other stakeholders in promoting initiatives aimed at reducing hospital-associated VTE. The authors call for ongoing evaluation and adaptation of risk assessment tools and prophylactic therapies to improve patient outcomes.

The article "System-Wide Thromboprophylaxis Interventions for Hospitalized Patients at Risk of Venous Thromboembolism: Focus on Cross-Platform Clinical Decision Support" by (Tsaftaridis et al., 2024) addresses the critical issue of venous thromboembolism (VTE) in hospitalized patients, particularly emphasizing the need for effective thromboprophylaxis strategies. The

authors highlight that VTE, which includes both deep vein thrombosis (DVT) and pulmonary embolism (PE), represents a significant health risk, being the third leading cause of cardiovascular mortality globally. With approximately 60% of VTE cases linked to recent hospital admissions, the article underscores the importance of preventive measures, especially in medical inpatients who are particularly vulnerable.

A key insight from the article is the complex nature of thromboprophylaxis management, which must consider both patient-specific and disease-specific risk factors. The authors note that existing VTE risk models, such as the Caprini, Padua, IMPROVE, and IMPROVE-DD scores, have undergone extensive validation but are still underutilized in clinical practice. The authors argue that this underutilization stems from several barriers, including the complexity of clinical management and the absence of validated VTE risk models integrated into care pathways.

The article critically evaluates the current state of thromboprophylaxis, revealing that less than 4% of hospitalized patients receive post-discharge thromboprophylaxis, despite clinical guidelines recommending anticoagulant therapy for those at risk. This gap indicates a significant opportunity for improvement in clinical practice, particularly given the increasing healthcare costs associated with VTE events in the U.S. healthcare system.

To address these challenges, the authors propose a multifaceted approach that includes quality improvement initiatives, national VTE prevention programs, and the implementation of computerized clinical decision support (CDS) tools. The development of a cloud-based universal CDS tool that incorporates validated VTE risk models is presented as a promising solution to enhance the uptake of appropriate thromboprophylaxis in hospitalized patients.

CONCLUSION

The literature on the prevention of venous thromboembolism (VTE) in non-surgical hospitalized patients reveals

a multifaceted approach to addressing this significant health concern. VTE, which includes deep vein thrombosis (DVT) and pulmonary embolism (PE), is a leading cause of preventable morbidity and mortality within this population. The urgency for effective preventive measures is underscored by the fact that a substantial percentage of hospitalized patients are at risk due to factors such as immobility, obesity, and advanced age (Forgerini et al., 2019).

A consensus in the literature emphasizes the importance of ambulation as a primary preventive strategy against VTE. The role of physical activity is highlighted as critical, particularly for patients who experience reduced mobility during their hospital stay (Chiara Chindamo & Arêas Marques, 2019). Despite the recognized benefits of ambulation, pharmacological prophylaxis, such as unfractionated heparin (UFH) and low-molecular-weight heparin (LMWH), remains underutilized, with ambulation often being the only criterion for discontinuing thromboprophylaxis (Chiara Chindamo & Arêas Marques, 2019) (Forgerini et al., 2019).

The literature also reveals significant gaps in adherence to prophylaxis protocols. Studies indicate that while evidence-based measures are critical for reducing VTE incidence, adherence remains inconsistent (Nicholson et al., 2020) (Chiara Chindamo & Arêas Marques, 2021). The need for systematic risk assessment models (RAMs) is emphasized, as these tools can help identify high-risk patients and tailor prophylactic strategies accordingly (Forgo et al., 2021) (Tsaftaridis et al., 2024).

Moreover, the literature discusses the importance of integrating clinical decision support systems to enhance the implementation of VTE prophylaxis protocols. This integration is vital in addressing the complex nature of thromboprophylaxis management and ensuring that appropriate measures are taken for at-risk patients (Tsaftaridis et al., 2024). The dual assessment of VTE and bleeding risks is also highlighted as essential for informed decision-making regarding thromboprophylaxis (Chiara Chindamo & Arêas Marques, 2021).

In conclusion, the literature underscores the complexity of VTE prevention in non-surgical hospitalized patients, emphasizing the need for improved adherence to prophylactic measures, effective risk assessment strategies, and the integration of clinical decision support systems. The current gaps in practice highlight the necessity for ongoing education and training for healthcare providers, as well as the implementation of comprehensive strategies to enhance patient outcomes and reduce the incidence of VTE.

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