

Review Article

The nursing strategies for preventing post-percutaneous coronary intervention hematomas: a review

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ABSTRACT

Post-percutaneous coronary intervention (PCI) hematomas pose significant risks for patients and can lead to severe morbidity and mortality if left unaddressed. Nurses play a vital role in preventing these complications, emphasizing the importance of their understanding and implementation of nursing strategies and interventions. This comprehensive review investigates the various nursing strategies and interventions aimed at mitigating the risk of post-PCI hematomas and improving patient outcomes. A systematic search across multiple medical databases and scholarly sources yielded data on preventive measures and treatment options for post-PCI hematomas. The review underscores the significance of nursing interventions, including patient education, pressure dressings, careful hemostasis, and medication management, in reducing the occurrence of hematomas. It also highlights the potential complications associated with post-PCI hematomas, emphasizing the necessity of timely intervention and patient education to minimize the risk. The review emphasizes the critical role of nurses in the prevention and management of post-PCI hematomas and provides insights for future research and quality improvement initiatives. Overall, the review serves as a valuable resource for healthcare professionals, offering a comprehensive understanding of nursing interventions and guidelines to enhance patient safety and minimize the incidence of post-PCI hematomas.

Keywords: Post-percutaneous coronary intervention, Hematomas, Quality of life

INTRODUCTION

Post-percutaneous coronary intervention (PCI) procedures are essential in managing coronary artery disease, offering patients effective treatment options to improve cardiovascular health. However, these procedures are not without risk, as the development of hematomas at the access site can pose significant challenges for patients and healthcare providers.¹ Hematomas, characterized by the accumulation of blood, can vary in size and severity, potentially leading to prolonged hospital stays, increased healthcare costs, and adverse patient outcomes if not promptly addressed.² Given the critical nature of this complication, nurses are at the forefront of implementing preventive measures and interventions to mitigate the risk of post-PCI hematomas and enhance patient safety.³

Nurses, as integral members of the healthcare team, are well-positioned to implement evidence-based practices that promote optimal patient care and positive treatment outcomes.⁴ By employing comprehensive nursing strategies, such as patient education, vigilant monitoring, and timely intervention, nurses can significantly reduce the incidence of post-PCI hematomas and contribute to improved patient well-being.⁵ Additionally, their role in educating patients and their families about the importance of adherence to post-procedural guidelines and the recognition of early warning signs can empower individuals to actively participate in their recovery process.⁶

This comprehensive review aims to explore the diverse range of nursing strategies and interventions designed to

prevent and manage post-PCI hematomas, emphasizing the critical role of nurses in ensuring patient safety and enhancing the overall quality of care in the context of PCI procedures. Through an in-depth analysis of current research and clinical practices, this review seeks to provide valuable insights into the multifaceted responsibilities of nurses in post-PCI care and the implications for patient outcomes and healthcare delivery. By highlighting the significance of nursing interventions in reducing the risk of post-PCI hematomas, this review aims to contribute to the ongoing improvement of nursing practices and the promotion of patient-centered care in cardiovascular medicine.⁴

METHODS

To conduct this comprehensive review, an extensive search was carried out across multiple medical databases and scholarly sources. The search terms included "post-PCI hematomas," "nursing interventions," "complications," and "prevention strategies." Studies and articles published within the past decade were selected to ensure relevance and up-to-date information. Inclusion criteria comprised research papers, clinical trials, case studies, and systematic reviews that investigated nursing interventions related to the prevention of post-PCI hematomas. The selected studies were analyzed, and the data were categorized according to the nursing strategies employed and their effectiveness in reducing hematoma occurrence.

Complications

Post-PCI hematomas can give rise to a range of potential complications, impacting both patient well-being and healthcare outcomes.⁷ First and foremost, these hematomas can result in prolonged bleeding and oozing at the access site, necessitating additional interventions to achieve hemostasis, which can lead to patient discomfort and delayed recovery.⁸ Furthermore, untreated hematomas may progress to pseudo aneurysms, requiring surgical repair or other invasive procedures.⁹ Hematomas can also create an environment conducive to bacterial growth, increasing the risk of infection at the access site, potentially leading to cellulitis or systemic infections if not promptly addressed.¹⁰ Compression from a hematoma can potentially damage nearby nerves or tissues, causing pain, numbness, or weakness. In some cases, larger hematomas may impede blood flow in nearby vessels, potentially leading to ischemia and tissue damage.¹¹ Delayed discharge and recovery, increased healthcare costs, and reduced patient satisfaction can result from complications associated with hematomas.¹² Psychologically, patients may experience anxiety and distress due to the presence of a hematoma and concerns about potential complications.¹³ In severe cases, additional medical or surgical procedures may be required to manage the complications associated with post-PCI hematomas, further adding to the patient's medical burden.¹³ It is clear that preventing post-PCI hematomas and taking prompt action when they occur are

of paramount importance to mitigate these potential complications, and healthcare providers, particularly nurses, play a critical role in early detection, intervention, and patient education to reduce the risk of hematoma-related issues.¹⁴

Prevention strategies

Preventive strategies for post-PCI hematomas are of paramount importance in safeguarding patient well-being and minimizing complications.¹⁵ Firstly, patient education is a cornerstone; informing patients about the necessity of remaining immobile for the recommended duration after the PCI, particularly emphasizing leg positioning, can help reduce the risk.¹⁶ Additionally, the application and meticulous maintenance of pressure dressings, adhering to physician's orders, are essential to promote hemostasis at the access site.¹⁷ In cases where applicable, the use of vascular closure devices should be accompanied by strict adherence to manufacturer guidelines for proper application and monitoring.¹⁸ Ensuring careful hemostasis prior to sheath or catheter removal is crucial, warranting the implementation of standardized protocols. Furthermore, the vigilant and continuous assessment of the puncture site is imperative to detect early signs of bleeding, swelling, or hematoma formation, facilitating timely intervention.¹⁹ Regular neurovascular checks, especially assessing distal blood flow indicators, and monitoring hemoglobin levels are vital components of hematoma prevention.²⁰ The precise administration of prescribed medications, including anticoagulants and antiplatelet agents, in accordance with physician orders, is equally critical.²¹ Finally, minimizing access site manipulation, which involves avoiding unnecessary leg movement, contributes to the prevention effort. Collaboration among healthcare team members, particularly close coordination with the interventional cardiologist, ensures comprehensive post-PCI care, further enhancing patient safety. The implementation of these multifaceted preventive measures, coupled with adherence to evidence-based guidelines, significantly diminishes the incidence of post-PCI hematomas, promoting a smoother recovery process for patients.

Treatment for post-PCI hematomas

The treatment of post-PCI hematomas is a multifaceted approach that considers various factors, such as the hematoma's severity and the patient's overall condition. When managing these complications, healthcare providers have several treatment options at their disposal. For small, asymptomatic hematomas, a conservative approach of monitoring and observation is often taken, especially when the hematoma is stable and not expanding. Pressure dressings can be applied to the access site to promote hemostasis in cases of small, minimally discomforting hematomas.²² Patients may also be advised to maintain bed rest and limb immobilization to reduce movement and the risk of hematoma expansion.¹⁷ If there is pain or discomfort, analgesic medications may be prescribed for

relief. In cases of larger or symptomatic hematomas, healthcare providers may opt for hematoma aspiration, a procedure involving the removal of accumulated blood using a needle and syringe, typically performed under ultrasound guidance to minimize complications.²³ In severe or rapidly expanding hematomas where other treatments are ineffective, surgical intervention may be necessary, which can include hematoma evacuation or, in extreme cases, surgical repair of vascular injuries.²⁴ If the patient is on anticoagulant medications, anticoagulation reversal may be required to promote hemostasis. In instances of significant blood loss, transfusion of blood products may be necessary to restore hemoglobin levels and stabilize the patient. Additionally, if signs of infection or cellulitis at the access site are present, appropriate antibiotics will be prescribed for infection management.⁸⁻¹⁰ Ultimately, the choice of treatment hinges on factors such as hematoma size, location, the presence of symptoms, and the patient's overall health. It is essential to have a healthcare provider thoroughly assess the patient's condition and determine the most appropriate treatment strategy. Timely intervention is paramount in preventing complications and enhancing patient outcomes.

DISCUSSION

The review highlights the critical role nurses play in preventing post-PCI hematomas. These complications are not only a source of patient discomfort but can also lead to more severe outcomes, including pseudoaneurysms and infections.⁸⁻¹⁰ By implementing evidence-based strategies and interventions, nurses can significantly reduce the incidence of post-PCI hematomas and enhance patient safety.⁵ This discussion section delves into the implications of these nursing interventions, including their impact on patient outcomes and potential areas for further research and improvement.

Significance of the identified nursing strategies

The nursing strategies identified in this review, including patient education, pressure dressings, vascular closure devices, careful hemostasis, neurovascular checks, and medication management, are instrumental in preventing post-PCI hematomas. These strategies are not only effective but also practical and feasible in clinical settings. They empower nurses to take a proactive role in minimizing the risk of complications, enhancing patient comfort, and ultimately improving patient satisfaction.^{25,26}

Challenges in managing and preventing complications

Despite the advancement of nursing strategies and evidence-based practices, challenges remain in managing and preventing post-PCI hematomas. The complexity of patient comorbidities, variations in procedural techniques, and the potential for unexpected complications make it imperative for nurses to remain vigilant and adaptable in their approach. Moreover, patient compliance with post-

procedure instructions can be a challenge, highlighting the importance of clear and effective patient education.²⁷

Areas for further research and improvement

As the field of interventional cardiology evolves, ongoing research and quality improvement initiatives are essential. Future studies may focus on the comparative effectiveness of various nursing strategies and their impact on patient outcomes. Additionally, research into novel technologies or approaches that further enhance hemostasis and reduce hematoma risk is warranted. The integration of data-driven healthcare systems to monitor and predict complications could also be an avenue for improvement.²⁸

In conclusion, this comprehensive review sheds light on the critical role of nursing in preventing post-PCI hematomas and improving patient outcomes. The identified nursing strategies, when integrated into clinical practice, have the potential to significantly reduce the incidence of these complications. However, challenges persist, necessitating ongoing research and innovation to further enhance patient safety in the field of interventional cardiology. It is imperative that healthcare providers, particularly nurses, continue to stay informed and updated on best practices to ensure the highest standard of care for PCI patients.

Implications of the study findings

The review of nursing strategies for preventing post-PCI hematomas underscores the critical role that nurses play in enhancing patient safety during the post-procedural phase. By implementing a range of preventive measures, nurses can significantly reduce the incidence of these potentially serious complications. The findings emphasize that a multidisciplinary approach, with close collaboration among healthcare providers, is crucial in achieving optimal patient outcomes.

CONCLUSION

In conclusion, post-PCI hematomas are a common and potentially serious complication, but through the diligent implementation of nursing strategies and evidence-based interventions, their incidence can be significantly reduced. Nurses are on the front lines of patient care and have a critical role in preventing these complications. This comprehensive review serves as a valuable resource for healthcare professionals, offering insights into the latest nursing interventions and guidelines to minimize the risk of post-PCI hematomas and improve patient safety. Further research and collaboration between healthcare teams are essential in refining and advancing these preventive strategies.

Recommendations

Based on the findings of this comprehensive review, several key recommendations can be proposed to enhance

the prevention and management of post-PCI hematomas. Firstly, the development of standardized nursing protocols and guidelines specific to post-PCI care can facilitate a systematic approach to patient assessment, education, and intervention, ensuring consistency and quality in nursing practice. Secondly, the integration of interdisciplinary collaboration among healthcare teams, including cardiologists, interventional radiologists, and nurses, can foster a cohesive approach to patient care, promoting effective communication and coordinated decision-making. Thirdly, the implementation of continuous nursing education programs focused on the latest advancements in PCI procedures, hemostasis techniques, and evidence-based nursing interventions can empower nurses to stay abreast of best practices and contribute to ongoing quality improvement initiatives. Moreover, the incorporation of patient-centered approaches, such as shared decision-making and tailored patient education materials, can empower patients to actively participate in their care, fostering a sense of partnership and mutual trust between patients and healthcare providers. Finally, the establishment of comprehensive monitoring and reporting systems to track the incidence of post-PCI hematomas and associated outcomes can provide valuable data for quality assessment and performance improvement, enabling healthcare facilities to identify areas for further enhancement and ensure the delivery of high-quality, evidence-based care for all PCI patients.

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