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Safety and Efficacy of Antithrombotic Strategies in Patients With Atrial Fibrillation Undergoing Percutaneous Coronary Intervention

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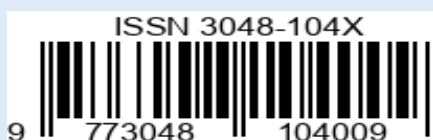
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ABSTRACT

Background: The landscape of antithrombotic strategies in patients with atrial fibrillation (AF) undergoing percutaneous coronary intervention (PCI) has evolved significantly over the past decade, driven by the need to balance the prevention of thromboembolic events with the risk of bleeding. **Literature Review:** The literature on antithrombotic strategies for patients with atrial fibrillation (AF) undergoing percutaneous coronary intervention (PCI) reveals a nuanced landscape characterized by evolving treatment regimens aimed at balancing thromboembolic prevention and bleeding risk. The initial exploration identified significant gaps in the understanding of optimal therapies for AF patients post-PCI, highlighting the need for evidence-based approaches. Subsequent systematic reviews and meta-analyses. **Conclusion:** In conclusion, the evolving body of literature reflects a significant shift towards optimizing antithrombotic strategies for AF patients undergoing PCI. The consensus points to the need for individualized approaches that consider both thromboembolic and bleeding risks, with a growing preference for dual therapy involving NOACs. As research continues to advance, it is imperative that clinical guidelines are updated to reflect these findings, ensuring that patient care is informed by the most current evidence.

Keyword: Safety, Efficacy, Antithrombotic Strategies, Atrial Fibrillation, Percutaneous Coronary Intervention

INTRODUCTION

The landscape of antithrombotic strategies in patients with atrial fibrillation (AF) undergoing percutaneous coronary intervention (PCI) has evolved significantly over the past decade, driven by the need to balance the prevention of thromboembolic events with the risk of bleeding. The initial exploration of this topic by (Jang et al., 2011) highlighted a critical gap in understanding the optimal antithrombotic therapy for AF patients post-PCI, noting the limited evidence available at that time. Their study set the stage for subsequent research aimed at identifying effective treatment regimens that could mitigate risks associated with both AF and coronary artery disease.

Building on this foundation, (Gong et al., 2017) conducted a systematic review and network meta-analysis that underscored the complexity of managing AF patients undergoing PCI. They pointed out that while dual-antiplatelet therapy (DAPT) is standard for coronary artery disease, the concomitant use of anticoagulants in AF patients is essential to prevent thrombosis. Their

findings emphasized the inadequacy of existing clinical evidence to support individualized antithrombotic regimens, particularly in light of the evolving guidelines which recommend triple therapy that includes an oral anticoagulant, aspirin, and clopidogrel.

further expanded the discussion by systematically reviewing antithrombotic regimens for anticoagulated patients undergoing PCI. They highlighted the increased bleeding risks associated with more intensive antithrombotic strategies and the challenges posed by the introduction of novel agents. Their analysis indicated that while the classic triple therapy is frequently referenced, the actual effectiveness and safety of newer regimens remain uncertain, necessitating a careful evaluation of patient-specific factors.

(Agasthi et al., 2020) contributed to this discourse by comparing direct oral anticoagulants (DOACs) with vitamin K antagonists (VKAs) in the context of post-PCI management for AF patients. Their systematic review and meta-analysis revealed nuanced insights into the safety profiles of these therapies,

suggesting that while DOACs may offer advantages in terms of reduced bleeding, the comparative efficacy in preventing adverse cardiovascular outcomes requires further investigation.

In a similar vein, (Chua et al., 2020) conducted a comprehensive systematic review and network meta-analysis that included a substantial number of patients. They found that dual antithrombotic therapy using non-vitamin K oral anticoagulants (NOACs) combined with P2Y12 inhibitors demonstrated a favorable safety profile compared to traditional triple therapy. Their findings highlighted the need for updated clinical guidelines that reflect the evolving landscape of antithrombotic management in AF patients undergoing PCI.

(Liang et al., 2022) further advanced the field by evaluating the comparative safety and efficacy of various antithrombotic regimens in AF patients post-PCI. Their rigorous methodology and inclusion of multiple randomized controlled trials underscored the importance of understanding the implications of different treatment strategies on both

bleeding risk and major adverse cardiovascular events.

Most recently, (Greco et al., 2023) provided a European perspective on antithrombotic management in AF patients following PCI. Their work emphasized the significance of bleeding avoidance strategies and the role of innovative therapies such as percutaneous left atrial appendage closure in high-risk populations. They also discussed findings from key trials that have shaped current understanding and practice regarding antithrombotic therapy in this complex patient cohort.

Together, these studies reflect a growing body of literature that seeks to optimize antithrombotic strategies for AF patients undergoing PCI, addressing the dual challenges of preventing thromboembolic events while minimizing the risk of bleeding. The evolving evidence base underscores the necessity for ongoing research and clinical vigilance to navigate the complexities of this critical intersection of cardiology and hematology.

LITERATURE REVIEW

The article titled "Optimal Antithrombotic Strategy in Patients With Atrial Fibrillation After Coronary Stent Implantation," authored by (Jang et al., 2011), addresses a critical gap in the existing literature regarding the management of patients with atrial fibrillation (AF) who undergo percutaneous coronary intervention (PCI). The authors highlight the limited evidence available on the optimal antithrombotic therapy in this specific patient population, which is crucial given the increased risk of thromboembolic events in AF patients.

The study meticulously investigates various antithrombotic treatment strategies and their outcomes in patients with AF post-PCI. It emphasizes the need for a balanced approach that minimizes the risk of both thromboembolic complications and bleeding events, which are significant concerns in this cohort. The authors present their findings in a clear and structured manner, allowing for a comprehensive understanding of the

implications of different treatment regimens.

One of the key insights from the article is the necessity for individualized therapy based on the patient's risk profile. The authors advocate for a careful assessment of the bleeding risk versus the thromboembolic risk when selecting an antithrombotic strategy. This nuanced approach is particularly relevant in light of the complexities associated with dual antiplatelet therapy (DAPT) and anticoagulation in AF patients undergoing PCI.

However, while the study offers valuable insights, it also underscores the need for further research to establish definitive guidelines. The authors acknowledge the limitations of their findings, including the potential for selection bias and the retrospective nature of the analysis. These factors may affect the generalizability of the results, highlighting the importance of future prospective studies to validate the optimal antithrombotic strategies in this patient population.

The article "Antithrombotic therapy strategies for atrial fibrillation patients undergoing percutaneous

coronary intervention: A systematic review and network meta-analysis" by (Gong et al., 2017) presents a comprehensive examination of the antithrombotic strategies employed in patients with atrial fibrillation (AF) who are undergoing percutaneous coronary intervention (PCI). The authors highlight a significant clinical challenge, as approximately 5% to 15% of patients undergoing PCI for coronary artery disease (CAD) also present with concomitant AF, necessitating a careful balance between the prevention of thromboembolic events and the management of bleeding risks associated with antithrombotic therapies.

The article critically evaluates the current guidelines, particularly the 2016 European Society of Cardiology (ESC) recommendations, which advocate for a triple therapy regimen combining oral anticoagulants (OAC), aspirin, and clopidogrel for the initial month post-PCI, followed by a transition to dual therapy. This approach aims to mitigate the risks of both thrombosis and bleeding, yet the authors point out a notable lack of robust clinical evidence to support the

individualized application of these regimens in the AF population undergoing PCI. This gap in evidence is particularly concerning given the complexity of managing anticoagulation in patients who may be at varying levels of bleeding risk.

The systematic review and network meta-analysis conducted by the authors aim to provide clarity on the efficacy and safety of different antithrombotic therapies for AF patients post-PCI. By synthesizing data from various clinical studies, the authors attempt to rank these therapies based on their outcomes. The findings suggest that while dual-antiplatelet therapy (DAPT) remains a standard post-PCI treatment, the role of non-VKA oral anticoagulants (NOACs) is still being elucidated. The authors note that NOACs may offer advantages in terms of anticoagulation management, as they require less frequent monitoring compared to vitamin K antagonists (VKAs). However, the article emphasizes that the efficacy and bleeding risk profiles of NOACs in this specific patient population are not yet fully established, highlighting the need for further research.

The article "Antithrombotic regimens in patients with percutaneous coronary intervention whom an anticoagulant is indicated: A systematic review and network meta-analysis" by provides a comprehensive analysis of the antithrombotic strategies employed in patients with atrial fibrillation undergoing percutaneous coronary intervention (PCI). The authors address a critical clinical dilemma: the balance between preventing thromboembolic events and minimizing the risk of bleeding, particularly in the context of increasing use of potent antiplatelet agents and direct oral anticoagulants (DOACs).

The systematic review and network meta-analysis conducted by the authors reveal that patients requiring anticoagulation during PCI are at a heightened risk of major bleeding complications. This risk is exacerbated by the intensification of antithrombotic regimens, as indicated by data from a national registry highlighting a correlation between the intensity of therapy and the incidence of both fatal and nonfatal bleeding

events among atrial fibrillation patients undergoing PCI ().

The article critically evaluates various antithrombotic regimens, including combinations of DOACs and P2Y12 inhibitors such as prasugrel and ticagrelor. The authors emphasize the necessity for clinicians to navigate the complexities of these regimens to optimize patient outcomes. They note that while more potent P2Y12 inhibitors may provide superior efficacy in preventing thrombotic events, their use must be carefully weighed against the potential for increased bleeding risk.

Furthermore, the findings of the meta-analysis underscore the importance of individualized treatment strategies based on patient-specific factors, including the severity of atrial fibrillation, the risk profile for bleeding, and the urgency of the PCI. The article calls for more robust clinical trials to establish clear guidelines on the optimal antithrombotic strategy for this patient population, as the current landscape presents a significant challenge for clinicians.

The article "Safety and efficacy of direct oral anticoagulants

compared to Vitamin K antagonists post-percutaneous coronary interventions in patients with atrial fibrillation: A systematic review and meta-analysis" by (Agasthi et al., 2020) provides a comprehensive evaluation of the comparative effectiveness of direct oral anticoagulants (DOACs) versus Vitamin K antagonists (VKAs) in patients with atrial fibrillation (AF) undergoing percutaneous coronary intervention (PCI). The authors systematically review existing literature and synthesize findings from multiple studies, which is crucial for understanding the evolving landscape of antithrombotic therapy in this patient population.

The main thrust of the article is the examination of dual antithrombotic therapy, particularly focusing on the use of dabigatran after PCI in patients with AF. The authors reference pivotal studies that have shaped current clinical practice, including the trials that highlight the risks of bleeding associated with antithrombotic strategies in this context. For instance, they note findings from the New England Journal of Medicine that underscore

the importance of balancing the prevention of thromboembolic events against the risk of bleeding, which is a significant concern in patients with AF undergoing PCI ((Agasthi et al., 2020)).

Through their systematic review, (Agasthi et al., 2020) critically analyze the safety and efficacy profiles of DOACs compared to VKAs. They present evidence suggesting that DOACs may offer a favorable safety profile, particularly in terms of reduced major bleeding events. This insight is particularly relevant given that bleeding complications can significantly impact patient outcomes and healthcare costs. The authors also discuss the implications of their findings for clinical practice, emphasizing the need for personalized antithrombotic strategies that consider individual patient risk factors.

Moreover, the article addresses the limitations inherent in the studies reviewed, such as variations in study design, patient populations, and definitions of outcomes. This critical evaluation of the existing literature enhances the

reliability of their conclusions and underscores the necessity for further research to solidify the findings presented.

The article titled "Antithrombotic Strategies in Patients with Atrial Fibrillation Following Percutaneous Coronary Intervention: A Systemic Review and Network Meta-Analysis of Randomized Controlled Trials" by (Chua et al., 2020) presents a comprehensive analysis of antithrombotic strategies for patients with atrial fibrillation (AF) undergoing percutaneous coronary intervention (PCI). The authors underscore the complexity of managing patients with AF who also have coronary artery disease (CAD), particularly in the context of acute coronary syndrome (ACS) following PCI.

The systematic review and network meta-analysis included six randomized controlled trials with a total of 12,158 patients, providing a robust dataset to evaluate the safety and efficacy of various antithrombotic strategies. One of the key findings is that there was no significant difference in major adverse cardiac events or in

individual outcomes such as all-cause mortality, cardiovascular death, myocardial infarction, stroke, or stent thrombosis among the different antithrombotic strategies evaluated. This suggests that while the outcomes may not differ significantly, the choice of antithrombotic regimen can have important implications for patient safety, particularly concerning bleeding risks.

The article highlights the ongoing debate regarding the optimal antithrombotic strategy for AF patients undergoing PCI, especially given the current guidelines recommending triple therapy (combining vitamin K antagonists or non-vitamin K oral anticoagulants with dual antiplatelet therapy). The authors argue that while triple therapy may reduce the risk of thrombotic events, it substantially increases the risk of bleeding complications, which poses a significant challenge in clinical practice. In contrast, the combination of non-vitamin K oral anticoagulants (NOACs) with P2Y12 inhibitors appears to offer a safer alternative, demonstrating fewer major bleeding events without compromising efficacy.

(Chua et al., 2020) effectively synthesize the existing literature, providing a critical evaluation of the evidence surrounding antithrombotic strategies in this patient population. Their conclusions advocate for a shift towards dual antithrombotic therapy, specifically NOACs combined with P2Y12 inhibitors, as a preferred approach in managing patients with AF undergoing PCI. This recommendation is particularly relevant for clinicians seeking to balance the risks of thrombotic events against the potential for bleeding complications.

The article titled "Comparative Safety and Efficacy of Eight Antithrombotic Regimens for Patients With Atrial Fibrillation Undergoing Percutaneous Coronary Intervention" by (Liang et al., 2022) provides a comprehensive analysis of various antithrombotic strategies in the context of atrial fibrillation (AF) patients undergoing percutaneous coronary intervention (PCI). The authors conducted a systematic review and meta-analysis, which is a robust approach to synthesizing clinical evidence, particularly in a field where treatment strategies can

significantly impact patient outcomes.

The methodology outlined in the article is rigorous, as the authors employed a thorough search strategy across multiple databases, including PubMed, Web of Science, Cochrane Central Register of Controlled Trials, Embase, and China National Knowledge Infrastructure. This extensive search ensured a wide capture of relevant randomized controlled trials (RCTs) published before September 30, 2021. The inclusion criteria were well-defined, focusing on RCTs that specifically compared antithrombotic strategies in AF patients who had undergone PCI. This focus on RCTs is crucial, as they are the gold standard for evaluating the efficacy and safety of medical interventions.

The article's critical evaluation of the included studies highlights the importance of considering both major bleeding events and major adverse cardiovascular events (MACE) as primary outcomes. By doing so, the authors addressed the dual concerns of safety and efficacy, which are paramount in managing AF patients

undergoing PCI. The emphasis on a minimum follow-up period of six months further strengthens the reliability of the findings, allowing for a more comprehensive assessment of long-term outcomes.

However, while the article provides valuable insights, it is essential to consider potential limitations in the interpretation of the results. The authors excluded observational studies and registry data, which may limit the generalizability of their findings to real-world clinical settings. Additionally, the exclusion of ongoing trials without results may have led to the omission of emerging therapies that could impact future treatment paradigms.

The article "Antithrombotic Management in AF Patients Following Percutaneous Coronary Intervention: A European Perspective" by (Greco et al., 2023) presents a thorough examination of antithrombotic strategies tailored to patients with atrial fibrillation (AF) undergoing percutaneous coronary intervention (PCI). The authors focus on bleeding avoidance strategies, which are crucial for this patient

population, particularly those at high risk for bleeding complications.

The article begins by highlighting the challenge of balancing the risks of thromboembolism and bleeding in AF patients who require PCI. The authors emphasize the importance of individualized treatment strategies, referencing the AUGUSTUS trial, which provides insights into antithrombotic therapy for patients with AF and acute coronary syndrome. This trial underscores the necessity of considering both the procedural context and the patient's clinical profile when deciding on antithrombotic regimens.

One of the key insights from the article is the comparison between percutaneous left atrial appendage closure and non-vitamin K oral anticoagulants (NOACs) in patients with non-valvular AF who are at high bleeding risk. The authors argue that left atrial appendage closure may offer a viable alternative to traditional anticoagulation strategies, potentially reducing the risk of bleeding while still providing adequate protection against thromboembolic events.

Additionally, the authors delve into the findings of the ENTRUST-AF PCI trial, which analyzes the efficacy of edoxaban in AF patients undergoing PCI. This pre-specified analysis sheds light on the nuanced interactions between anticoagulation strategies and the clinical presentation of coronary syndromes, whether acute or chronic. The authors effectively illustrate how these distinctions can influence treatment outcomes and patient safety.

Furthermore, the article discusses the implications of coronary lesion characteristics on clinical outcomes in AF patients undergoing PCI. By examining the effects of lesion complexity and clinical risk factors, the authors provide a critical evaluation of the efficacy and safety of different antithrombotic therapies, including the comparative analysis of dabigatran dual therapy versus warfarin triple therapy drawn from the REDUAL PCI trial. This subgroup analysis is particularly valuable as it highlights the need for tailored approaches based on individual patient risk profiles.

CONCLUSION

The literature on antithrombotic strategies for patients with atrial fibrillation (AF) undergoing percutaneous coronary intervention (PCI) reveals a nuanced landscape characterized by evolving treatment regimens aimed at balancing thromboembolic prevention and bleeding risk. The initial exploration identified significant gaps in the understanding of optimal therapies for AF patients post-PCI, highlighting the need for evidence-based approaches. Subsequent systematic reviews and meta-analyses, such as those conducted by (Gong et al., 2017) and , have underscored the complexity of managing these patients, revealing that while dual-antiplatelet therapy (DAPT) is standard for coronary artery disease, the concomitant use of anticoagulants remains essential.

A critical analysis of various antithrombotic regimens indicates that while traditional triple therapy combining oral anticoagulants, aspirin, and clopidogrel has been the norm, there are emerging alternatives, particularly with the introduction of non-vitamin K oral anticoagulants (NOACs). Studies suggest that dual

therapy with NOACs and P2Y12 inhibitors may offer a more favorable safety profile compared to triple therapy, significantly reducing the risk of major bleeding without compromising efficacy in preventing thromboembolic events. Furthermore, (Liang et al., 2022) reinforced the importance of evaluating both bleeding risks and major adverse cardiovascular events in determining the best therapeutic approach.

The European perspective on antithrombotic management emphasizes the necessity of individualized treatment strategies, particularly for high-risk patients. This includes considering innovative interventions such as percutaneous left atrial appendage closure, which may provide an alternative to traditional anticoagulation methods.

In conclusion, the evolving body of literature reflects a significant shift towards optimizing antithrombotic strategies for AF patients undergoing PCI. The consensus points to the need for individualized approaches that consider both thromboembolic and bleeding risks, with a growing preference for dual therapy involving

NOACs. As research continues to advance, it is imperative that clinical guidelines are updated to reflect these findings, ensuring that patient care is informed by the most current evidence.

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