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SUMMARY WITH CRITICAL APPRAISAL

Frequency of Complete Blood Counts for Patients at Risk of Heparin-Induced Thrombocytopenia: A Review of Guidelines

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Abbreviations

HIT	Heparin-induced thrombocytopenia

Context and Policy Issues

Cardiac patients, such as those with myocardial infarction or unstable angina, are routinely given antithrombotic therapy (i.e., the combination of anticoagulant and antiplatelet therapy) to prevent the formation or extension of blood clots.[1] Heparins, including unfractionated heparin and low-molecular weight heparin, are one class of anticoagulants that act by indirectly inhibiting thrombin, an enzyme that catalyzes coagulation-related reactions.[1] While effective in reducing morbidity and mortality associated with thrombotic conditions,[2] exposure to heparin may result in an adverse immune-mediated reaction termed heparin-induced thrombocytopenia (HIT).[3] As the name suggests, HIT is a reduction in platelets (thrombocytopenia; defined as a platelet [thrombocyte] count $<150 \times 10^9$/L) that follows heparin exposure.[4]

There are two types of HIT; type 1 (HIT-I) is mild, transient and not clinically significant, whereas type 2 (HIT-II) is a clinically significant IgG antibody-mediated process in which platelet activation occurs, leading to a hypercoagulant state.[2] In general medical practice, the term "HIT" is used to refer to HIT-II specifically.[2] Although a reduction in platelets typically increases the risk of bleeding, in patients with HIT there is a paradoxical hypercoagulation due to an increase in platelet activation and thrombin generation.[3] HIT can result in venous or arterial thrombosis, leading to serious morbidity (e.g., heart attack or stroke, end-organ damage, limb gangrene) in up to 30% of patients, or mortality in 5 to10% of patients.[2,3] Approximately 50% of patients who undergo cardiac surgery develop HIT antibodies, but only 1 to 2% develop clinical HIT (thrombocytopenia, with or without thrombosis).[4]

Screening for HIT usually involves serial monitoring of platelet levels in patients who are receiving heparin.[5] However, it has been suggested that this serial monitoring also has the potential to cause harm, due to resultant unnecessary withdrawal of heparin and replacement by non-heparin anticoagulants in patients without HIT.[5] In 2012, the American College of Chest Physicians published guidelines suggesting that platelet count be monitored every 2 or 3 days from day 4 to day 14 (or until heparin is stopped) for patients receiving heparin who are considered to have more than a 1% risk of HIT, and that platelet count not be monitored for patients who are considered to have less than a <1% risk.[4] However, these were weak recommendations made on evidence that was rated as being "very low" or "low" in quality, and there was a difference of opinion among the experts involved in guideline development.[6]

The purpose of this report is to examine recent evidence-based guidelines regarding the use of complete blood counts to monitor for HIT in cardiac patients receiving intravenous unfractionated heparin.

Research Question

What are the evidence-based guidelines regarding the frequency of complete blood counts to monitor for heparin-induced thrombocytopenia during intravenous heparin infusions for cardiac conditions?

Key Findings

No relevant evidence-based guidelines were identified regarding the frequency of complete blood counts to monitor for heparin-induced thrombocytopenia during intravenous heparin infusions for cardiac conditions.

Methods

Literature Search Methods

A limited literature search was conducted on key resources including Ovid Medline, PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases and a focused Internet search. No methodological filters were applied to limit retrieval by publication type. The search was limited to English language documents published between January 1, 2013 and September 6, 2018.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Cardiac patients receiving intravenous unfractionated heparin (i.e., ST elevated myocardial infarction, non-ST elevated myocardial infarction, unstable angina)
Intervention	Complete blood counts to monitor for heparin induced thrombocytopenia
Comparator	No comparator
Outcomes	Evidence-based guidelines
Study Designs	Guidelines

Exclusion Criteria

Articles were not eligible for inclusion if they did not meet the selection criteria outlined in Table 1, they were duplicate publications, were published prior to 2013, or were guidelines with unclear methodology.

Summary of Evidence

Quantity of Research Available

A total of 218 citations were identified in the literature search. Following screening of titles and abstracts, all 218 citations were excluded; no publications met the inclusion criteria for this report. Appendix 1 presents the PRISMA[7] flowchart of the study selection.

Summary of Findings

No relevant evidence-based guidelines were identified regarding the frequency of complete blood counts to monitor for heparin-induced thrombocytopenia during intravenous heparin infusions for cardiac conditions; therefore, no summary can be provided.

Limitations

No relevant evidence-based guidelines were identified. It is possible that evidence-based guidelines exist that were published more than 5 years ago and were excluded by the current date-limited search (e.g., including the 2012 American College of Chest Physicians guidelines[4] mentioned previously). However, given that the 2012 guidelines identified insufficient evidence,[6] older guidelines would likely be outdated.

Conclusions and Implications for Decision or Policy Making

No relevant evidence-based guidelines were identified regarding the frequency of complete blood counts to monitor for HIT during intravenous heparin infusions for cardiac conditions. Evidence-based guidance is needed to inform when platelet levels should be monitored, and at what frequency, to monitor for HIT in cardiac patients who are receiving intravenous heparin.

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Appendix 1: Selection of Included Studies