

The importance of bleeding

Bleeding is common after PCI and is associated with a 3-fold increase in mortality and major adverse cardiovascular events. Blood transfusion after PCI is also independently associated with mortality. The complexity and acuity of PCI patients in Washington State is increasing, leading to greater risk of bleeding. However, bleeding risk is modifiable with interventions before, during, and after the PCI procedure.

How are COAP hospitals doing?

Bleeding rates among COAP hospitals are worse than the national average. Like the rest of the country, COAP hospitals have made marked gains in radial access use and reduction of bleeding over the past decade. Most hospitals now have an O/E ratio <1 for risk-adjusted bleeding, reflecting impressive gains since the risk model was developed. However, there is still room to improve.



Calculate and plan

Patients at highest risk for bleeding are *least* likely to receive bleeding prevention techniques. This “Risk-Treatment Paradox” can be avoided by routine assessment of bleeding risk. Patients at highest risk of bleeding or with baseline anemia may benefit from pre-PCI optimization and consideration of the bleeding avoidance strategies described below. Online risk calculators are available from ACC and SCAI.



Safe access sites

Transradial access reduces bleeding events and may improve survival for patients with STEMI, compared with femoral access. COAP sites with “radial first” practice routinely achieve transradial rates over 80%. Recently, bleeding rates have declined nationally for both radial and femoral access, potentially reflecting

COAP Best Practice Recommendations

- 1) Perform a formal bleeding risk assessment for all patients, including the use of a risk calculator when feasible
- 2) Use transradial access when possible, especially for high bleeding risk patients such as patients with STEMI
- 3) Avoid routine use of GP IIb/IIIa inhibitors
- 4) Avoid blood transfusions for stable patients with Hb > 8 g/dl
- 5) Consider shorter duration of DAPT therapy for high bleeding risk patients receiving current-generation drug-eluting stents for stable ischemic disease

increasing attention on bleeding avoidance and “safe femoral” techniques such as ultrasound guidance. While femoral artery closure devices have not been definitively shown to reduce bleeding, they can be considered by experienced operators when femoral access is required.



Procedural anticoagulants and antiplatelets

Earlier data showed bivalirudin was superior to the combination of heparin and a GP IIb/IIIa inhibitor for bleeding avoidance, and more recent studies have shown similar outcomes among patients treated with bivalirudin vs. heparin alone. For this reason, routine use of GP IIb/IIIa inhibitors is discouraged. Bivalirudin may be considered for patients at high bleeding risk, especially if femoral access is used.



Post-PCI transfusions

While transfusions may be life-saving in the setting of acute bleeding, shock, or ongoing ischemia, transfusions should be avoided for stable patients. Transfusion thresholds are controversial and based on limited data, but a restrictive threshold of Hb <8 g/dl appears to be safe compared with <10 g/dl among CAD patients.



Long-term therapy

Dual anti-platelet therapy for 3-6 months after PCI is safe for contemporary drug-eluting stents, but patients with MI or high anatomic complexity may benefit from longer DAPT. Recommendations for post-PCI therapy should be tailored to patient risk. The DAPT and PRECISEDAPT risk scores have online calculators. In addition, several DES have shown superiority to BMS for high-bleeding risk patients with planned DAPT of 1 month; there may be limited role for BMS in contemporary practice. Finally, for patients with afib or venous thromboembolism, use of an anticoagulant and P2Y12 inhibitor is superior to “triple therapy” also including aspirin.

Links, Resources, and References:

- [ACC Reduce the Risk Toolkit](#)
- [ACC CathPCI Bleeding Risk Calculator](#)
- [Precise DAPT Score Calculator](#)
- [High Bleeding Risk Definitions | Circulation](#)
- [Bleeding and Mortality Systematic Review](#)
- [Blood Transfusion and PCI Systematic Review](#)
- [Bleeding Avoidance Strategies | Nature Reviews](#)
- [Transfusion Thresholds RCT | JAMA](#)
- [ACC/AHA DAPT Guideline | Circulation](#)
- [ACC Expert Consensus Anticoagulants and Antiplatelets](#)