Reducing the Incidence of Access Site Injury and Bleeding Complications

Scope of the Problem: Access site injury and bleeding (whether related to the vascular access or systemic) are the two most common complications of PCI occurring in 3.0% of patient in NNE in 2007. These complications are associated with increased length of stay (an increased post-PCI LOS averaging 2.5 days) and increased inhospital mortality (OR=2.2).

Goal: Our goal is to reduce the incidence of access site injuries and bleeding. We believe there are significant opportunities to reduce a patient's risk of developing these adverse events.

Strategies:

1. Identify process variables associated with access site injury and bleeding.
2. Identify patient variables associated with access site injury and bleeding.
3. Determine best practices through benchmarking visits and reports on institutional improvement projects.
4. Assess relevant new technology (e.g., vascular closure devices, ultrasound-guided arterial access) and new medications (e.g., bivalrudin).

Activities:

1. An EMMC center study of fluoroscopy-guided access showed that it decreased access site injury and bleeding. A MMC center study identified a high site of puncture as a risk factor for retroperitoneal bleeding.
2. A clinical predication rule was developed.
3. Benchmarking visits identified having a dedicated staff, receiving standardized training on an annual basis, with protocol-driven care, especially for ongoing bleeding and/or hypotension following sheathe removal, as best practice.
4. A cause-and-effect diagram identified a single wall stick, sheathe size, concurrent use of a venous sheathe, the use of IIb/IIIa receptor antagonists, the use of direct thrombin inhibitors, and maximum ACT as related to the risk of access site injury and bleeding. Analysis of registry data confirmed most of these assumptions.
5. The use of closure devices was found to decrease these complication rates. Several sites are obtaining experience with ultrasound-guided vascular access.
6. DHMC has mapped their implementation of multiple process and structure changes to a decreased risk of access site complications and bleeding.
7. An analysis of institution-specific event rates and their relationship to process variables highlighted some inconsistencies in data collection.

Progress:

1. Reported rates of access site injury and bleeding have decreased by 23% from 2005 (3.9%) to 2007 NNE (3.0%)
2. An Access Site Injury and Bleeding Quality Report is now part of the standard PCI Report. It displays both the adverse event rate and the use of important process measures.
3. We are changing our data collection instrument (adopting the NCDR Cath/PCI instrument) to include new data elements that will facilitate more consistent collection of relevant process and outcomes variables across centers.