



# Clinical Update

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## Heparin Induced Thrombocytopenia

One to three percent of all patients exposed to heparin can develop the severe complication of heparin-induced thrombocytopenia (HIT).<sup>1</sup> More concerning, however, is that an incidence analysis at a tertiary care center showed 49% of all new HIT cases occurred postoperatively in cardiac surgery patients for an overall incidence of 2.1%<sup>2</sup>.

### What is HIT?

Type 1 HIT is a mild, nonimmune reaction that may not be recognized if platelet counts are not routinely monitored. Type 2, by comparison, can be life-threatening. This immune-mediated reaction typically occurs 4 to 10 days after initial heparin exposure in 1% to 3% of all patients exposed to unfractionated heparin (UFH) and up to 0.8% in patients receiving low molecular weight heparin (LMWH)<sup>3,6</sup>. The key finding is a drop of more than 50% of the baseline platelet count<sup>1,3,5</sup>. Since platelet counts may drop without HIT in postoperative patients, some experts recommend using a postoperative, rather than preoperative platelet count as baseline<sup>3</sup>.

HIT related to LMWH appears later than UFH-associated disease, and HIT can manifest earlier in patients who have had heparin exposure in the previous 3 months, such as a PCI prior to CABG<sup>3,7</sup>. IgG antibodies (HPF4) bind to the heparin complex in the blood, causing platelet activation and release of procoagulants<sup>3</sup>. Thrombosis occurs in both arterial and venous circulation and in large vessels. Bleeding — typically a cardinal sign of a low platelet count — is uncommon in HIT<sup>1,3</sup>.

### Risk Factors

LMWH therapy for thromboprophylaxis significantly reduces the risk of HIT compared with UFH in surgical patients<sup>2</sup>. The incidence is very low in patients receiving subcutaneous low-dose heparin for fewer than 5 days<sup>2</sup>. Heparin-coated intravascular catheters have been implicated, but be aware that a commonly cited study is from 1989, and researchers looked at only 12 patients with heparin-coated pulmonary artery catheters<sup>4</sup>.

HIT after cardiac surgery is typically evident postop days 5 to 10. Therefore, it's important to incorporate signs and symptoms of distal extremity pain, coldness, decreased sensation and movement, and new skin lesions at heparin injection sites in discharge teaching<sup>1,3,5</sup>.

### Diagnosis and Treatment

Diagnosis is made by combining clinical signs and symptoms with a positive HPF4 antibody blood test. By definition, all patients with HIT have the antibodies, but not all patients with antibodies will develop HIT<sup>1</sup>.

Begin treatment as soon as HIT is diagnosed. Stop all forms of heparin and administer a direct thrombin inhibitor

(DTI), such as lepirudin (Refludan) which is cleared by the kidneys, or argatroban which is cleared by the liver<sup>3</sup>. DTIs are also indicated in place of UFH or LMWH in patients with a history of HIT who require anticoagulation<sup>3</sup>. Also hold warfarin; if it has already been started, vitamin K can reduce anticoagulation<sup>5</sup>. This is important because warfarin can affect aPTT, which is used to monitor DTI therapy<sup>5</sup>.

### Looking Ahead

A 2009 study examined 10.5 million U.S. hospital discharges between 1979 and 2005<sup>6</sup>. Secondary thrombocytopenia was identified in only 0.15% of patients between 1979 and 1992, but doubled to 0.36% between 1993 and 2005. It was rare in patients younger than 40 and in postpartum women<sup>6</sup>. Interestingly, UFH administered for prophylaxis was associated with higher risk than treatment dosing (1.6% v. 0.9%). Overall, it is duration of therapy, such as for prophylaxis, rather than dose that presents risk for HIT. LMWH reduces risk for long-term therapy<sup>6</sup>.

Another interesting study tested preoperative cardiac surgery patients for HPF4 antibodies<sup>7</sup>. Of 1114 patients, 5.4% tested positive. Postop, they had a significantly longer length of stay, longer mechanical ventilation, and more acute limb ischemia, renal failure and gastrointestinal complications compared with patients testing negative<sup>7</sup>. In fact, the presence of HPF4 antibody was a greater risk factor for renal complications than was diabetes. HIT developed in 3% of the total number of patients or 60% of those who tested positive preoperatively. The authors recommend routine HPF4 screening for all preoperative cardiac surgical patients, particularly because a large majority of patients undergoing surgery will have had a prior heparin exposure during cardiac catheterization.

### Balancing Risk for Chest Drainage

There are no current data on the incidence of chest tube occlusion after cardiac surgery. However, a 2009 survey reports one hundred percent of responding surgeons had observed chest tube "clogging" and 87% had experienced adverse patient outcomes as a result<sup>8</sup>. One option is heparin-coated chest tubes that use covalently bonded heparin and a polymer matrix that allows tiny amounts of molecular heparin to diffuse into the tube's lumen for 24 to 48 hours downstream from the mediastinum — not into the bloodstream. Another option is coated chest tubes that decrease friction, making the lumen more slippery and less adherent for clots.

As with all care, choosing a heparin-coated chest tube to reduce thrombus risk within the tube needs to be balanced with the risk of HIT. As Kress and colleagues suggest, if HPF4 antibodies are identified during preoperative blood work, surgeons will know which 3% of patients are at risk for HIT<sup>7</sup> and can then use heparin-coated tubes without worry in the remaining 97% of patients.

## In The Literature

### Bringing Evidence to Practice

The current issue of *Nursing Management* provides a helpful overview of setting priorities for evidence-based nursing care projects, searching the literature, analyzing articles, and translating research to practice. The author also provides key implementation plan elements including assembling a productive team, setting timelines, supportive leadership and presenting findings to front-line clinicians. If you need a spark to get your evidence-based practice reinvigorated, this is a good, practical, quick read.

Source: Russell-Babin K: Seeing through the clouds. *Nursing Management* 2009;40(11):27-32.

### Analyzing Care Decisions

Patient decision aids are designed to help patients and their families participate with health professionals in care decisions and incorporate their personal values and goals into their decision-making. The December 2009 issue of the *American Journal of Nursing* has a review of selected tools and how to incorporate them into practice. While these aids have been slow to catch on, as more and more people seek information online, these are ideal tools to help them explore benefits and risks of different approaches and their feelings about them.

Source: Whitmann-Price RA, Fisher KM: Patient decision aids: tools for patients and professionals. *American Journal of Nursing* 2009;109(12):60-63.

### Check Those COWs That Moove

When was the last time you analyzed the cleaning and disinfection of bedside computers or computers on wheels (COWs) in your intensive care unit or emergency department? Researchers in Boston report on a project that evaluated cleaning by placing an invisible fluorescent marker on the keyboard. Though health-care associated pathogens can remain viable on environmental surfaces such as keyboards for days to months, at baseline, the cleaning rate was 0%. This easily replicated study showed that after making specific assignments for cleaning responsibilities and providing education and feedback, a cleaning rate of 100% was achieved.

Source: Leander J, et al: Dangerous cows: an analysis of disinfection cleaning of computer keyboards on wheels. *American Journal of Infection Control* 2009;37:778-780.

### Should Mental Status Direct Surgical Approach?

Research in the current issue of *Orthopaedic Nursing* examined outcomes in 180 patients over age 70 with and without dementia and delirium who had displaced femoral neck fracture. Traditionally, healthy older people were treated with hip replacement and those with dementia had internal fixation because patients with altered mental status are less likely to be able to follow the postoperative precautions needed after hip replacement. This study, however showed no difference in complications or mortality at 4 and 12 months and concludes that altered mental status per se should not determine surgical repair.

Source: Olofsson B: Mental status and surgical methods in patients with femoral neck fracture. *Orthopaedic Nursing* 2009;28(6):305-313.

## On the World Wide Web Essential Nursing Resources



The 25th edition of Essential Nursing Resources has been published by the Interagency Council on Information Resources in Nursing. This group was organized in 1960 to establish an effective system of information resources in nursing to advance the profession through the promotion and use of its literature. This 10-page compendium provides hundreds of links to resources all over the world and citations of key reference material for nurses. Some are paper-based and some require paid subscriptions, but many are completely free online. The lists of evidence-based practice databases, indexes and resources; best practices and practice guidelines; and health statistics are particularly useful.

<http://www.icirn.org/Homepage/Essential-Nursing-Resources/Essential-Nursing-Resources-PDF.aspx>

### Patient Decision Aids

The Ottawa Hospital Research Institute hosts the International Patient Decision Aid Standards Collaboration and provides a comprehensive site about patient decision aids. With material for both professionals and patients, it is a great place to start exploring these tools and how you can either use them in your practice or in your personal life if you or a loved one is facing a health challenge that will require making decisions about which therapy to pursue.

<http://decisionaid.ohri.ca/index.html>

#### Sources

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Your friends at Atrium wish you and yours  
a happy and healthy holiday season!

