Heparin-Induced Thrombocytopenia Causing Graft Thrombosis and Bowel Ischemia post Endovascular Aneurysm Repair

Abdulmajeed Altoijry, MD, MSc
PGY3
Vascular Surgery
McGill University
Potential conflict of interests
Société des sciences vasculaires du Québec (SSVQ)
Journée d’Actualités en sciences vasculaires
22 novembre 2013

Dr. Abdulmajeed Altoijry, Presenter

No conflict of interests to declare
Introduction

Heparin

- Commonly used as an anticoagulant.
- Prevention and treatment of thromboembolism.
- Vascular and cardiac surgery procedures.
- Bleeding and thrombosis may occur.
Introduction. Cont,

- Heparin-induced thrombocytopenia (HIT).
- Known complication of heparin therapy.
- Sudden fall in the platelet count and usually appears a few days after the start of heparin.
- Slight decrease in platelet count (HIT-I)
- Complicated by thrombotic events (HIT-II).
- Vascular procedures; endovascular interventions, ? literature for HIT.
Case report

- 70-year-old male.
- PMH: HTN, DLP, CAD and prostate carcinoma.
- Elective endovascular repair of an infrarenal abdominal aortic aneurysm.
CT angiogram images (pre-op)
Case report

- Endurant™, aorto-uniliac graft, amplatzer occluder of the left common iliac artery, and a right-to-left femoral-femoral bypass with Dacron graft.

- 5000 IUs of unfractionated heparin (UFH) was given intravenously (intraOP).

- Discharged on post-operative day 1 after an uneventful postoperative course.
Case report. Cont.

12 days later:

- Bloody diarrhea and general malaise.
- Abdominal exam was unremarkable; faint pulse in the femoral-femoral bypass graft and distal pedal pulses were not palpable.
- Platelet count was only 18,000.
- Duplex ultrasound: patent right to left femoral-femoral bypass with thrombus visualized throughout the graft.
- ABI: 0.48 and 0.45 for the right and left side respectively.
CTA abdomen and pelvis:

- Thrombosis of the aortic graft including the SMA and the femoral-femoral graft.

- No endoleak, the IMA was thrombosed and the IIA's were patent.

- Edema and thickening of the large bowel wall, no evidence of transmural bowel ischemia..
CT angiogram images at presentation
Based on the patient’s clinical presentation, CT findings and drop in platelet count.

Dx:

Subclinical bowel ischemia secondary to HIT thrombosis of the aortic stent graft and the SMA.
Treatment course

- Intravenous anticoagulation (argatroban).

- Daily examination and platelet count f/u.

- Dx was confirmed by HIT immunoassay (heparin platelet factor 4).

- PLTs count (50,000 at 5 days and 80,000 at 10 days after presentation).

- Symptoms improved 10 days after presentation.

- Warfarin was started when the platelet count reached 100,000, 3 days of combined anticoagulation therapy.

- D/C home: no symptoms and normal bowel movements.
3 months follow up CT angiogram

Near complete re-canalization of the endograft and femoral femoral graft and residual thrombus in the SMA origin.
CT angiogram at presentation (left) and at 3 months F/U (right)
**Discussion**

**Heparin-induced thrombocytopenia**

Known complication of heparin therapy usually occurring within the first 10 days after heparin treatment has started.

**Type one (HIT-I):**

- The most common variant.
- Fall in platelet count within the first two days after initiation of heparin therapy.
- Correct itself with the discontinuation of heparin therapy. Thrombocytopenia, non-immune mechanism secondary to a direct effect of heparin on platelet activation.

**Type two (HIT-II):**

- Less common and more aggressive.
- Heparin-associated thrombocytopenia and thrombosis (HITT).
- Immune-mediated disorder associated with the formation of antibodies against the heparin-platelet factor 4 complex.
- Overall incidence of HIT-II is 2.6%.
- 0.2 to 5.0% in patients exposed to heparin > 4 days.
- 0.2% for those treated with UFH for < 4 days.
- Mortality rate ≈ 20% to 30%.
- Limb amputation in 10% to 20% of unrecognized and untreated patients.
- **UFH** rather than (LMWH), **surgical patients** and female sex, risk factors for HIT.
Vascular surgery

- Not uncommon.
- Exact incidence is not clear, variation in the literature (as confirmed by HIT assay).
- Low as 1.9% and high as 21% in others.
- Postoperative thrombocytopenia could be due to platelet adherence to the graft material.
- **To date**, HIT secondary to EVAR is uncommon with unknown incidence.
- Five cases of thrombosis associated HIT-II/ three case reports.
- All of these HIT-II cases presented with either acute lower limb ischemia or lower limb deep vein thrombosis.
- Endograft thrombosis and mesenteric arterial thrombosis ischemia have not been previously reported in the literature.
The primary finding for diagnosis

- Fall in the platelet count of more than 50%, within two weeks after using heparin therapy.

Clinical features

- Venous thrombosis and or embolism, including DVT/PE.

- Arterial thrombosis involving aorta and major limb arteries, resulting in limb ischemia.

- After endovascular procedures, also rarely manifest as thrombotic complication at the site of intervention.
Laboratory tests

- Enzyme-linked immunosorbent assay
- Platelet $^{14}$C serotonin release assay
- Heparin-induced platelet aggregation
**Treatment**

- Immediate cessation of any sources of heparin.

- Replacement with an anticoagulant therapy (does not cross-react with HIT antibodies):
  - Danaparoid, lepirudin, fondaparinux, and argatroban.

- Warfarin should not be started:
  - Thrombocytopenia resolves.
  - Anticoagulation with one of the alternatives.

- LMWH **should not** be substituted for UFH after HIT develops because of frequent **cross-reactivity** with HIT antibodies.
Unusual thromboembolic events and lack of response to heparin with a Hx of heparin exposure should raise suspicion of HIT; repeat platelet counts should be done along with other serologic tests.
Conclusion

• Heparin-induced thrombocytopenia is a rare but potentially limb- and life-threatening adverse reaction seen in patients exposed to heparin.

• Patients undergoing vascular and endovascular procedures in which large dose of heparin are used are at risk.

• A high index of suspicion is required in order to diagnose it and initiate proper therapy to prevent serious thrombotic complications.
References


Thank You

Merci