

Management of Intraabdominal Compartment Syndrome Secondary to Anticoagulation Induced Retroperitoneal Haemorrhage after Aorto-Bifemoral Grafting

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ABSTRACT

Introduction: Post operative complications after major arterial surgeries are inevitable in some patients due to severe atherosclerosis. Advanced age groups, diabetics, hypertensives, coronary artery disease, chronic obstructive pulmonary disease compromise the outcome of peripheral vascular disease. Aorto- bifemoral bypass (ABF) is the most preferred surgery for patients with bilateral aortoiliac occlusive disease. For unilateral occlusion of contralateral iliac artery without significant stenosis, femoro femoral (FF) or iliofemoral (IF) bypass have been advocated. In all patients, cardiac, renal and respiratory status must be assessed before the aortic procedure.

Case report: We report a 33 year old male patient with abdominal compartment syndrome following aorto-bifemoral and femoro-popliteal bypass grafting, preoperatively evaluated and taken up for aortobifemoral and femoropopliteal bypass grafting through transabdominal approach. Recognition and management of IAH are key critical care measures which may decrease morbidity and improve survival in these vascular patients.

Conclusion: Intra-abdominal hypertension (IAH) and abdominal compartment syndrome (ACS) are common complications of ruptured abdominal aortoiliac aneurysms (rAAAs) and other abdominal vascular catastrophes even in the age of endovascular therapy. Morbidity and mortality due to systemic inflammatory response syndrome (SIRS) and multiple organ failure (MOF) are significant.

Keywords: Intra-abdominal Hypertension, Aorto Bifemoral Bypass Grafting Abdominal Compartment Syndrome

INTRODUCTION

Surgical revascularisation by the way of aorto-femoral bypass grafting is the standard of care for advanced aortoiliac disease. Secondary antithrombotic and antiplatelet prophylaxis is essential in these patients to achieve long-term patency of the revascularized or recanalized arterial segment as well as to prevent MI and stroke. Anticoagulant related retroperitoneal haemorrhage leading to intraabdominal compartment syndrome is a well known complication and has been reported worldwide. Abdominal compartment syndrome (ACS) is defined as sustained intra-abdominal pressure (IAP) >20 mmHg associated with new organ dysfunction or failure¹. This multi-organ failure(MOF) is the leading cause of mortality after aortic surgeries². Spontaneous retroperitoneal hematoma (SRH) on the other hand is a distinctive clinical entity, most commonly seen in association with patients with anticoagulation therapy,

bleeding abnormalities, and haemodialysis^{3,4} and may represent one of the most serious and potentially lethal complications of anticoagulation therapy⁵. Stephan D and colleagues evaluated 928 patients that were on chronic anticoagulation with warfarin in a retrospective cohort study. As per literature, the incidence of first bleeding episodes varied from 17.3, 7.5, 1.1, 0.2 events for minor, severe, life threatening and fatala bleeding per 100 patient years respectively.⁶

CASE REPORT

A 42 year old male presented with severe claudication pain in left lower limb- 6 months and rest pain- 1 month, unable to walk- 1 week, blackish discoloration of great toe extending onto forefoot- 5 days. Arterial pulses were absent in both limbs. Arterial Doppler showed distal abdominal aorta diffuse athermatous disease with complete occlusion of bilateral common iliacs and femoral arteries. Spiral computed tomography angiogram revealed total occlusion of infra renal aorta and bilateral proximal common iliac arteries with normal coronaries(fig.1).

Midline laparotomy (transperitoneal approach) - Infrarenal aorto-bifemoral bypass grafting using 14x7 mm Gore-tex inverted 'Y' graft + distal SFA and popliteal endarterectomy (fig.2) done under general anesthesia. Post operatively patient was started on heparin infusion 1000 units per hour. On Post operative day 3 patient developed abdominal distension with hypotension, decreased urine output and respiratory distress. On evaluation patient was found to have raised intra abdominal pressure with >20mm hg with activated partial thromboplastin time > 2 minutes. Patient was explored and hematoma was evacuated and laprostomy was done with a urosac bag (fig.3)and a delayed closure (fig.4 and 5) was done with an interlaying composite mesh to close the abdomen. Further post operative period was uneventful.

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Figure-1: Preoperative CT angio film - total occlusion of infrarenal distal abdominal aorta, (L) and (R) proximal common iliac arteries - long segment occlusion of (L) distal superficial femoral artery and popliteal artery with collateral reformation - occlusion of (R) mid and distal anterior tibial artery

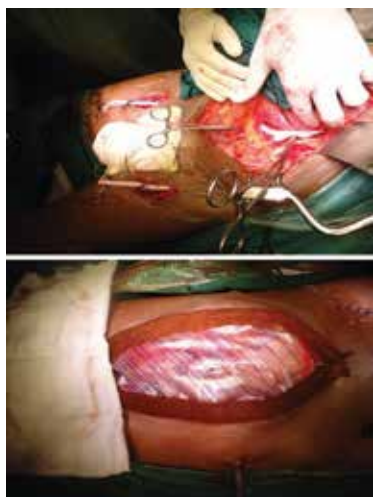


Figure-2: Aorto-bifemoral graft being performed; **Figure-3:** Laprostomy with Urosac bag



Figure-4: delayed closure with composite interlaying Physiomesh; **Figure-5:** after wound closure

DISCUSSION

Retroperitoneal haemorrhage is known to occur with the usage of heparin and acitrom despite monitoring and maintenance of levels. Retroperitoneal haematoma compromising on the limited peritoneal and retroperitoneal space causing abdominal compartment syndrome is very well reported^{7,8}. Respiratory insufficiency, hypotension, oliguria due to obstructive nephropathy and intestinal ischemia are some of the major complication of abdominal compartment syndrome. IAP greater than 18mmHg following aortic surgery was a significant risk factor for the development of impaired renal function⁸. ICU monitoring, Good hydration, blood transfusion, stoppage of anticoagulants, correction of anti-coagulopathy are the necessary initial supportive measures to achieve good outcome. Surgical decompression is essential and 93% effective in reversing the organ and is associated with an overall survival of 59%.⁹ Primary closure of laparotomy wound to be delayed if there is risk of raised IAP⁸ The gap between the wound edges needs to be covered to prevent excessive fascial retraction, the formation of a large hernia and peritoneal contamination and closure devices allowing coverage of the intraperitoneal organs without undue tension include towel clips, the silastic "Bogota bag" and the use of a mesh⁸. Early mesh closure has been shown to lower mutli-organ failure and mortality.^{10,11}

CONCLUSION

Extreme caution and monitoring needs to be exercised while starting on anticoagulants postoperatively Anticoagulant related retroperitoneal haemorrhage is a known entity leading to abdominal compartment syndrome. It is well recognised following major trauma, but, this also occurs following aortic surgery. Early recognition of this problem requires high index of suspicion and is very vital as it carries very high risk of multi-organ failure and mortality. The measurement of IAP is simple and non-invasive, and should be a routine component of physiological monitoring in patients following any aortic surgery. Urgent intervention by the way of surgical decompression improves the outcome in such patients.

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Appendices:

IAH Grading System according to the World Society of Abdominal Compartment Syndrome

- **Grade I:** IAP 12-15 mmHg
- **Grade II:** IAP 16-20 mmHg
- **Grade III:** IAP 21-25 mmHg
- **Grade IV:** IAP > 25 mmHg

Risk factors responsible for IAH/ACS according to the World Society of Abdominal Compartment Syndrome

- Mechanical ventilation
- Acidosis (pH < 7.2)
- Polytransfusion (>10U Packed Red Blood/24 h)
- Hypothermia (core temperature 5 lt colloid or crystalloid/ 24 h) Sepsis
- Bacteremia
- Intra-abdominal infection/abscess
- Pneumonia
- Peritoneal Dialysis
- Abdominal surgery, especially with fascial closures
- Massive fluid resuscitation (>5 lt colloid or crystalloid/ 24 h)
- Gastroparesis - gastric distention - ileus
- Major burns
- Major trauma
- Prone positioning
- Massive incisional hernia repair
- Damage control laparotomy
- Laparoscopy with excessive inflation pressures
- High Body Mass Index (>30 Kg/m²)
- Coagulopathy Liver dysfunction/cirrhosis with ascites
- Hemoperitoneum/pneumoperitoneum
- Acute pancreatitis
- Peritonitis
- Intra-abdominal or retroperitoneal tumors