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Case Report

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Retroperitoneal Hematoma in PCI Patients

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Introduction

Retroperitoneal bleeding occurs when blood enters into the space behind the posterior reflection of the abdominal peritoneum. Retroperitoneal hemorrhage (RH) is a rare bleeding complication of percutaneous coronary intervention (PCI), which can result as a consequence of femoral access or can occur spontaneously. Common constellation of symptoms includes abdominal, back, flank, or groin pain; a palpable abdominal mass; and shock. Rapid diagnosis and treatment amongst a team of seasoned acute care personnel is key to patient survival.Treatment includes general measures,covered stents,coil emebolization or surgery.

Epidemiology

Retroperitoneal hematoma occurs in around 0.03 to 0.06 % post PCI. Femoral access is an important determinant of RH, in PCI. Radial artery as a culprit is in 4.7%cases only. Factors identified included female sex, sheath superior to inferior epigastric artery, glycoprotein IIb/IIIa inhibitor use, low body weight, low body surface area, history of chronic obstructive pulmonary disease, and sheath size >8F.

Spontaneous hemorrhage is a considerably rarer phenomenon. Clinical trials of anticoagulation-induced hemorrhage of the retroperitoneum have documented a rate of 0.6% to 6.6%, with mortality occurring in 20% Iatrogenic retroperitoneal bleeding was noted in 0.57% of patients with an associated mortality rate of 10.4%.

Evaluation

Accurate diagnosis requires a high clinical index of suspicion as well as an accurate and focused history and physical examination. The most common presentation of bleeding into the retroperitoneal space is abdominal or flank pain. Femoral nerve palsies occurs in 20 to 30% of cases. In Hemorrhagic shock patients demonstrate anxiety and tachycardia early on in the disease process and hypotension, confusion, and hypothermia later [1-3].

However, presentation is often non-specific with a lack of cutaneous bruising or other localizing signs that can mean a delay in presentation and diagnosis.

The single most useful laboratory measurement to narrow the differential diagnosis towards retroperitoneal bleeding is falling haemoglobin.The other blood tests include coagulation profile.

Imaging

CT Scan CT is helpful for the diagnosis of retroperitoneal hematoma given its speed, high spatial resolution, and noninvasiveness. CT scan depict blood, localize areas of bleeding, and evaluate for recent or active extravasation of contrast material. Non-contrast CT is helpful in patients with compromised renal functions

CT angiography (CTA) is usually performed to detect the site of active retroperitoneal bleeding in case of clinically suspected acute bleeding

Figure 1: Retroperitoneal Hemmorage in CT Scan

Ultrasonography

The profound shortcoming of abdominal ultrasonography is the inability to effectively evaluate the retroperitoneal space. Because of this, ultrasound remains an incredibly useful tool in evaluating for concomitant free fluid in the peritoneal space, but cannot be reliably used to rule in or out retroperitoneal bleeding [4-6].

It is also limited as is the ability of US to detect if bleeding is active or not and reliably reveal the etiology

Bladder Fluoroscopy
The "dented bladder sign" is a finding noted during fluoroscopy. It is suggestive of external compression and is an important early marker of RPH.

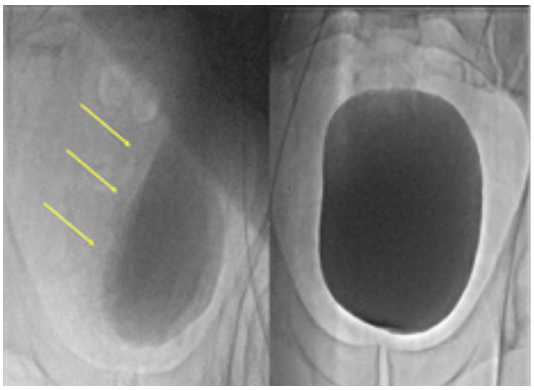


Figure 2|: Dented bladder sign

Blood Parameters
Hemoglobin,PCV, prothrombin time, partial thromboplastin time, international normalized ratio, and thromboelastography to identify a patient's anticoagulation status [7-9].

Prevention
Good femoral access and closure technique is key to Retroperitoneal hematoma prevention Femoral puncture should be done under fluoroscopy guidance (puncture at inf border of femoral head) or under USG guidance (for large bore access)

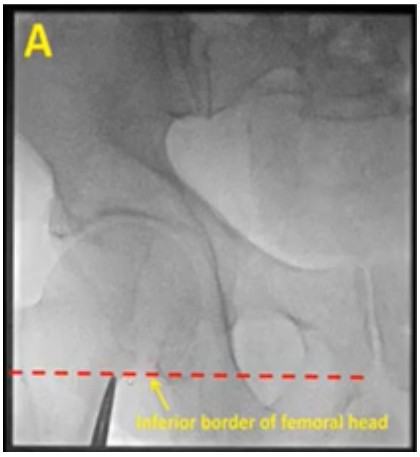


Figure 3: Femoral Puncture site

Vascular closure devices-Like Proglide,Angioseal

Management
The treatment of retroperitoneal bleeding can be thought of in a stepwise approach from nonoperative management to angioembolization or, in severe cases, surgical intervention.

General Measures
Large intravenous access—sometimes a central line may be needed to administer vasopressors and large volume of crystalloids or blood.

- Administration of normal saline.
- Blood should be sent for type and cross, followed by transfusion depending on the magnitude of bleeding and patient's hemodynamics
- Hemoglobin measurement may be useful, although often acute bleeding does not result in immediate decrease in hemoglobin.
- Anticoagulation should be reversed (protamine for heparin, discontinue glycoprotein IIb/IIIa inhibitors and cangrelor).
- Manual pressure should be held over the access site, especially if there is also a groin hematoma.

Active bleeding
Similar to coronary perforation site of bleeding is Important for implementing subsequent treatment.
There are two main types of iliofemoral perforations:

- large vessel perforation or small vessel perforation (such as perforation of the inferior epigastric or lateral circumflex iliac artery).
- Prior to pursuing definitive treatment, a balloon is inflated (at low pressure) over the site of perforation to stop ongoing bleeding.

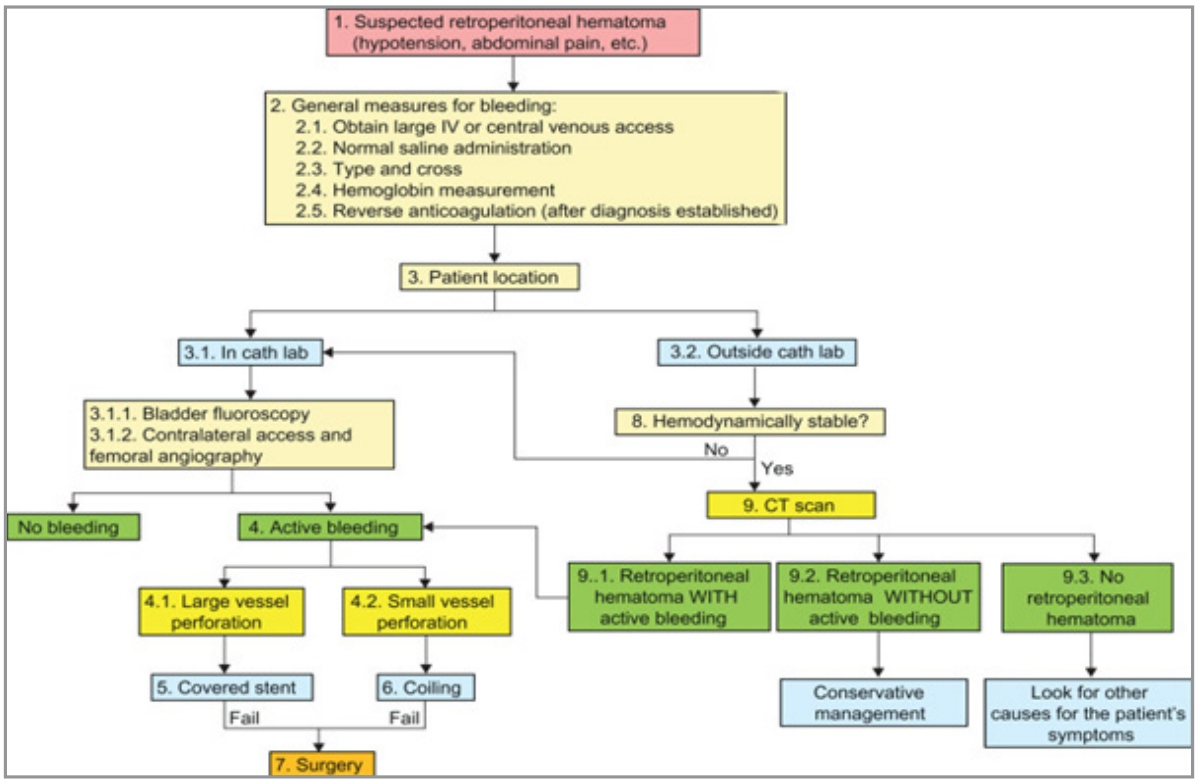
Covered Stents
If prolonged balloon inflation fails to achieve hemostasis placement of a covered stent across the site of perforation can seal large vessel perforations but may be challenging to deliver. Moreover, stents deployed in the common femoral artery are prone to fracture.

Balloon expandable covered stents, such as the allow more precise positioning than self-expanding covered stents, such as the Fluency Plus (Bard).

- Self-expanding stents are preferred for the common femoral artery, as they are more resistant to deformation during flexion Coil or microsphere embolization
- Coiling embolization can be used to stop bleeding in case of small branch perforation. If coiling is used, retrograde bleeding through the perforation should be excluded.
- Another option is microsphere, "cyanoacrylate glue," or thrombin embolization, especially in cases of very distal vessel perforation, where delivering coils is not always possible. Particular attention should be paid in those cases to avoiding leakage of the sealant outside the perforated vessel.
- Alternatively, prolonged balloon inflation or implantation of a covered stent across the origin of the perforated vessel may achieve hemostasis

Surgery

- If placement of a covered stent across the perforation site fails or is not desirable (e.g., for perforations at the superficial and profunda femoral artery bifurcation), surgical treatment of the perforation may be required.



Algorithm for Management Of Retroperitoneal Hematoma

Conclusion

RPH is an infrequent but serious complication of transfemoral catheterization procedures and is associated with significant morbidity and mortality. While there has been a decline in the incidence of major bleeding in the last decade, it still remains a significant problem. Risk factors for RPH include low body weight, female gender, emergency procedure, pre and post procedure heparin, pre-procedure IIb/IIIa inhibitors, and arterial access above the mid femoral head. Bivalirudin is associated with a lower bleeding risk [10].

Mangement is initiated by aggressive volume resuscitation and careful monitoring of the hemodynamics. If the patient remains unstable, then an interventional approach guided by the anatomical abnormality producing the RPH is indicated. Surgical management should be considered only when the interventional approach has been unsuccessful.

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