Delayed femoral artery thrombosis after hemi arthroplasty of hip- a case report

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ABSTRACT

Vascular complications following hip-arthroplasty (HA) are rare. Delayed vascular complications are exceptional with handful of reports. We report a case of femoral artery thrombosis following hemi arthroplasty with delayed presentation after a bone fragment left in situ penetrated and injured the vessel. This report is a revelation for surgeons who need to be extremely careful while operating as well as be vigilant with patients in their follow up and should assess for vascular status at each visit.

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1. Introduction

Vascular complications are rare complications following hip arthroplasty (HA) surgery.^{1–3} The incidence of these injuries after primary arthroplasty is so uncommon that only a few reports are published in literature.^{3–7} As evident in the literature, there is often a delay in diagnosis even in acute setting. A delayed presentation is extremely rare and diagnosis requires high index of suspicion and an out of box thinking. Given the infrequency of presentation and likely delay in diagnosis, the situation is impediment with the threat to limb and life of the patient.^{7,8}

We report a case of femoral artery injury that had delayed presentation with thrombosis at 10 weeks following hemi HA.

2. Case

A 78-year-old male patient with body mass index (BMI) 24 kg/cm², non-smoker, non-diabetic, American society of anesthesiologist (ASA) grade 2, presented to orthopedic emergency with a history of fall at home and inability to bear weight on his right lower limb. Clinical examination and the X-ray revealed intertrochanteric fracture (AO 31-A2 Type-Fig. 1). The right foot

dorsalis pedis and posterior tibial artery pulses were palpable and there was no neurological deficit of the involved limb. Patient was admitted and need of surgical intervention as well as possible type of interventions were discussed at length. After a written informed consent, a cemented hemi arthroplasty was planned. The patient was placed in left lateral position following spinal anesthesia. A Hardinge direct lateral approach was used for exposure and a cemented hemi arthroplasty was performed uneventfully. The operative duration was 65 minutes with a blood loss of about 150 ml. Postoperatively, the patient was stable having pulse 82/min and blood pressure 142/76 mm Hg. There was no distal neurovascular deficit. Patient was mobilized after a satisfactory check X-ray (Fig. 2) on 3rd postoperative day. He was discharged on 5th postoperative day. On 14th postoperative day, patient was followed up for suture removal and the wound revealed a healed scar. Patient was walking full weight bearing with the help of walker and had no complaints whatsoever. He was advised follow up every month thereafter. On his third visit i.e. two and half month follow-up, he complained of swelling of right lower limb up to proximal leg and bluish discoloration of tip of toes of right foot. The swelling of leg was noticed from last 5 days which was gradually progressive from distal to proximal while the discoloration was observed from last one day. On examination, the swelling was moderate, pitting and without any tenderness. The dorsalis pedis as well as posterior tibial arteries of that side were not palpable. An urgent arterial ultrasound of right lower limb was advised which showed injury of right common femoral artery (CFA) by some bony fragment in

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Fig. 1. Shows the preoperative X-ray of patient with Intertrochanteric fracture.

Fig. 2. Shows the postoperative x-ray with cemented prosthesis.

proximal thigh and formation of thrombus and no flow distally (Fig. 3). The patient was transferred to vascular surgeon for further management. The findings of femoral artery injury by bone fragment were confirmed by CT angiography (Fig. 4) and patient was advised an arterial bypass surgery for the vascular injury, but patient died meanwhile before intervention.

3. Discussion

Vascular complications following hip arthroplasty are very rare.^{1–3} The reported incidence is somewhere between 0.2 and 0.3% causing acute or sub-acute lower extremity hemorrhagic or ischemic symptoms.^{2,6,7} The acute presentation occurs following either a transection or penetration of major vessel. This causes massive bleeding leading to hypotension which can endanger the life of patient. Similarly, a compression of major vessel can cause ischemia, which may lead to limb amputation.^{2,7,8} The factors attributable to vascular injury bear patient predisposition factors and intra-operative procedure related issues. Blood vessel disorders of age like arteriosclerosis; severe acetabular deformities such as congenital hip dysplasia, ankylosing spondylitis, rheumatoid arthritis, severe osteoporosis, and vascular anatomical abnormalities are common predisposing patient risk factors. On the other hand, revision operation, surgical approach, and acetabular screw

Fig. 3. Ultrasound doppler images of right lower limb shows normal blood flow in proximal common femoral artery (arrow in A). The bone fragment is seen as a linear echogenic structure (thin arrow in B) impinging on the common femoral artery causing narrowing and distal thrombosis (thick arrow in B). No flow is seen in the popliteal artery (arrow in C).

Fig. 4. Shows CT angiography, coronal (A), Saggittal (B) and volume rendered (C) images demonstrating a large bone fragment in right hip joint impinging on the common femoral artery (arrow).

placement, retractor placement, use of electro-cautery and bone cementing are common operative handling causes.^{6,7,9,10}

Acute thrombosis of femoral artery was first reported by Thomas et al in 1994.⁴ The surgeons found little bleeding during the

end of surgery and feet were cold when drapes were removed. Varun et al. (2016), An S et al. (2018) described their cases having acute thrombosis which were diagnosed in recovery room hours after the procedure.^{5,6} The authors suggested that rarity of entity and masked effects by anesthetic agents may lead to some delay in diagnosis. Timely intervention could save life and limb in such cases.

Rarely, vascular complications arise late and such delayed injuries are challenging to diagnose and difficult to treat. Vetrhus et al. reported a case of pseudo-aneurysm arising in common femoral artery due to a free bone cement piece that subsequently caused popliteal thrombosis after a year of HA but was successfully salvaged.¹¹ A similar case had also been reported by Behcet.¹²

Ours case was unique with delayed presentation of Common Femoral artery (CFA) injury. The cause appears to be a free bone fragment that was left in situ inadvertently antero-medially as suggested by color doppler. The mechanism of injury was probably the pulling of bone fragment by Psoas muscle tendon or migration of piece by itself with movements of limb and subsequent impingement of femoral vessel by it, which gradually led to penetration and thrombosis of the CFA extending into the superficial femoral artery. The injury was not acute as there were no signs of massive intraoperative bleeding and patient was stable intraoperatively as well as postoperatively. The distal vascularity was also normal postoperatively as well as on first follow-up. The computed tomogram (CT) confirmed injury to CFA by bone fragment and thrombosis extending to Popliteal artery. The patient died before definitive treatment for vascular injury, this could be due to thromboembolism.

Treatment of vascular injury requires urgent intervention either by vascular surgery or endovascular thrombolysis.^{2,3,6,7} The outcome in some of the cases discussed above been rewarding as they occurred acutely in sophisticated set up with in-house vascular specialists and timely intervention. Our patient was discharged uneventfully and only at 10 weeks he presented with bluish discoloration of toes that prompted us to search for possible pathology.

Preventing a vascular injury therefore gains more importance than treating one. Surgeons should have accurate and through knowledge of the anatomical structures and their variations. Being gentle in dissection, retraction and cautious during cementation and other critical steps are paramount to prevent this mishap.^{7,11}

4. Conclusion

Even though vascular injury after hemi HA surgery is rare, surgeons should be aware of this possibility. In hemi arthroplasty, bone fragments specifically present antero-medially should be fixed with the main shaft by either a wire loop or thread and if fixation is not

possible, then these should be removed. Bone fragments left in the soft tissues can cause catastrophic complication of vascular injury.

Authors' contributions

KK was the operating surgeon for case as well as responsible for follow up. SM and MJ reviewed the literature. KK and MJ wrote the manuscript where SM gave the critical inputs. All authors read the manuscript and agreed on the content.

Conflicts of interest

The authors declare that they have no competing interests.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jcot.2019.07.017>.

References

1. Kakwani R, Duggan J, Muller S. Femoral artery rupture during total hip arthroplasty. *BMJ Case Rep.* 2013;2–4. <https://doi.org/10.1136/bcr-2013-009922>.
2. Calligaro K, Dougherty M, Ryan S, Booth R. Acute arterial complications associated with total hip and knee arthroplasty. *J Vasc Surg.* 2003;38:1170–1177. <https://doi.org/10.1016/S0741>.
3. Abularrage CJ, Weiswasser JM, DeZee KJ, Slidell MB, Henderson WG, Sidawy AN. Predictors of lower extremity arterial injury after total knee or total hip arthroplasty. *J Vasc Surg.* 2008;47:803–807. <https://doi.org/10.1016/j.jvs.2007.11.067>.
4. Parfenchuck TA, Young TR. Intraoperative arterial occlusion in total joint arthroplasty. *J Arthroplast.* 1994;9:217–220.
5. Varun GBS, Muralidhar N, Bharathidasan K. A case Report : an acute thrombus in the femoral artery following total hip arthroplasty. *J Orthop Case Rep.* 2016;6: 55–57. <https://doi.org/10.13107/jocr.2250-0685.377>.
6. An S, Shen H, Feng M, Li Z, Wang Y, Cao G. Femoral artery injury during total hip arthroplasty. *Arthroplast Today.* 2018;4:459–463. <https://doi.org/10.1016/j.artd.2018.03.003>.
7. Nachbur B, Meyer RP, Verkkala K, Zürcher R. The mechanisms of severe arterial injury in surgery of the hip joint. *Clin Orthop Relat Res.* 1979:122–133.
8. Ratliff A. Arterial injuries after total hip replacement. *J Bone Joint Surg Br.* 1985;67:517–518. <https://doi.org/10.1302/0301-620x.67b4.4030843>.
9. Proschek D, Proschek P, Hochmuth K, et al. False aneurysm of the left femoral artery and thrombosis of the left femoral vein after total hip arthroplasty. *Arch Orthop Trauma Surg.* 2006;126:493–497. <https://doi.org/10.1007/s00402-006-0166-x>.
10. Reiley MA, Bond D, Branick RI, Wilson EH. Vascular complications following total hip arthroplasty. A review of the literature and a report of two cases. *Clin Orthop Relat Res.* 1984:23–28.
11. Vetrhus M, Nybo Tm, Stokkeland PJ, Young S. Delayed diagnosis of a late vascular complication after Total Hip Replacement. *Eur J Vasc Endovasc Surg.* 2009;18:51–52. <https://doi.org/10.1016/j.ejvs.2009.07.020>.
12. Bechet FR, Himmer O, Mairy Y, Lootvoet L. False aneurysm of the common femoral artery after total hip arthroplasty: a case report. *Revue de Chirurgie Orthopédique et Réparatrice de l'Appareil Moteur.* 2004;90:365–368.