

Internal iliac artery pseudoaneurysm in primary total hip arthroplasty

Sanjay Agarwala, Ganesh Mohrir, Pradeep Moonot

ABSTRACT

Vascular injury is one of the rare complications of primary total hip arthroplasty (THA). We report an unusual case of lobulated pseudoaneurysm arising from one of the branches of the left internal iliac artery during acetabulum preparation in THA, which was successfully treated with coil embolization and multidisciplinary care. After 6 years follow up, patient did not have any symptoms related to the hip replacement. We recommend that surgeons should be extremely cautious while drilling medial wall of the acetabulum for depth assessment. Aggressive multidisciplinary approach, including possible support from an interventional radiologist is required for the treatment of such vascular injuries.

Key words: Acetabulum, total hip arthroplasty, vascular injury, pseudoaneurysm

MeSH terms: Arthroplasty, replacement, hip, aneurysm

INTRODUCTION

Total joint arthroplasty is performed with objectives of providing pain relief and better quality of life to the patients suffering from arthritis of the hip and knee joints.¹ Rarely, serious complications including vascular injury can occur during the procedure, which may affect the outcome of surgery.¹⁻³ The incidence of vascular injury in primary total hip arthroplasty (THA) is approximately 0.04%.⁴ We report an unusual case of vascular injury during preparation of the acetabulum in primary THA.

CASE REPORT

A 72-year-old male presented with severe arthritis of left hip secondary to avascular necrosis of the femoral head. The patient had three centimeter shortening along with fixed flexion and adduction deformity. Preoperative radiograph showed presence of a large osteophyte at the

floor of the acetabulum [Figure 1a]. A cementless total hip replacement with modified Hardinge's approach was performed using large head metal on metal articulation with articular surface replacement cup (voluntary recall since August 2010), unipolar Metal Head and Corail femoral stem (DePuy Orthopaedics, Inc., Warsaw, USA) [Figure 1b]. Intraoperatively, a 3.2 mm drill was used to identify the floor of the acetabulum and the depth of reaming. The procedure was uneventful with around 300 ml of intraoperative blood loss. Two hours later, the patient developed unexplained hypotension with tachycardia, which was treated with colloids and 2 units of blood. After next 2 h, he complained of lower abdominal pain. Abdomen and pelvis ultrasound examination conducted for investigating the cause of pain revealed a large (18 cm × 10 cm × 7 cm) retroperitoneal hematoma. Four units of fresh frozen plasma (FFP) and 6 units of platelets were administered for the management of hematoma. A lobulated pseudoaneurysm of 2.2 cm × 1.2 cm size, arising from one of the branches of the left internal iliac artery [Figure 2a] was reported in an emergency CT angiography. An interventional radiologist treated the pseudoaneurysm with coil embolization [Figure 2b]. Subsequently, the patient developed acute renal failure, which required hemodialysis and inotrope support for 10 days. On 19th day, the patient was discharged from the hospital with complete recovery and full weight bearing. A total of 16 units of blood, 4 units of FFP and 6 units of platelets were required for the treatment during his hospital stay. At 6 years followup, there were no symptoms related to the hip replacement. Similarly, no evidence of pseudoaneurysm was detected on repeat computed tomography (CT) angiography [Figure 2c]. Blood ion levels and MRI scans also did not show any adverse

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metal reaction. Patient consent has been taken to report this case.

DISCUSSION

Modern total joint arthroplasty is a successful and safe surgery; however there are chances of limb or life threatening vascular complications.¹ Vascular injury is relatively uncommon during primary THA compared to total knee arthroplasty and revision THA. Indirect vessel injury can be the result of various causes including mechanical stretching, maneuvering of the limb and thermal injury from bone cement.^{1,5-7} The common causes of vascular injury in THA are inadvertent placement of acetabular screws,⁸⁻¹¹ thermal injury due to bone cement as well as fixation of intraoperative periprosthetic fractures, embolization or injury to the vessel wall during surgical approach or maneuvering of the limb.^{4,8} In our case, vascular injury was

not caused by any of the above mentioned mechanisms, but occurred during preparation of the acetabulum by a depth assessment from a drill hole.

Medial acetabular osteophytes can result in lateralization of the cup which may affect abductor mechanics. Various techniques have been devised to identify the true floor of the acetabulum. These range from medial reaming to identify the pulvinar or using a power drill to make a small hole through the medial wall gradually and use a depth gauge to assess the bone thickness.¹² We used a 3.2 mm drill bit to assist in placing the acetabular component in the optimum position. We believe that the vascular injury to the branch of internal iliac artery was probably caused by this technique which might explain the late presentation of symptoms of blood loss and formation of pseudoaneurysm [Figure 3]. The complication was successfully managed by CT angiography and coil

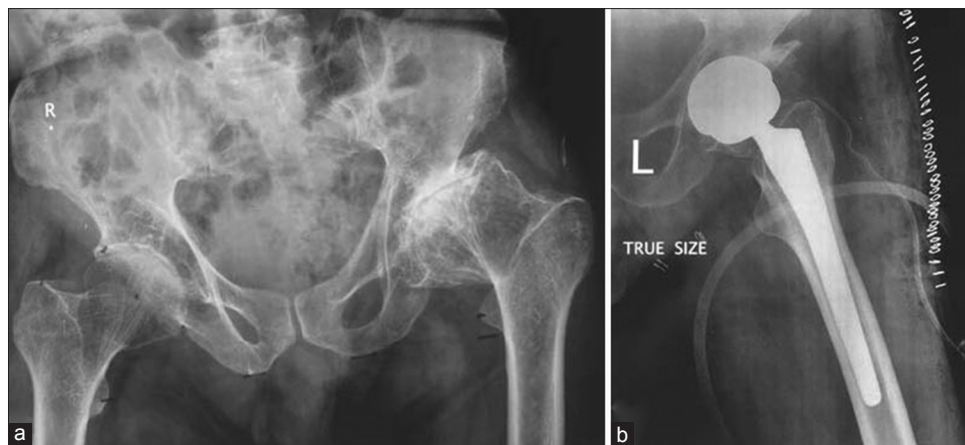


Figure 1: (a) Preoperative radiograph of pelvis with both hips showing a large osteophyte at the floor of the acetabulum in the left hip (b) Postoperative anteroposterior radiograph showing left hip arthroplasty



Figure 2: (a) Computed tomography angiography showing pseudoaneurysm of a tributary of left internal iliac artery (b) Computed tomography angiography arrow showing post coil-embolisation of the pseudoaneurysm (c) Six years followup of computed tomography angiography showing no pseudoaneurysm

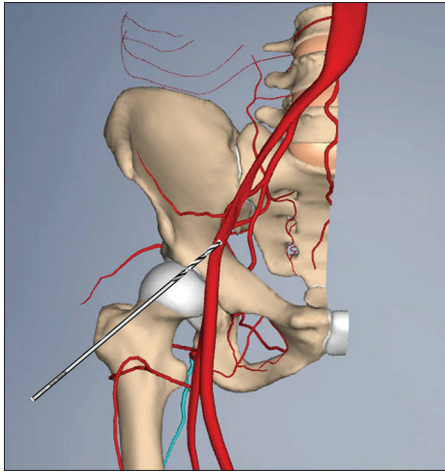


Figure 3: Line diagram of the iliac vessels showing how the drill bit may have injured the branch of the internal iliac artery

embolization. The internal iliac artery is 4 cm long, begins at the common iliac bifurcation, level with the lumbosacral intervertebral disc and anterior to the sacroiliac joint. It descends posteriorly to the superior margin of the greater sciatic foramen where it divides into an anterior trunk, which continues in the same line towards the ischial spine and a posterior trunk, which passes back to the greater sciatic foramen. Isolated internal iliac artery aneurysms are rare and commonly associated with abdominal aortic aneurysms. Common iliac artery is most commonly involved (70%), next the internal iliac artery is involved (25%). Iliac artery aneurysms are bilateral in approximately 30% cases.^{13,14}

In the previous case series on vascular injury during THA, the injury is reported to affect the external iliac vein and artery or profunda femoris artery, which was treated by open surgery and vascular repair.^{1,4} However, in our case, injury occurred to internal iliac artery. We advice surgeons to be extremely careful while drilling medial wall of the acetabulum or use some other technique to identify the true acetabular floor. Access to an interventional radiologist may be useful. Similarly, close postoperative surveillance is required for diagnosing the vascular injury which can be successfully managed with aggressive multidisciplinary approach.

REFERENCES

1. Parvizi J, Pulido L, Slenker N, Macgibeny M, Purtill JJ, Rothman RH. Vascular injuries after total joint arthroplasty. *J Arthroplasty* 2008;23:1115-21.
2. Doi S, Motoyama Y, Itoh H. External iliac vein injury during total hip arthroplasty resulting in delayed shock. *Br J Anaesth* 2005;94:866.
3. Berger C, Anzböck W, Lange A, Winkler H, Klein G, Engel A. Arterial occlusion after total knee arthroplasty: Successful management of an uncommon complication by percutaneous thrombus aspiration. *J Arthroplasty* 2002;17:227-9.
4. 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;47:803-7.
5. Aust JC, Bredenberg CE, Murray DG. Mechanisms of arterial injuries associated with total hip replacement. *Arch Surg* 1981;116:345-9.
6. Hirsch SA, Robertson H, Gorniowski M. Arterial occlusion secondary to methylmethacrylate use. *Arch Surg* 1976;111:204.
7. Calligaro KD, Dougherty MJ, Ryan S, Booth RE. Acute arterial complications associated with total hip and knee arthroplasty. *J Vasc Surg* 2003;38:1170-7.
8. Barrack RL. Neurovascular injury: Avoiding catastrophe. *J Arthroplasty* 2004;19:104-7.
9. Hwang SK. Vascular injury during total hip arthroplasty: The anatomy of the acetabulum. *Int Orthop* 1994;18:29-31.
10. Keating EM, Ritter MA, Faris PM. Structures at risk from medially placed acetabular screws. *J Bone Joint Surg Am* 1990;72:509-11.
11. Wasielewski RC, Cooperstein LA, Kruger MP, Rubash HE. Acetabular anatomy and the transacetabular fixation of screws in total hip arthroplasty. *J Bone Joint Surg Am* 1990;72:501-8.
12. Padgett DE. Total hip arthroplasty hybrid and uncemented. In: Stern SH, editors. *Key Techniques in Orthopaedic Surgery*. New York: Thieme; 2001. p. 124.
13. Uberoi R, Tsetis D, Shrivastava V, Morgan R, Belli AM, Subcommittee on Reporting Standards for Arterial Aneurysms of The Society for Vascular Surgery. Standard of practice for the interventional management of isolated iliac artery aneurysms. *Cardiovasc Intervent Radiol* 2011;34:3-13.
14. Sakamoto I, Sueyoshi E, Hazama S, Makino K, Nishida A, Yamaguchi T, *et al.* Endovascular treatment of iliac artery aneurysms. *Radiographics* 2005;25 Suppl 1:S213-27.

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