Total Hip Arthroplasty With Acetabular Fixation: An Unexpected Complication

AL-ACHRAF KHORIATI, MBBS, BSC, MRCS

abstract

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The incidence of vascular injuries associated with total hip arthroplasty (THA) is low. However, several vascular structures are at risk of injury within the pelvis. These include the external iliac, femoral, and obturator vessels. Both reaming of the acetabulum and drilling of the acetabular screw holes may place these structures at risk. If left untreated, injuries to these vessels may be associated with severe morbidity and mortality. In this report, an acute vascular complication that had an unusual presentation is highlighted. A 72-year-old woman presented to the emergency department following a road traffic accident in which she sustained a combined fracture of the right acetabulum and femoral head. Her treatment involved a combination of THA and pelvic open reduction and internal fixation. The immediate perioperative recovery period was uncomplicated. However, the patient developed a deep venous thrombus in her right calf 7 days after surgery. Further investigation revealed a second thrombus, occluding the right common femoral vein. Surgical exploration revealed that a screw placed during the initial surgery was pressing against the vessel and occluding it. The discrepancy in incidence between the development of deep venous thrombosis and vascular compression or injury means that the association between the 2 events is unlikely to be made. The author highlights this unusual presentation to improve early recognition and prompt management of similar cases. The importance of adequate preoperative planning and intraoperative imaging with a C-arm is also stressed.

The author is from the Department of Orthopaedics, Princess Grace Hospital, London, United Kingdom.

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Correspondence should be addressed to: Al-Achraf Khoriati, MBBS, BSc, MRCS, Department of Orthopaedics, Princess Grace Hospital, 42-52 Nottingham Place, London W1U 5NY, United Kingdom (alkhoriati@doctors.org.uk).

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The incidence of vascular injuries associated with both primary and revision total hip arthroplasty (THA) is low.\(^1\) If left undetected or untreated, these injuries may be associated with severe morbidity and mortality.\(^2\) A number of vascular structures are at risk for injury within the pelvis. These include the external iliac, femoral, and obturator vessels.\(^2\) Both reaming of the acetabulum and drilling of the acetabular screw holes may place these structures at risk.\(^3\) These risks are no doubt increased in THA procedures performed in patients with associated acetabular fractures. Operative procedures in such patients often require much more extensive work and the insertion of multiple screws at different locations within the pelvis. Cases in the literature report direct injury to these vessels as a consequence of either fixation in the acute setting\(^4\) or migrated components years after initial fixation.\(^5\) This report describes an acute vascular complication with an unusual presentation to improve the early recognition and prompt management of similar cases.

**CASE REPORT**

A 72-year-old woman presented to the emergency department after a road traffic accident in which she sustained a combined fracture of the right acetabulum and femoral head. The complex nature of the fractures necessitated specialized management at a tertiary trauma center. The fractures were managed successfully with primary fixation and total hip replacement with a cemented stem, uncemented trabecular metal cup, and multiple plates\(^6\) (Figure 1). Multiple screws were required for fixation of the plates. There appeared to be no intraoperative complications. The immediate perioperative recovery period was also uncomplicated. Weight bearing was permitted, and the patient mobilized successfully.

One week postoperatively, the patient had a swollen, tender calf ipsilateral to the operated hip. Ultrasound scan showed a massive deep venous thrombus. The patient was immediately given anticoagulants. After a week of anticoagulation, the patient’s calf remained swollen, with rubor and tenderness ever present. A vascular opinion was sought, and venography was obtained and showed occlusion of the right common femoral vein (Figures 2-3) at the level of the femoral head. The intravenous catheter was manipulated very gently across the occlusion using a glide wire (Figure 4). This was found to pass very close to the medial acetabular screw, indicating that this screw was pressing against the vessel and occluding it.

Three weeks after the initial intervention, the patient underwent re-exploration of the region. Trauma to the surrounding tissues after insertion of the screw had led to the formation of scar tissue around the femoral vein. It was decided at this point that the patient should be managed with venous grafting. A femoral-to-iliac bypass was then performed. The patient subsequently made a full recovery.

**DISCUSSION**

The association between both pelvic fractures\(^7\) and joint replacement surgery\(^8\) and the development of deep venous thrombosis is well established. In contrast, the occurrence of both early and late direct vascular injuries is a rare occurrence, with some studies quoting the incidence to be as low as 0.25% (in all cases of THA).\(^5\) Mechanisms of injury include damage to the common femoral artery with the misplacement of retractors\(^9\) and damage to the femoral vessels sustained by the placement of cerclage wires.\(^10\) Because of the often technically difficult nature of pelvic reconstructive surgery, the
placement of cage screws has also been associated with both neurologic and vascular injuries.\textsuperscript{11}

The discrepancy in incidence between the development of deep venous thrombosis and vascular compression or injury means that the association between the 2 events is unlikely to be made. The author would like to emphasize the clear link between the 2 events in this case and consequently the importance of postoperative anticoagulants in this setting. These should be administered from the very beginning, starting on the day of surgery. Amputation is a recognized complication of failure to detect insults to the femoral vessels (eg, compression by screws).\textsuperscript{5}

Awareness of the potential for these injuries is therefore crucial so that prompt investigation and rapid intervention can be initiated to avoid such severe events.

A number of reports have advocated the necessity of preoperative imaging\textsuperscript{2,12} with computed tomography or magnetic resonance imaging to adequately plan complex acetabular surgery. The author believes that this case emphasizes the importance of adequate radiographic planning with the appropriate modality in cases where fixation may prove complex. In such complex cases, the use of a C-arm intraoperatively is a necessity. In this case, it would have avoided placement of a screw so deeply beyond the lamina quadrilatera.

\textbf{REFERENCES}