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Progressive thrombotic occlusion of the left common iliac artery after anterior lumbar interbody fusion

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Abstract We report a case of progressive thrombotic occlusion of the left common iliac artery in a 41-year-old woman after anterior interbody fusion, which initially presented only as a sensation of numbness. Diagnosis was delayed until complete arterial occlusion occurred 36 h after surgery. A sensory deficit may be the only early sign of a progressive thrombotic arterial occlusion. In anterior spinal surgery, routine postoperative vascular monitoring of the lower extremities is rec-

ommended and mandatory for early diagnosis and treatment of this rare complication.

Key words Arterial thrombosis · Anterior lumbar interbody fusion · Complication · Vascular injury

Introduction

Anterior interbody fusion for degenerative disorders of the lumbar spine is currently undergoing a renaissance either by a less invasive open surgery; e.g. mini-laparotomy [4] or by laparoscopic-assisted surgery [6, 7, 10]. With the gaining popularity of anterior spinal surgery, complications specific to this approach become more evident. We report the unusual presentation of a left common iliac artery occlusion in a 41-year-old woman after anterior lumbar interbody fusion.

Case report

A 41-year-old woman developed recurrent disabling low-back pain and pseudoradicular leg pain 14 years after successful anterior/posterior fusion of L4 to the sacrum. The preoperative diagnostic work-up demonstrated a degenerative L3/L4 intervertebral disc on the MRI scan with a positive concordant pain L3/L4 discogram. Solid fusion of the lower levels had been diagnosed by preoperative flexion/extension views, tomograms and by the intraoperative findings on removal of the posterior translaminal facet joint screws (stainless steel) prior to repeat MRI scan. Anterior and posterior extension of the previous fusion to L3 was deemed appropriate to treat the patient's severe pain and functional limitation.

The previous surgical history included a hysterectomy and four surgeries for excision of ovarian cysts. There was no history of diabetes, cardiovascular disease or smoking.

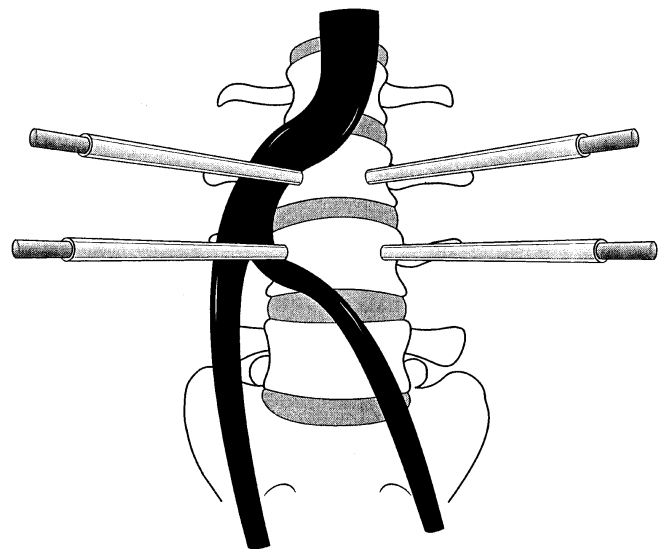


Fig. 1 Schematic presentation of stay retractors in the L3 and L4 vertebrae used in this case to retract the left common iliac artery

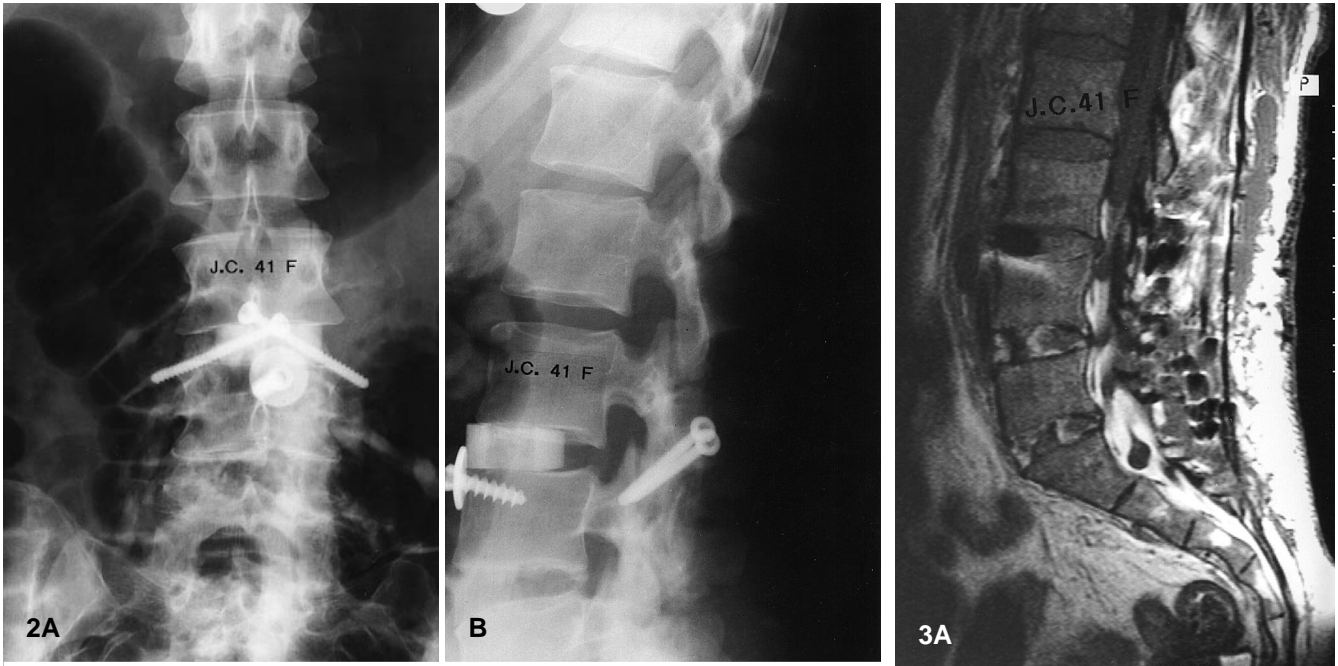
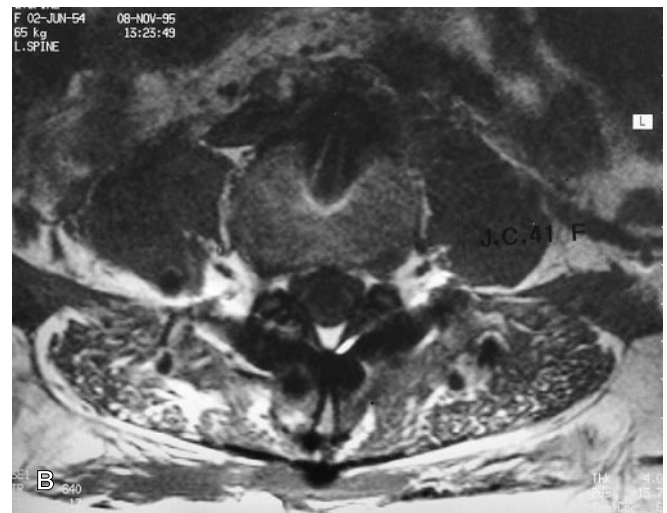


Fig. 2 Postoperative anteroposterior (A) and lateral (B) radiographs demonstrating a combined anterior and posterior fusion at L3/L4 with correct screw and graft position

Fig. 3 Postoperative MRI to rule out a neural compromise. The images show normal postoperative situation but not evidence for nerve root or cauda equina compromise. A T1-weighted sagittal scan, B T1-weighted axial scan



Significant scarring and fibrosis was encountered during the repeat anterior retroperitoneal approach. The vessels were mobilized and retracted with stay retractors (four Steinmann pins, covered with plastic sheaths) inserted into the vertebral bodies of L3 and L4 (Fig. 1). Discectomy, femoral ring allograft fusion (filled with autologous cancellous bone) and stabilisation with a titanium screw and washer were carried out without intraoperative complications. Posterolateral fusion and translaminar facet joint screw fixation was then uneventfully carried out under the same anaesthesia (Fig. 2). There were no noted intraoperative complications and no evidence for a vascular injury. Blood loss was 500 cc for the whole procedure.

In the recovery room, the patient complained of left foot numbness without clear dermatomal distribution. Pin prick sensation was present but decreased. Perianal sensation, sphincter tone, motor power, reflexes and peripheral pulses were normal. However, a decrease in temperature of the left leg was not noted. In the absence of a motor deficit or evidence for a misplaced screw (Fig. 2), the symptoms were interpreted as nerve root irritation resulting from disc height restoration by the anterior fusion. The patient was closely monitored overnight. Because left foot numbness and paraesthesia remained unchanged, an MRI scan was performed the following morning to document the absence of a cauda equina or a nerve root compression syndrome (Fig. 3). About 36 h after surgery, the patient developed acute severe pain in the whole left leg, worse laterally than medially, that progressed over 3 h to complete sensory and motor loss from the knee down. In addition, there was a loss of all left peripheral pulses after they had been palpable 2 h prior to the complete motor deficit. The leg became pale and cold and left common iliac artery occlusion was diagnosed. Because preoperative arteriography was not readily avail-

able and emergency surgery prompted, the vascular surgeon decided to proceed with immediate thrombendarterectomy. Intraoperatively, the clinical diagnosis was verified with a 1.0 bis 0.5 cm diameter thrombus blocking the left common iliac artery at the level of the L4 vertebra. Pathologic examination of the clot showed the classic laminated structure of a thromboembolus. However, thrombendarterectomy was unsuccessful and was followed a few hours later by a femoro-femoral bypass surgery using a Dacron graft; restoring circulation to the left leg. No fasciotomy of the limb was needed.

Postoperatively, the patient had severe hyperaesthetic pain on the lateral aspect of left thigh, but sensation in the lower limb improved. The motor power increased to MRC grade 2–3 in the L4–S1 innervated muscle groups by the time of discharge 5 weeks postoperatively. A thorough postoperative diagnostic work-up failed to reveal any underlying abnormalities (e.g. cardiovascular diseases, arteriosclerosis obliterans, collagen vascular disease, myeloproliferative disorders or dysproteinemias).

At 1-year follow-up, the patient had slightly improved, but still had severe pain requiring significant amount of analgesics, decreased sensation and motor power (MRC grade 3–4) in the limb. Peripheral circulation of the leg was restored to normal.

Discussion

Vascular complications in anterior spinal surgery are relatively rare (0–0.08%) in large series, but well recognized as potential complications of this type of spine surgery [2, 5]. These complications are more frequently (15.6%) encountered when exposure of the lower lumbar spine is required for an interbody fusion [1]. Most complications involve lacerations to the iliolumbar vein, left iliac vein or artery or the middle sacral vessels [1]. The left iliac artery is at risk of partial occlusion during retraction while exposing the lower lumbar disc spaces [9]. Occult atherosclerotic plaques in the left iliac artery may theoretically produce a clot during retraction of the artery and subsequently cause occlusion of the left iliac artery [9]. Despite this potential risk, the incidence of left iliac artery occlusion is very rare. So far, only one case has been reported in the literature in association with spinal surgery [3]. We report here another case, stressing the importance of early diagnosis and management.

Vascular complications are usually identified intraoperatively. As such, they can be managed and repaired immediately with the help of a vascular surgeon. In our case, the diagnosis was delayed as there were no intraoperative complications and a vascular injury was not suspected. The purely sensory neurologic abnormalities after lumbar spinal fusion and instrumentation raised suspicion of a neurologic rather than a vascular injury. Complete throm-

botic occlusion of the left iliac artery developed 36 h postoperatively. In the presence of significant scarring and fibrosis, it is assumed that direct trauma to the vessel during dissection and retraction caused a rupture of an atherosclerotic plaque leading to subsequent increasing thrombotic occlusion. We do not attribute this complication to the stay retractors [9], although we cannot exclude a contributing effect. On the other hand, the stay retractions are beneficial in avoiding continuous manipulation of the vessel by slipping manually held retractors which theoretically could cause intima lesions. In cases of an incomplete but progressive occlusion, the only initial complaint may be a sensation of numbness [8], a feature not recognized in time in our case. At this stage, blood supply to the lower limb may be marginal, but still sufficient to maintain normal motor function and viability of the leg. Only secondarily, the classic picture of a cold, painful, pulseless and paralyzed leg developed as a result of a complete arterial occlusion.

Conclusion

Postoperative neurologic abnormalities after anterior surgery should make the spine surgeon suspicious not only of spinal but also of vascular causes. Patients with established peripheral vascular disease, or cardiovascular risk factors, previous anterior retroperitoneal lumbar spine surgery or the elderly patient may benefit from a preoperative vascular work-up. Routine vascular monitoring after anterior lumbar spinal surgery is therefore mandatory and can easily be achieved by intermittent pulse oxymetry of the toes.

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