Endovascular treatment of postlaminectomy aortic pseudoaneurysm

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Aortic pseudoaneurysm following lumbar laminectomy is a rare but potentially life-threatening complication. We report a case of a 49-year-old female patient who developed a pulsatile abdominal mass and pain following a lumbar laminectomy procedure. An aortic pseudoaneurysm was diagnosed which was successfully treated with endovascular stent-graft exclusion. This report represents the first case of endovascular exclusion of a laminectomy-related aortic pseudoaneurysm. Physicians should be aware of this complication in patients who developed abdominal pulsatile mass with pain following lumbar laminectomy procedure. (J Vasc Surg 2008;47:1083-5.)

Iatrogenic vascular injuries caused by lumbar laminectomy procedure, although rare, can result in devastating consequences. With an estimated incidence of this iatrogenic injuries ranging between 0.016% and 0.17%, the associated mortality rate is very high which ranged between 15% and 61%.1-3 The presentation is usually acute during the procedure, and the treatment frequently required emergency open surgical procedure for repair of the injury with associated significant morbidity and mortality. The complications can also be delayed most commonly arteriovenous fistula and pseudoaneurysms.4,5 In this report, we describe a postlaminectomy aortic pseudoaneurysm which was successfully treated with stent-graft exclusion using an aortic cuff device.

CASE REPORT

A 49-year-old female with a 2-year history of lumbar stenosis underwent an elective L4-L5 lumbar laminectomy procedure. Preoperative evaluation of the lumbar spine using magnetic resonance imaging (MRI), revealed no gross abnormalities of the adjacent aorta. The laminectomy was performed under general anesthesia via a standard posterior approach. The operation was completed uneventfully with a total operative time of 80 minutes and intraoperative blood loss of 50 ml. She had an uneventful postoperative recovery and was discharged home on postoperative day five.

Two months later, at home she experienced progressive dull, constant abdominal pain. She presented to the emergency room where she was vitally stable. Abdominal examination revealed a tender pulsatile right lower quadrant mass. An abdominal computed tomography (CT) scan revealed a saccular aortic pseudoaneurysm at the level of L4-L5 vertebrae. It was decided to treat the pseudoaneurysm using an endovascular approach. Under general anesthesia, a right groin cutdown was performed with a retrograde right femoral artery access obtained, and an 18F introducer sheath was inserted into the distal aorta. A percutaneous retrograde left common femoral artery access was established, and a 5F sheath placed through which a 5F pigtail catheter (Boston Scientific, Natick, Mass) was inserted into the abdominal aorta. Following an abdominal aortogram which demonstrated the aortic pseudoaneurysm (Fig 1), an endovascular aortic cuff 22 mm in diameter (W. L. Gore Associates, Flagstaff, Ariz) was inserted over an Amplatz superstiff wire (Boston Scientific) which successfully excluded the aortic pseudoaneurysm (Fig 2). The patient tolerated the procedure well and was discharged home on postoperative day three. On her follow-up visit at 6, 12, and 24 months, she had no further abdominal symptoms and surveillance CT scan showed successful exclusion of her aortic pseudoaneurysm.

DISCUSSION

Lumbar laminectomy is a commonly performed orthopedic procedures in patients inflicted with lumbar stenosis. Albeit uncommon, vascular complications involving the aorta can occur due to iatrogenic injuries caused by aggressive instrumentation in regions anterior to the lumbar spine.1-3 Our report is notable because this represents the first case of successful treatment using an endovascular aortic cuff to exclude an aortic pseudoaneurysm caused by a lumbar laminectomy procedure.

Vascular complications associated with lumbar laminectomy are rare to occur with a reported incidence in the literature between 0.016% and 0.17%.1-3 This incidence likely represents an underestimated figure because clinical manifestations is highly variable depending the type and degree of trauma, which frequently result in misdiagnosis.6 Although rare, the reported vascular complications are associated with very high mortality rates if not promptly discovered and treated.1,3,4 Most injuries occur at the level of L4-L5 in 75% of reported cases.5,7 In addition to the anatomical relation between the large vessels and lumbar vertebrae, discectomy between the fourth and fifth lumbar vertebrae is the most commonly performed procedure for this disorder, and the vessels at this level are particularly vulnerable to injury because of their relative immobility and proximity to each other when the patient is in the prone position.
position. Most vascular injuries involve the common iliac vessels more on the left side and much less commonly the distal abdominal aorta. The presentation is usually of massive bleeding with tachycardia and hypotension either during or immediately after the operation in which case, emergency surgery is required with repair of the affected vessels. However, the presentation may be delayed months or even years after the original surgery in which case they present with arteriovenous fistula or a pseudoaneurysm of the affected vessel. Most reports of late presentations are of arteriovenous fistulae because of their unusual features. Pseudoaneurysm is the least commonly sequel of vascular injury with very few reports in the literature all of which were delayed in presentation. The presentation is usually an expanding tender abdominal mass or delayed rupture with hypovolemic shock. The natural history of traumatic pseudoaneurysm of the aorta is not benign. Potts and Algine reviewed 13 published cases of traumatic pseudoaneurysm of the aorta that resulted from penetrating trauma and found that four of the 13 patients died because of free peritoneal or pleural rupture, all at times remote from the original injury. Treatment of a traumatic pseudoaneurysm is thus mandatory once diagnosed to avoid these dreaded outcomes. The classic treatment is by open surgical repair, however, reports in the literature show mortality rates ranging from 5% to 10% with open surgery.

Endovascular repair of aortic pseudoaneurysm is an attractive modality of treatment and have been used before in the treatment of both traumatic and iatrogenic arterial pseudoaneurysms. It is less invasive, avoids operating on hostile surgical fields and is associated with rapid postoperative recovery. Maleux and associated reported a case of postlaminectomy aortic pseudoaneurysm which was successfully treated with translumbar thrombin embolization, which remained successful with a follow-up period of 10 months. The authors recommended that technique for selected cases of aortic pseudoaneurysms with a small neck which is not amenable to endovascular stent-graft exclusion. Stent-graft exclusion has been used for the treatment of arterial pseudoaneurysms in various anatomical regions with excellent results. In one of the earliest reports, Parodi and colleagues reported a 100% success rate for traumatic aortic pseudoaneurysm exclusion using homemade stent-graft devices. A subsequent report by Marin and associates showed successful stent-graft exclusion of seven patients who developed traumatic arterial pseudoaneurysm with a mean follow-up period of 6.5 months. Our case represents the first case in the literature of repair of the rarely reported postlaminectomy aortic pseudoaneurysm using stent graft. The patient had a successful and durable

Fig 1. A preprocedural aortogram demonstrated a saccular aortic aneurysm at the L4-L5 lumbar spine region following a postlaminectomy procedure.

Fig 2. Following the deployment of an aortic cuff device, the completion aortogram showed completion exclusion of the aortic pseudoaneurysm.
outcomes over a 2-year period of follow up. The technique that has been successful in the treatment of pseudoaneurysms in different vascular beds proved to behave in the same favorably way in this pathological entity. With many aortic cuff devices available from various manufacturers as a part of FDA-approved infrarenal aortic aneurysm treatment armamentarium, we choose the Gore Excluder aortic cuff because it has the smallest profile of 18F in its delivery armamentarium, we choice the Gore Excluder aortic cuff device in a postlaminectomy aortic pseudoaneurysm representing an off-label usage of the device, our report underestimates that this minimally invasive treatment strategy is feasible and effective therapeutic technique.

REFERENCES
