

## CASE REPORTS

# Endovascular exclusion of iliac artery to iliac vein fistula after lumbar disk surgery

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Iliac arteriovenous (AV) fistula is rare after lumbar disk surgery. Traditionally, open repair through the arterial lumen was performed. We report endovascular exclusion of an iliac AV fistula in a 41-year-old woman 8 years after lumbar diskectomy. An angiogram showed an AV fistula connecting the right common iliac artery and vein. This was repaired with placement of two covered wall stents in the right common artery and external iliac artery, and embolization of the right internal iliac artery. Contrast medium-enhanced computed tomography scan at 5 months confirmed elimination of the AV fistula and right iliac artery patency. This technique should be considered in management of iliac AV fistulas. (*J Vasc Surg* 2003;37:1091-3.)

Arteriovenous (AV) fistula of the aorta and its branches may cause massive shunt flow, leading to congestive heart failure and venous hypertension. Abdominal aortic aneurysm, penetrating trauma, and lumbar disk surgery are recognized causes of acquired iliac AV fistula. While major vessel injury is uncommon during lumbar disk surgery, it may go unnoticed at the time of injury in 50% of patients. The mechanism of AV fistula formation in lumbar spine surgery is penetration of the anterior longitudinal ligament with dissecting instruments, injuring the aorta, vena cava, or iliac vessels. Aortocaval injury has been reported after intervention at the L4-L5 level, and iliac injury after intervention at the L5-S1 level.<sup>1</sup>

Repair of AV fistula is recommended to prevent serious complications later.<sup>1</sup> Direct open surgical repair of a fistula through the artery incurs risk for substantial blood loss perioperatively. Surgical bypass grafting with exclusion of the iliac system has also been advocated. We report the case of a 41-year-old woman in whom a large AV iliac fistula was successfully treated with an endovascular technique 8 years after lumbar diskectomy.

### CASE REPORT

A bruit was detected in a 41-year-old woman at routine physical examination. She had no symptoms. Her only medical

history was a lumbar diskectomy performed 8 years previously. Examination revealed a grade III-VI systolic ejection murmur over the precordium and pansystolic murmur throughout the abdomen. The electrocardiogram, chest and abdominal radiographs, echocardiogram, and abdominal ultrasound scan were all normal. A contrast medium-enhanced computed tomography (CT) scan indicated caval filling in the arterial phase of the scan and an enlarged vena cava, consistent with central venous overload. An angiogram demonstrated an AV fistula arising at the bifurcation of the right common iliac artery, communicating with the right common iliac vein (Fig 1).

We elected to manage this fistula with an endovascular approach. The right groin area was infiltrated with 20 mL of 1% lidocaine hydrochloride (Xylocaine; AstraZeneca Pharmaceuticals, Dublin, Ireland). Through a percutaneous right common femoral artery approach, two covered Wallstents (10 × 30 mm, 10 × 50 mm, respectively; Boston Scientific, Galway, Ireland) were placed in the right iliac arterial system through an 11F sheath. Ten-millimeter stents were chosen because the arterial diameter proximal to the fistula measured 9 mm. Two stents were placed because there was still some perigraft flow noted at angiography after the first stent had been deployed. Immediately before stent placement but at the same sitting, coil embolization of the right internal iliac artery was performed through a contralateral common femoral artery puncture (Fig 2, A). Digital pressure was applied for 5 minutes to the puncture sites in both groins. No closure device was used. No anticoagulation agent was given before or during the procedure. Full therapeutic heparinization was commenced immediately after the procedure and continued for 48 hours. Maintenance therapy has been enteric-coated aspirin, 75 mg/d, since the procedure. A highly satisfactory immediate result was obtained after the procedure (Fig 2, B), with immediate closure of the fistula. Neither buttock or hip claudication developed. CT scans at 5 months post-intervention demonstrate continued closure of the

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Competition of interest: none.

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0741-5214/2003/\$30.00 + 0

doi:10.1067/mva.2003.180



**Fig 1.** Initial diagnostic angiogram identifies an arteriovenous fistula (*arrow*) between the right common iliac artery and the iliac venous system. Vena caval dilatation is noted, consistent with chronic arteriovenous communication.

fistula (Fig 3). The patient remains well, and murmur has disappeared.

## DISCUSSION

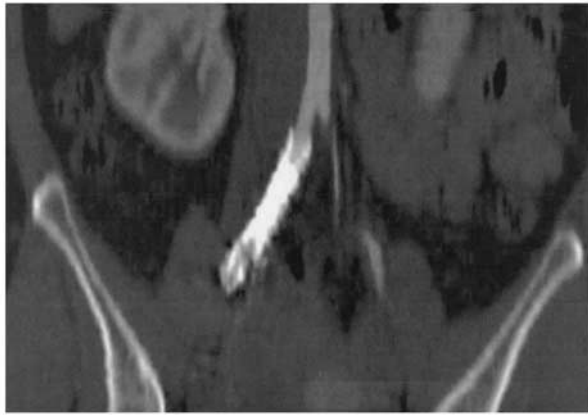
Linton and White<sup>2</sup> first reported an AV fistula between the iliac artery and vena cava after intervertebral disk surgery in 1945. The injury was not recognized until 8 months later, and was treated with proximal and distal iliac artery ligation. AV fistula after lumbar disk surgery is rare. Over 30 years, Brewster et al<sup>3</sup> reported 20 aortoiliac AV fistulas, but only 4 developed after lumbar disk surgery. Murmur was noted in 80% of patients, congestive heart failure in 35%, and leg edema in 40%.

Jarstfer and Rich<sup>4</sup> reported that AV fistula after lumbar disk surgery followed exploration of L4-5 in 73% of patients and L5-S1 in 27% of patients. Anatomically the fistulas were ilioliac (69%), right iliac artery to inferior vena cava (22%), and aortocaval (9%). Symptoms appeared at 24 hours (9%), 24 hours to 1 year (70%), and after 1 year (21%). Venous repair was with lateral suture in 81% of patients, ligation in 6%, and quadruple ligation in 11%. Arterial repair was with lateral suture in 38% of patients, excision with interposition grafting in 42%, ligation in 8%, and quadruple ligation in 10%. Surgical mortality rates vary from 9% to 34%.<sup>4-11</sup>

Anda et al<sup>12</sup> in 1991 used CT to examine the prevertebral lumbar anatomy in 4 patients with vascular complications after lumbar surgery and 50 healthy adults with low back pain who had not undergone surgery. Six common groups of vascular anatomy at the L3-S1 level were identified and delineated. Precise anatomic localization may help to reduce intraoperative difficulties and thus contribute to reduction in morbidity and mortality with operative approaches to these lesions.



**Fig 2.** A, Intraoperative fluoroscopy demonstrates two wall stents and a hypogastric artery embolization coil in place. B, After stent grafting, a highly satisfactory immediate angiographic result was obtained.



**Fig 3.** CT scan at 5 months shows stable graft position and continued exclusion of arteriovenous communication with non-opacification of the inferior vena cava during the arterial phase.

Endovascular exclusion might substantially reduce treatment-related morbidity in iliac AV fistula after lumbar disk surgery. In 1995 Zajko et al<sup>13</sup> reported the first endovascular repair of a right common iliac artery to inferior vena cava fistula. They placed a percutaneous stent graft in the common iliac artery of a patient in whom fistula developed after repair of a right iliac artery trocar injury sustained during laparoscopy. CT scans at 3 months demonstrated a patent and intact artery, and clinical improvement was clinically noted at 7 months. In 1996 McCarter et al<sup>14</sup> reported endoluminal stent grafting of a left ilioiliac AV communication in a patient with cardiac failure 4 years after diskectomy. An angiogram at 1 month demonstrated an intact endoluminal repair. We add to this literature a report of endoluminal stent graft exclusion of a right ilioiliac AV communication 8 years after diskectomy. The challenge in managing this fistula through an endovascular route was to ensure that perigraft flow would not occur from the internal iliac artery after placing a covered stent in the common external iliac artery. Complete occlusion of the fistula was achieved with coil embolization of the internal iliac artery before placing the covered stent. AV fistula endoluminal stent grafting with internal iliac artery embolization provided a solution to this difficult iatrogenic injury, with low

morbidity. Close long-term follow-up of our patient and others will be needed to firmly establish the role of endovascular repair in the management of complex iliac AV fistulas.

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Submitted Jun 6, 2002; accepted Oct 22, 2002.