

Iatrogenic iliac arteriovenous fistula following lumbar disc surgery

Jatrogenna przetoka tętniczo-żylna naczyń biodrowych po operacji kręgosłupa lędźwiowego

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Introduction

Iatrogenic arteriovenous fistula (AVF) after lumbar disc surgery is a rare but potentially life threatening complication [1]. It may present with a diverse array of manifestations. Hence the diagnosis is often delayed and overlooked leading to increase in morbidity and mortality. Early diagnosis and treatment can be life saving. We are reporting a case of iatrogenic iliac AVF following lumbar disc surgery, treated with endoluminal stent-graft.

Case report

A 40-year-old previously healthy male underwent lumbar discectomy for a documented disc herniation at L₄-L₅ level on 2/6/2006. The surgery lasted for 3 hours and was uncomplicated. Patient had no significant past medical history. His social and family histories were unremarkable.

Twenty-four hours after the surgery patient developed sudden onset of dyspnea and sweating. His blood pressure was 120/70 mm Hg. He had tachycardia and mild oxygen desaturation. Electrocardiogram (ECG) showed sinus tachycardia and 'S1 Q3 T3'. Venous Doppler study of lower limbs showed dilated right common iliac and external iliac veins with decreased and intermittent flow. It was interpreted as acute thrombosis of right iliac veins. Echocardiogram showed hyperactive right and left ventricles with normal pressures and increased pulmonary artery flow velocity. Based on post operative circumstances a diagnosis of pulmonary embolism was made and inferior vena cava (IVC) filter was inserted on 5/6/2006. There was little improvement in symptoms. He was discharged on 13/6/2006 with oral anticoagulant.

Within a few days, his symptoms worsened. He developed increasing dyspnea, orthopnea, palpitations and cough with blood tinged sputum. He also noticed distension of abdomen, swelling of legs, loss of appetite and decreased urine output. In this critical condition patient was referred to our institute on 7/7/2006.

Clinical examination revealed bilateral leg edema, tachycardia, elevated jugular venous pressure (JVP), hepatomegaly, ascites, bilateral basal rales and S3 gallop. Continuous murmur was heard all over the back up to the sacral region. He had anemia [Hb% 8 gms], abnormal liver function tests with a prolonged INR of 10. Chest X ray revealed cardiomegaly with increased vascular markings. An echocardiogram showed dilated IVC, right atrium, right ventricle and pulmonary artery with mild elevation of pulmonary artery pressure. An abdominal ultrasound showed moderate hepatomegaly, ascites and right pleural effusion. A diagnosis of high output cardiac failure due to infra diaphragmatic AVF was made.

Abdominal aortogram showed a large communication between right common iliac artery (CIA) and right common iliac vein (CIV), briskly filling IVC (fig. 1), thereby confirming the diagnosis of AVF. A self expanding stent-graft measuring 14 × 16 × 70 mm (EXCLUDER AORTIC STENT GRAFT – GORE ASSOCIATES) was inserted into right CIA through homolateral percutaneous femoral approach and complete closure of the fistula was achieved (fig. 2 and 3). Patient improved dramatically within hours. His edema, ascites and pleural effusion disappeared over next 2 days. All biochemical parameters became normal within 2 days. He became asymptomatic and was discharged 3 days later. Patient remained asymptomatic at 1 year 8 months follow up.

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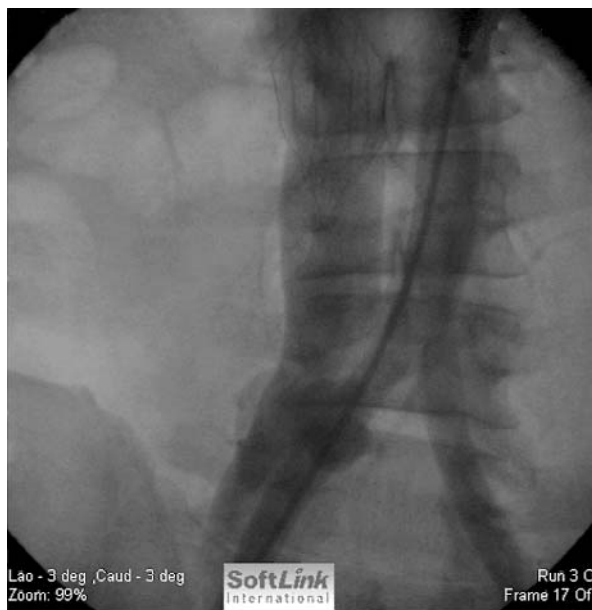


Fig. 1. Abdominal aortogram showing right common iliac arteriovenous fistula briskly filling inferior vena cava

Ryc. 1. Aortografia brzuszna; widoczna przetoka prawej tętnicy biodrowej wspólnej, przez którą szybko wypełnia się żyła główna dolna



Fig. 3. Complete exclusion of fistula after stent-graft deployment

Ryc. 3. Całkowite zamknięcie przetoki w wyniku implantacji stentgraftu

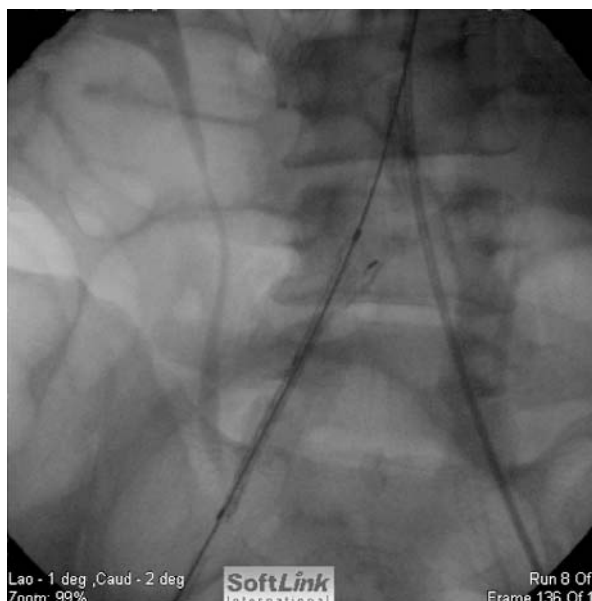


Fig. 2. Stent-graft getting deployed arteriovenous fistula

Ryc. 2. Stentgraft rozprężany w miejscu przetoki

Discussion

Arteriovenous fistula formation is an unusual but well described complication of lumbar disc surgery. It was first described by Linton and White in 1945 [2]. The injury is typically caused by surgical instruments penetrating

beyond the anterior longitudinal ligament [3]. It can even occur in the hands of most competent and experienced surgeons [4]. Because the aortic bifurcation occurs at the level of L₄-L₅, the injury typically involves the aorta, vena cava, iliac arteries and veins all of which are situated immediately anterior to the vertebra. The exact vessels injured are related to the level of the surgery and the angle of instrumentation. The right CIA and vein are more frequently involved because of the higher percentage of interventions at L₄-L₅ level.

The AVF gradually enlarges until the patient develops overt heart failure. Diagnosis can be delayed as long as 6-8 years [5, 6]. Patients usually present with signs and symptoms of high output heart failure including fatigue, malaise, dyspnea on exertion, tachycardia, widened pulse pressure, edema and hyperdynamic precordium. As in our case the patients are commonly erroneously evaluated for deep venous thrombosis and pulmonary embolism.

Only 73 AVFs following disc surgery were described up to 1976, with a mortality of 10% [1]. An additional 70 cases were reported in 1994 [7]. In a more recent literature review of 122 vascular complications of lumbar disc surgery, 78 involved AVFs between 2 vessels of the aortocaval intersection [8]. Presentation was acute in 6.4%, subacute in 19% and late, as high output failure in 64% of the cases. Surgical mortality was 1.3%. In a single center experience of 8099 consecutive cases of lumbar disc surgery 4 patients (0.05%) had vascular complications and in that 2 had AVFs [9].

Our patient developed symptoms 24 hours after surgery and was initially treated elsewhere as pulmonary embolism and even received an IVC filter. He continued to have progressive congestive heart failure and it took more than one month for the correct diagnosis to be established.

High index of suspicion based on clinical signs is important in the detection of these AVFs. Angiography remains the gold standard for diagnosis and guidance for treatment. Intra vascular ultra sound (IVUS) can be of great help in selected cases, particularly in high output fistulas and/or those located near bifurcation where turbulence makes angiography less reliable [10]. Recently spiral computed tomography has also permitted precise and detailed evaluation of the vascular lesion [11]. In our case conventional cine angiography was adequate in confirming the clinical diagnosis and guiding the percutaneous stent-graft placement.

Until recently surgery was the only possible cure. Surgical correction still carries morbidity and mortality rates of about 1.3-6% in modern series [12]. Growing experience with endoluminal aneurysm exclusion has produced good immediate and midterm success, although the long term results are still being documented. Several ilio-iliac AVFs have been treated successfully with percutaneous stent-grafts [13-16].

Conclusion

Arteriovenous fistula formation as a complication following lumbar discectomy is an uncommon but well described entity. This infrequent complication of disc surgery is recognized in the surgical literature, but is poorly appreciated in medical and cardiology circles. There should be a high index of suspicion in a post operative patient presenting with high output congestive heart failure. Thorough clinical examination for possible AVF

is rewarding. 'Listen over every scar' a caveat attributed to Dr Howard Burchell, an outstanding bedside clinician is a useful advice. Recognition of this entity is critical as timely surgical correction or endoluminal treatment is almost always curative.

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