

Venous injury in lumbar anterior spine surgery

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Summary

Background/Objective: To assess the clinical and angiological outcome of venous injury in lumbar anterior spine surgery.

Design: Follow-up study.

Methods: During a seven-year time span 77 consecutive patients underwent lumbar anterior spine surgery. Of these patients three patients suffered two minor and two major vein injuries. In two cases this was a common iliac vein injury. The other two injuries were at the level of the junction of the iliac veins with the inferior vena cava. The injuries were repaired by direct suture and the patients were followed-up by an independent angiologist.

Results: The follow-up, done clinically and with duplex sonography, plethysmography and ankle pressures showed no sequelae from the venous injuries.

Conclusions: Venous injuries following anterior spine surgery are rare and may have a good recovery. Preoperative informed consent is recommended.

Key words: anterior spine surgery; venous injury; outcome; plethysmography; duplex sonography

Introduction

Anterior lumbar surgery (ALS) is commonly performed, worldwide.

Venous injuries are rare but well described and are the most common complications in ALS [1-5].

There are no studies observing the outcome of venous injuries in ALS. The aim of this study is to determine the long-term outcome of venous injuries in ALS.

Patients and methods

In a seven-year time period (1st January 1999-31st December 2005) 77 consecutive unselected patients underwent ALS. In the same seven-year time period 1989 patients underwent spine surgery. The study population consisted of 52 female (68%) and 25 male (32%) patients. The age ranged from 24 to 85 years (mean 50.5 years). In a 48-year-old male patient a ventral intercorporeal spondylosis L5/S1 was performed using a syncage (Synthes-Stratec, Waldenburg, Switzerland) and an autograft from the iliac crest. While removing the retractors bleeding from the junction of the common iliac veins started and the tear had to be closed with non-resorbable suture material. 710 ml of blood were re-transfused by the use of a cell-saver. Secondly the traction of the instruments resulted in a tear in the left common iliac vein in a 61-year-old female patient undergoing anterior lumbar intervertebral fusion (ALIF) L5/S1 and L4/L5. The lesion was sutured with non-resorbable suture material. The patient required two units of blood.

Last a 55-year-old female patient was operated for a symptomatic, dislocated total disc prosthesis Charité Waldemar Link GmbH/Co/KG, Hamburg, Germany) L5/S1 implanted three weeks earlier. By exposing the access to L5/S1 a tear in the iliac junction to the inferior vena cava occurred. The tear was readapted with non-resorbable suture material. A small second tear in the left common iliac vein later caused by the docking instruments was repaired as well. The blood loss was altogether 250 ml and no transfusion was required. Spine surgery was completed in all three patients.

Follow-up was done by an independent angiologist. The clinical vascular status as well as a duplex sonography (Colour duplex ultrasonography, Acuson Sequoia, Acuson Corporation, Mountain View CA, USA) and plethysmography results (Photoplethysmography, Vasoquant VQ 2000, ELCAT GmbH, Germany) were recorded. Follow-up was done 11 months to 30 months after the operation (mean 23 months).

Results

Venous injury occurred in 5.1% of the ALS and in 0.2% of all spine surgical procedures. The three patients following venous injury had in the clinical examinations symmetrical legs with symmetrical pulses of normal quality. The duplex sonography of the deep venous system from the calf veins to the inferior vena cava was patent without any reflux, postthrombotic signs or stenosis.

Photoplethysmography showed in all patients normal filling times and normal pump function in the supine position and in the tourniquet test.

Arterial injury occurred in 0.05%. In this one case a hole in the left common and internal iliac artery created by an instrument caused major blood loss (by closing the holes through a laparotomy the patient survived without sequelae). There was no other arterial complication and especially no delayed thrombosis.

There was no nerve injury in our ALS patients, in particular no case of retrograde ejaculation nor sympathetic chain injury.

Discussion

Surgery of the anterior lumbar spine is a common procedure. The procedure is associated with a low risk of vascular injury [1-6]. The more common venous vascular injuries involve the inferior vena cava, the iliac veins or smaller branches including the iliolumbar vein resulting in blood loss. Arterial vascular injury includes mainly the infrarenal aorta and the iliac arteries resulting in haemorrhage, thrombosis with ischaemia, and false aneurysms [1-6].

Other complications of ALS include damage to nerves, spine, ureter, intestine, bone fractures, deep vein thrombosis and others [3, 6].

Focussing on the venous injuries we had four injuries in three patients out of 77 lumbar anterior spine procedures. Venous injury occurred therefore in 5.1% of the ALS (and in 0.2% of all spine surgical procedures). In the literature venous vascular injury in ALS occurs in up to 15.6% [1]. All our venous injuries were induced by traction instruments. Threaded devices were used in all these three patients carrying a greater risk for vascular injury than non-threaded devices [6]. On two occasions the traction used to expose the operating field caused a tear at the junction of the common iliac veins with the inferior vena cava, and direct trauma caused the injury on the common iliac vein on two other occasions. There was no injury to the iliolumbar vein or other smaller branches.

All injuries were repaired by direct suture. In all our venous injuries the level L5/S1 was involved. In the follow-up there were no sequelae of these injuries detectable.

Arterial injury occurred in 0.05% of all 1989 procedures. Arterial injury did not occur in ALS. In the literature arterial injury occurs in up to 0.6% in ALS [5] and in thoracolumbar spine surgery up to 1% mortality is described [5].

In conclusion, venous injury as a result of anterior spine surgery is rare [1]. The outcome of these vascular injuries may be benign [5, 6], but necessity to ligate the inferior vena cava and the iliac veins with its sequelae is described [2]. The most careful handling of instruments and traction is necessary in ALS to avoid vascular and especially venous injury. The use of a cell-saver in case of vascular injury and informed preoperative consent are recommended.

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