surgical superficialization procedure for too deeply located AVFs. This technique may be associated with increased risk of wound infection and fistula failure due to necessity of long surgical incision and much manipulation of the vein. A minimally invasive superficialization technique such as suction lipectomy is being described in an aim to minimize these complications with the support of perioperative ultrasound guidance (2). This perioperative guidance and vein mapping minimizes potential complications, such as fistula injury, bleeding and tributary vein damage. However, the ultrasonographic synchronous complications like hematoma and arm swelling were noted (3), so patients should be informed preoperatively about the risks of bleeding, infection, scarring and fistula thrombosis (4).

The procedure should be considered as successful when the fistula can ensure two needle cannulation and appropriate hemodialysis at postoperative week three.

In conclusion, the liposuction technique may be considered to be an alternative to traditional surgical superficialization procedures, however, careful patient selection and preoperative plastic surgery consultation is necessary.

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Endoscopic Superficialization of Arteriovenous Fistula: A Novel Technique With Common Devices

Dear Editor,

Deeply situated but otherwise well-matured arterialized veins in obese patients lead to access dysfunction and require revision surgery for superficialization. Here, we present a novel technique of endoscopic superficialization to minimize tissue trauma and scar building.

A 65-year-old female patient was referred due to ineffective single-needle dialysis of a left radio-cephalic fistula. First cannulation attempts revealed a 6 cm long straight distal needle access segment, followed by a 9 mm deep lying proximal cephalic vein under the superficial fascia with a tributary. Our concern was to preserve the distal segment of the arteriovenous fistula (AVF) for temporary, postoperative single-needle dialysis.

Using intraoperative ultrasound (US) imaging, the course of the deeply situated outflow vein, the superficial fascia, and the tributary were marked on the skin (Fig.1a). US-guided tumescence anesthesia was applied to separate the vein from the overlying skin. Two small transverse incisions on either side of the vein proximal to the straight segment of the AVF were used to introduce two non-disposable 5 mm laparoscopic tocars (Karl Storz, Tuttingen, Germany; Fig1b,c). A subcutaneous space was created by blunt dissection of tissue after insertion of a 5 mm endoscopic video camera with 30° optic (Karl Storz) and a 5 mm endoscopic suction device (Elefant; Coloplast, Humblebeak, Denmark). We applied continuous CO₂ with 12 mmHg to enhance vein visibility. Scars between skin and vein due to initial needling and the superficial fascia were dissected with scissors. Next, excess fat overlying the vein was aspirated under endoscopic control 2 cm lateral and medial. The endoscopically controlled liposuction was continued until the formation of a cavity (Fig. 1d). The tributary of the cephalic vein was identified, clipped, and cut. The duration of the whole procedure was 60 min. Finally, a suction drainage was left in the operating field and removed 24 h postoperatively.

The patient’s recovery was uneventful and single-needle dialysis was realizable directly after surgery.
FIG. 1. (a) Preoperative planning; (b) Endoscopic devices (5 mm) used for superficialization (trocars, 30° angled camera, suction device, instruments in case of conversion to open surgery); (c) Intraoperative situs; (d) Endoscopic view of the dissected cephalic vein and partially removed subcutaneous fat tissue; (e) Forearm cephalic vein before \((a = 9\, \text{mm})\) and after \((b = 5\, \text{mm})\) endoscopic superficialization; (f) Successful cannulation of superficialized cephalic vein.
through the short juxta-anastomosis cannulation area. 14 days postoperatively, the depth of the middle to proximal cephalic vein after endoscopic procedure was 5 mm as opposed to 9 mm before the procedure (Fig. 1e). Successful cannulation of the superficialized cephalic vein segment was initiated 47 days postoperatively (Fig. 1f).

**DISCUSSION**

Superficialization of an AVF as second stage procedure by means of flap elevation (1) and open lipectomy (2), have been shown to be effective yet invasive options to prepare the cephalic vein for needling in obese patients. Previous attempts of minimally invasive procedures, such as ultrasound-guided liposuction (3), were shown to be associated with wound necrosis and large hematomas.

Therefore, based on endoscopic surgery for hernia repair and following the technique of endoscopic basilic vein transposition (4), we developed a superficialization technique to obtain AVF function that allows visual control of the vein during the entire procedure. This minimizes the risk of vein injury and allows identifying other anatomical structures such as superficial fascia and tributaries.

Endoscopic surgery for superficialization and closing of tributaries over a deep lying AVF has not been previously described. The novel technique renders revision and superficialization safer, as it reduces the risk of vein injury without prolonging the procedure. Furthermore, this minimally invasive technique avoids long skin scars, and provides excellent functional and aesthetic results.

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**High ANTI-PF4/Heparin Antibodies Titer and Thromboses Due to Infection 9 Months After Cessation of Heparin in Hemodialyzed Patient With Heparin-Induced Thrombocytopenia**

Dear Editor,

Heparin-induced thrombocytopenia (HIT) in hemodialysis (HD) is a life-threatening complication of heparins prescription (1). We present a unique case of HIT in a 75-year-old male who was admitted to the hospital with end stage renal disease of unknown etiology. Past medical history included: arterial hypertension, heart failure, atrial fibrillation, deep venous thrombosis treated with warfarin, operations of the lumbar spine and gastric cancer (no previous heparin administration).

Treatment with HD initiated in April 2013 by non-tunneled central venous catheter (CVC) filled with unfractionated heparin and saline flushes of extracorporeal circuit, platelet count was $126 \times 10^9/L$. On the 3rd HD session nadroparin 0.15 mL i.v. was administered (Fraxiparine Glaxo Wellcome Production, Notre Dame de Bondeville, France).

A few minutes after starting the 6th HD session (the 9th day), the patient complained of dyspnea, chest pain and flushing. Arterial blood pressure...