

TARGETED LIPOSUCTION FOR VESSEL SUPERFICIALIZATION TO FACILITATE ARTERIOVENOUS FISTULA CREATION IN AN OBESE PATIENT: A CASE REPORT

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ABSTRACT

Background: Arteriovenous fistula (AVF) is the preferred form of permanent vascular access for long-term hemodialysis. In patients with obesity, excessive subcutaneous adipose tissue may place otherwise suitable vessels at a depth that makes identification and subsequent cannulation difficult. Surgical superficialization is effective but may require extensive dissection. Targeted liposuction offers a minimally invasive option for reducing the skin-to-vessel distance in selected patients.

Case Presentation A 60-year-old woman with obesity, right upper-limb ptosis, and chronic kidney disease was referred for vascular access creation for hemodialysis. Clinical examination was limited by redundant soft tissue and difficulty in identifying the superficial vascular structures. Preoperative ultrasonography demonstrated a suitable target vessel at a depth of approximately 1.17 cm from the skin surface. After multidisciplinary assessment, targeted minimally invasive liposuction of the upper arm was performed over the mapped vascular structures. Post-procedure ultrasonography demonstrated reduction of the vessel depth to approximately 0.6 cm. A brachial artery–cephalic vein arteriovenous fistula was subsequently created on the second postoperative day.

Results The procedure was completed without reported immediate complications. Reduction in the overlying adipose tissue facilitated identification and access to the target vessels. The patient subsequently had a functioning AVF suitable for hemodialysis. A visible reduction in arm ptosis and improvement in upper-limb contour were also noted.

Conclusion Targeted liposuction may be a useful minimally invasive adjunct for superficialization of suitable vascular structures in selected obese patients requiring hemodialysis access. Further experience with standardized long-term assessment of AVF maturation, cannulation, and patency is required.

KEYWORDS: obesity; arteriovenous fistula; vascular access; vessel superficialization; liposuction; hemodialysis; chronic kidney disease

INTRODUCTION

Arteriovenous fistula (AVF) remains the preferred form of permanent vascular access for patients requiring long-term hemodialysis because of its established durability and favorable complication profile. Contemporary vascular-access recommendations emphasize individualized access planning and preservation of suitable native vessels.¹

Obesity does not preclude creation of a native AVF; however, excessive subcutaneous adipose tissue may increase the skin-to-vessel distance and impair both clinical assessment and reliable needle cannulation. When a mature fistula lies too deeply, several superficialization techniques have been described, including vein elevation, transposition, open lipectomy, endoscopic approaches, and liposuction.^{2–6}

Liposuction is attractive because it can reduce the thickness of overlying adipose tissue through small access incisions, potentially avoiding the larger dissection required for conventional superficialization. Published series have demonstrated meaningful reductions in access depth and successful cannulation in selected patients, although wound complications and delayed cannulation have also been reported.^{4–7}

We report a case in which targeted liposuction was used to reduce the depth of the vascular structures of the upper arm and facilitate subsequent AVF creation in an obese patient with marked arm ptosis.

Case Presentation

A 60-year-old woman with obesity, right upper-limb ptosis, and chronic kidney disease was referred for creation of permanent vascular access for hemodialysis. Because of her body habitus and redundant soft tissue, the superficial vascular structures of the right arm were difficult to identify and were considered unsuitable for straightforward access.

Preoperative vascular mapping was performed using duplex ultrasonography. A suitable vascular target was identified beneath the subcutaneous tissue, with a reported skin-to-vessel depth of approximately 1.17 cm. The course of the target vascular structures was marked clinically before the procedure.

A multidisciplinary approach involving the vascular access and plastic surgery teams was adopted. The objective was to reduce the depth of the target vessels while minimizing surgical dissection and preserving the vascular structures required for subsequent AVF creation.

Operative Technique

After preoperative mapping, the relevant segment of the upper arm was marked. Targeted minimally invasive liposuction was performed over the mapped vascular structures to reduce excess subcutaneous adipose tissue. Care was taken to avoid direct injury to the mapped vessels and adjacent neurovascular structures.

The reduction in soft-tissue thickness was assessed clinically and with ultrasonography. Following liposuction, the skin-to-vessel distance was reduced from approximately 1.17 cm to 0.6 cm.

The patient was observed postoperatively. On the second postoperative day, the brachial artery and cephalic vein were readily accessible, and an arteriovenous fistula was successfully created.

RESULTS

Targeted liposuction produced a substantial reduction in the soft-tissue thickness overlying the vascular structures. Ultrasonography demonstrated a reduction in vessel depth from approximately 1.17 cm preoperatively to 0.6 cm following liposuction.

The subsequent brachial artery–cephalic vein AVF was successfully created. No immediate postoperative complication was reported in the available clinical record. The patient subsequently had a functional vascular access suitable for hemodialysis.

In addition to improving vascular accessibility, reduction of redundant soft tissue resulted in a visible decrease in arm ptosis with improvement in upper-limb contour and mobility.

DISCUSSION

Successful hemodialysis access requires not only adequate maturation of the fistula but also reliable accessibility for cannulation. In patients with obesity, increased subcutaneous tissue can make an otherwise satisfactory AVF difficult to palpate and puncture. The literature describes several approaches, including lipectomy, transposition, elevation, endoscopic superficialization, and liposuction.^{2,3}

A review of superficialization techniques in obese patients found high technical success across reported approaches, although the evidence is heterogeneous. Lipectomy and transposition have generally demonstrated more durable outcomes, whereas liposuction has been used less frequently and remains supported largely by small observational series.²

The present case demonstrates the potential value of a targeted, minimally invasive approach before AVF creation. Rather than waiting for an already created fistula to become difficult to cannulate, reduction of the soft-tissue depth was undertaken as part of vascular-access planning.

Published studies support the ability of liposuction to reduce access depth. In one series of ultrasound-guided liposuction, mean AVF depth decreased from 13.3 mm to 5.1 mm, with successful puncturability in most patients.⁶ Another series of 19 patients reported a reduction in mean access depth from 1.75 cm to 0.93 cm and successful dialysis access in 79% of patients, although some patients required repeat procedures or developed access-related complications.⁷

The present case is notable because liposuction was performed as a targeted preparatory procedure before AVF creation, rather than solely as a secondary procedure for an already mature but inaccessible fistula. This may facilitate both surgical exposure and subsequent cannulation while avoiding extensive open lipectomy or vein transposition in selected patients.

Patient selection and precise vascular mapping remain critical. Excessive or poorly controlled liposuction around a vascular pedicle may result in bleeding, hematoma, thrombosis, nerve injury, lymphatic injury, or skin compromise. Duplex ultrasonography can assist with preoperative mapping and postoperative assessment.

The main limitations of this report are its single-patient design and limited outcome information regarding long-term AVF maturation and patency. BMI, aspirated fat volume, time to first cannulation, dialysis adequacy, and long-term access patency should be reported in future cases and series.

CONCLUSION

Targeted liposuction may provide a minimally invasive option for reducing skin-to-vessel distance in selected obese patients in whom excessive subcutaneous tissue compromises vascular accessibility. In this patient, targeted reduction of the overlying adipose tissue facilitated identification and successful creation of a brachial artery–cephalic vein AVF. The technique may also improve upper-limb contour and reduce arm ptosis. Larger studies

with standardized long-term follow-up are required to establish its reproducibility, safety, effect on cannulation, and impact on AVF patency.

DECLARATIONS

Patient consent for publication: [Please confirm and insert the institution/journal-specific wording regarding written informed consent for publication.]

Ethics approval: [Please insert the institutional statement regarding ethics approval/waiver for this single case report.]

Conflict of interest: The author declares no conflict of interest. [Confirm before submission.]

Funding: No specific funding was reported for this work.

Author contribution: Dr. Divya K R contributed to the clinical management, preparation of the manuscript, and revision of the final article. [Modify according to the final author list.]

Figures

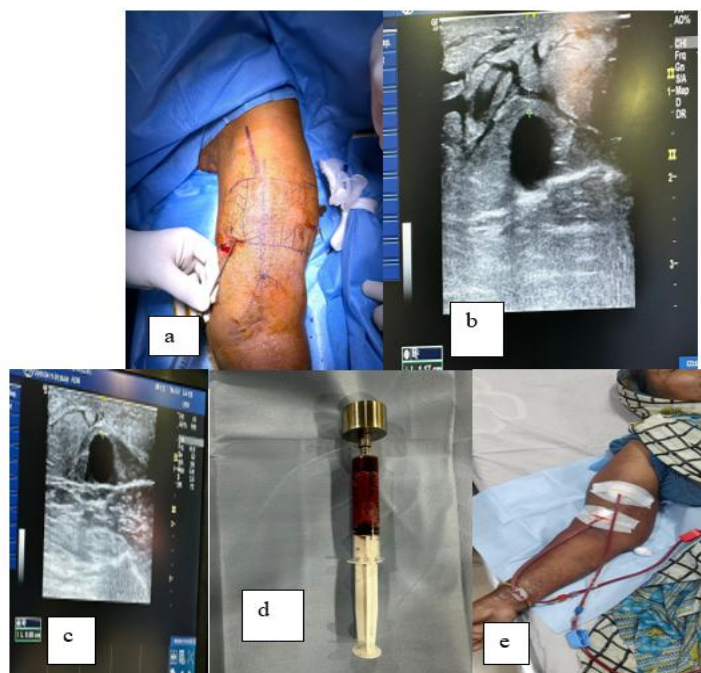


Figure 1. Composite clinical (a) and ultrasonographic (b) images demonstrating preoperative marking, vessel depth, targeted liposuction, post-liposuction vessel depth(c), aspirated tissue (d), and postoperative AVF creation (e).

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