# Lipectomy as a new approach for superficialization of forearm arterio-venous fistulae


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### Background

Although an arterialized vein may be of good size cannulation may be difficult due to its depth. A superficial vein as small as 3mm may be cannulated more easily than a 10mm vein that lies at 1 cm. Fat tissue overlying the AV access makes it more challenging for the hemodialysis nurses to palpate and successfully enter the vein. Infiltration of the subcutaneous tissue and hematoma formation is frequently seen and sometimes associated with short term loss of the hemodialysis access. Superficialization has previously been described by elevation or transposition of the vein in a subcutaneous tunnel. Mobilization and transposition[1-2] however may cause torsion of the vessel which may lead to stenosis. We present a surgical technique in which fistulae of the forearm are superficialized by lipectomy without mobilisation of the vessel.

### Surgical Technique

Figure 1: Post surgical lipectomy, the two incision sites are clearly visible.

One or two incisions are made at a right angle over the cephalic vein. The subcutaneous adipose tissue is dissected from the skin distally and proximally from the incision site. Then the anterior surface of the vein is freed of the subcutaneous fat, collateral veins may be ligated by either clip of suture depending on size. The fat pad is then excised, removing the pad with the underlying fascia one inch to all sides from the vein (Figure 1).

**Patients**

Table 1. Patient characteristics

| | |
|---|---|
| Age (average) | 54.0 (S.D = 16.0) |
| Females | 67.7% |
| BMI (average) | 29.8 (S.D. = 4.2) |
| Weight in kg (average) | 79.8 (S.D. = 14.9) |
| Creatinine Clearance prior to surgery (average) | 14.44 ml/min |
| Diabetes mellitus prevalence | 32.3% |
| Hypertension prevalence | 90.3% |
| Access Doppler flowrate (average) | 833 ml/min (S.D. = 283) |
| Vein diameter at the time of surgery in mm (average) | 7.03 (S.D. = 1.1) |
| Depth of the vein before intervention in mm | 8.55 (S.D. = 3.2) |
| Depth of of the vein after intervention in mm | 3.2 (S.D. = 1.2) |
| Access in use | 28 (90.3%) |

31 Patients underwent lipectomy during February 2003 and September 2006. The procedure was performed at either the European Hospital of Paris or the Clinique Jouvenet. The patients were followed for a minimum duration of 6 months. 32.3 % of the patients were diabetics and 90.3 % had hypertension (Table 1). Two thirds of the patients were female. The average body mass index was 29.8. Only fistulae of the forearm were included in this study.

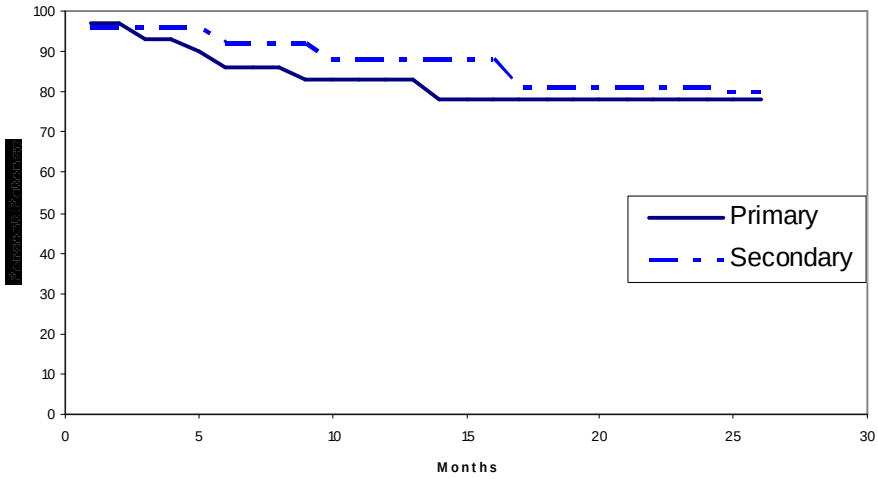
**Results**

Table 2. Patency rates

| Months | Primary | Secondary |
|---|---|---|
| 6 | 86% | 92% |
| 12 | 83% | 88% |
| 24 | 78% | 81% |

Of the initial 31 patients, 29 are using their fistula for hemodialysis (two are not yet on dialysis). For the 10 patients who were already treated by haemodialysis at the time of lipectomy mean delay between lipectomy and first puncture of the access was 48 days (range: 7 to 134). The average depth of the fistulas before the intervention was 8.5mm compared to 3.2mm after the surgical procedure. The primary patency rates were 86%, 83%, and 78% at 6, 12 and 24 months. The secondary patency rates were 92 %, 88%, and 81 % at 6, 12, and 24 months (Table 2, Figure 2).

Figure 2. Results of Survival Analysis of the Primary and Secondary Patency Rates




Using the Cox Regression Analysis female and diabetic patients were twice as likely to require an angioplasty procedure to maintain the access as non-diabetics or males. Hypertension as a co-morbidity that would predispose to stenosis did not reach clinical significance. A large access diameter prior to the surgery decreased the likelihood of acquiring a stenosis (Table 3).

Table 3. Univariate Predictors of Failure
(i.e., Angioplasty required) by Cox Regression Analysis
*clinically significant

| Variable | Hazard Rate | Significance | 95% Confidence Interval |
|---|---|---|---|
| Age | 1.03 | .005* | 1.009 – 1.05 |
| Body Mass Index | 1.001 | .99 | .926-1.08 |
| Smoking | .04 | .12 | .001-2.26 |
| Diabetes Mellitus | 2.34 | .006* | 1.28-4.28 |
| Hypertension | 3.16 | .16 | .27-21.90 |
| Doppler Flow rate | .98 | .03* | .96 - .999 |
| Access Diameter | .54 | .001* | .39 - .75 |
| Depth Prior | .90 | .09 | .79 – 1.02 |
| Female | 2.42 | .03* | 1.07 – 5.45 |
| Weight | 1.03 | .01* | 1.01 – 1.05 |

## Conclusion

Difficulty cannulating a fistula is a common problem in our hemodialysis population. This novell procedure facilitates cannulation of a hemodialysis access and provides a new asset to the spectrum of procedures available to achieve a usable and functioning fistula.

Superficializing a forearm fistula by lipectomy has a primary patency rate of 83% at one year. It has superior primary patency rates when compared to basilic vein transposition2 and similar patency rates when compared to vein transposition of the forearm .

## References

[1] M.B.Silva, R.W.Hobson, P.J.Pappas, P.B.Haser, C.T.Araki, M.C.Goldberg, Z.Jamil, F.T.Padberg: Vein transposition in the forearm for autogenous hemodialysis access, J Vascular Surgery Dec 1997, 26, 6, 981

[2] Weyde W, Krajewska M, Letachowicz W, Klinger: Superficialization of the wrist native arteriovenous fistula for effective hemodialysis vascular access construction. Kidney Int. 2002 Mar;61(3):1170-3.