

Recurrence after surgery for varices in the groin is not dependent on body mass index

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Summary

Objective: To investigate if the body mass index (BMI) differs between different groups of patients (incomplete ligation also defined as technical error, neo-revascularisation, uncertain and mixed) in recurrent same site inguinal varices after surgery (REVAS).

Methods: During a six and half year time span, we retrospectively analysed 203 consecutive procedures in 153 patients undergoing recurrent same site vein surgery in the groin. Individual BMI was calculated and compared within the different REVAS nature of the source groups.

Results: The median BMI was 28 for patients undergoing recurrent vein surgery in the groin

with no relevant difference in BMI between the different source groups (confidence interval for the difference of adjusted group means equals [-1.5, 2.6]).

Conclusions: There is no relevant difference in BMI between the two commonest REVAS groups.

This may be due to small sample size, but confidence limits for difference of mean BMI indicate that this is not very large.

Key words: recurrence; varicose vein surgery; body-mass-index; CEAP and REVAS classification

Introduction

Surgery for chronic superficial venous insufficiency is a very common procedure. Recurrent varicose veins after surgery are unfortunately frequent, a recurrence rate of up to 50% in 5 years has been assumed in previous studies [1-7]. Others have found that up to 60% of limbs of patients surviving more than 30 years after ligation and stripping show incompetence at or near the sapheno-femoral junction [3, 4]. The reasons for same site recurrence are mainly incomplete ligation, also defined as technical error, neo-revascularisation and other reasons classified as mixed or uncertain.[1]. Technical failure is defined as an incorrectly performed previous procedure such as

non-flush ligation of the sapheno-femoral junction, typically with the presence of a stump with refluxing tributaries connecting to the insufficient stump [1, 2].

In the last decade we have tended to believe that technical error is found more often in the obese than in the non-obese REVAS patients following previous sapheno-femoral ligation. Therefore we aimed to assess in a retrospective study based on the case notes whether there is a statistically significant difference in the BMI of REVAS incomplete ligation / technical error patients as compared to neo-revascularisation, mixed and uncertain REVAS patients [3, 4, 8].

Patients and methods

In a six and half year period (1st April 2000 – 30th September 2006) 153 consecutive unselected patients underwent 203 procedures for recurrent same site venous incompetence in the groin.

23 patients were male (28 procedures) and 130 female (175 procedures). The age ranged from 24 to 80 (median age 54) years.

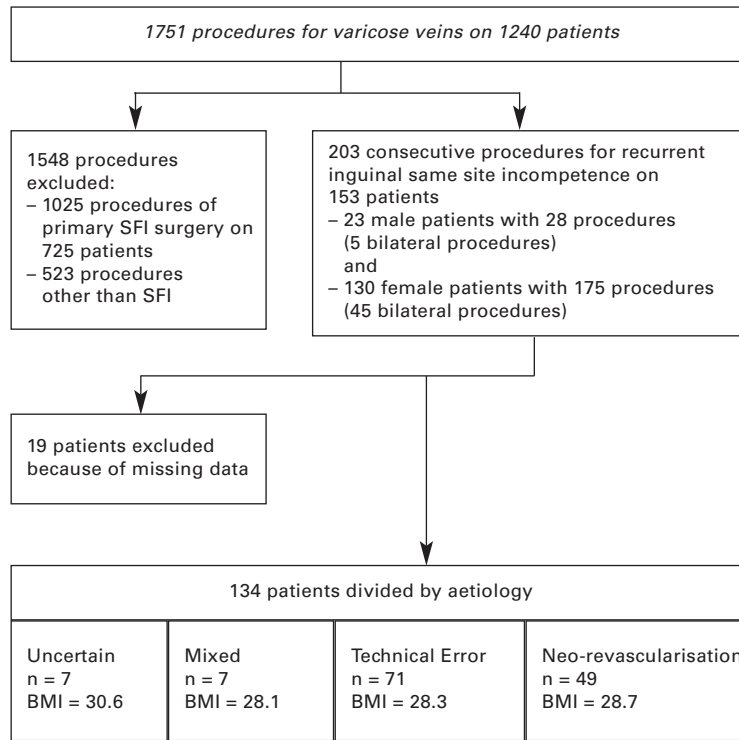
50 patients underwent bilateral inguinal REVAS

procedures and 39 patients had a combination with primary vein surgery on the contralateral leg.

The total number of procedures in this time period for varicose veins was 1751. These procedures included 1025 primary surgery procedures for sapheno-femoral incompetence (SFI) and included the 203 (12%) procedures for recurrent inguinal same site incompetence.

Following the REVAS classification, only patients

Figure 1
Flow chart with patients and patient characteristics.



with the groin as topographical site and the sapheno-femoral junction recurrence were included [1]. Only reflux patients with same site sources were included. Within the same site there was no tactical failure group and technical failure could be compared directly with neo-revascularisation, uncertain and mixed forming smaller groups [1].

185 patients had undergone one previous groin procedure, 14 patients two, and 4 more than two previous procedures.

The sapheno-femoral junction was always studied preoperatively (Colour duplex ultrasonography, Acuson Sequoia, Acuson Corporation, Mountain View CA, USA). Reflux was defined as retrograde flow during Valsalva manoeuvre of more than 0.5 seconds. The groin was always accessed via a transverse incision.

In all but two patients the indirect (or lateral) access to the femoral vein was chosen. In two patients previous surgery had obviously left the sapheno-femoral junction almost untouched, therefore direct access was easily possible. Absorbable suture material was used for the ligations (Vicryl, Ethicon Endo-Surgery, Johnson and Johnson Company, Spreitenbach, Switzerland) and non-resorbable material for the long saphenous stump in REVAS. The insufficient long saphenous vein was, if still present, stripped from proximal to distal to avoid nerve injuries.

A conventional stripper (Vastrip, Astra Tech, Swe-

den) was used. Stab avulsions were made as preoperatively marked.

Preoperative height and weight were measured and the BMI (body mass index) determined [9, 10]. According to the American Obesity Association, a BMI between 25 to 29.9 was considered overweight and a BMI of 30 or more defined as obesity [9].

To test potential associations between BMI and aetiology, we considered a linear model with BMI as dependent variable and age (numeric), gender (categorical) and aetiology (categorical) as covariables. We carried out a per patient analysis by defining aetiology as the reason for the last procedure on a given patient. Due to missing data in the case reports within a retrospective study, the original data set was reduced from 153 to 134 patients. As the REVAS categories 'uncertain' and 'mixed' consisted of only seven observations each, we omitted these two groups in our analysis. This led to 120 observations.

The model equation is:

$$BMI = \text{constant} + a(\text{Gender}) + b * \text{Age} + c(\text{Aetiology}) + \text{error}.$$

To substantiate the conclusions concerning aetiology, we calculated a 95%-confidence interval for the difference between 'technical error' and 'neo-revascularisation', $c(2) - c(1)$, according to the formula [est. difference +/- std. error * $t_{116;0.975}$].

The software used was Data desk 6.1, Data Description Inc., Ithaca, NY, USA.

Results

After fitting the linear model specified in the methods section, we could find no significant association between the categorical factor aetiology and the response BMI. The 95%-confidence interval for the difference of BMI between aetiology groups 'technical error' and 'neo-revascularisation' was [-1.5, 2.6] with an estimated difference $c(2) - c(1)$ of 0.53 and a standard error of 1.0. As

the confidence interval contains the value zero, no significant association between BMI and aetiology is visible. The length of the interval reflects the accuracy which is possible with the given moderate sample size.

Although age is well known to be correlated with BMI, there was no significant association between age and BMI at a 5% level in our study.

Figure 2

Plot of BMI against age for the two different levels of aetiology. For each level, a lowest smoother (S-plus) was added.

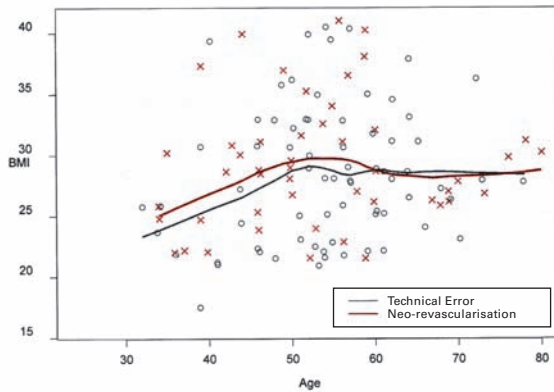


Figure 2 plots BMI against age for the two most frequent levels of aetiology.

BMI ranged from 18 to 40.5, the median BMI of patients with recurrent surgery in the groin being 28.

The median delay between the first operation and the REVAS operation in the groin was

12 years (1 to 45 years) with an inter quartile range of 12.

Discussion

Incomplete ligation or technical error and neo-revascularisation are discussed as the main reasons for REVAS [2, 11–14]. In a recent publication of REVAS patients, it was found that neo-revascularisation occurred as often as technical failure (20% resp. 19%) in redo groin surgery [2]. This is consistent with our findings. Clinical observation led to the hypothesis that overweight and obesity would lead to a more defensive operating tactic due to the fact that a larger incision is needed to access the femoral vein and often very fragile venous branches are found. Our data could not confirm this hypothesis.

More than 85% of the REVAS procedures were performed in limbs of females. Women may care more about aesthetic appearance and present earlier for the first and second operation. Hormonal factors and especially previous pregnancies are well known as risk factors for varicose veins.

The median time delay between the first and last operation was 12 years. We carried out a sensitivity analysis where we refitted the model to the reduced data set consisting of only those patients

with a single previous procedure and checked that the inclusion of patients with multiple previous procedures had no substantial effect on the estimates or conclusions.

We also analysed the data via logistic regression with binary outcome “technical failure / revascularisation” and covariables including age and BMI. The conclusion was the same.

In summary, we conclude that there is no relevant association between BMI and REVAS groups.

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