A Randomised Trial of Ultrasonic Dissection Versus Electrocoagulation to Reduce Lymphatic Complications after Surgery for Recurrent Sapheno-femoral Incompetence

W.G. Mouton,1* J.R. Bessell,2 T. Zehnder,3 R. Wirth,1 M. Naef1 and H.E. Wagner1

1Department of Surgery, Regionalspital Thun, Switzerland; 2Division of Surgery, Flinders Medical Centre, South Australia; and 3Department of Medicine, Regionalspital Thun, Switzerland

Objective. Prospectively to compare lymphatic drainage after ultrasonic dissection, an electrocoagulation technique and sharp dissection in the groin during surgery for recurrent sapheno-femoral incompetence.

Design. Prospective, randomised study comparing three surgical techniques.

Methods. Thirty-six consecutive patients undergoing surgery for recurrent sapheno-femoral incompetence were randomised. Twelve patients underwent dissection with ultrasound, 12 with electrocoagulation and 12 controls had sharp dissection with ligation of scar and lymphatic tissue using absorbable suture material.

Results. The mean drain output per patient was 13.5 ml in the ultrasonic group, 15.4 ml in the electrocoagulation group and 8.3 ml in the suture ligation group. Six minor cases of lymphatic leakage occurred in the ultrasonic group. This resulted in no clinical problem. There were no other significant differences between the three groups.

Conclusions. There is no detectable advantage for the use of ultrasound or electrocoagulation in recurrent saphenous high ligation compared to sharp dissection.

Keywords: Varicose veins; Recurrent; Lymphocoele; Ultrasound.

Introduction

Operation for recurrent sapheno-femoral incompetence may be complicated by troublesome lymphatic fistula and lymphocoele.1,2 This is usually attributed to the extensive scar tissue, which forms following surgery necessitating considerable dissection at any further operation. The ultrasonic scalpel has facilitated many other forms of dissection, and we wished to establish whether lymphatic fistula and lymphocoele rates could be reduced by the use of this new technology. There is no prospective randomised study in this area, but retrospective studies indicate a lymphatic complication rate following primary varicose vein surgery of 0.87%.2 Therefore, the aim of this study was to prospectively compare lymphatic output after ultrasonic versus electrocoagulative groin dissection in a standardised operative field during redo saphenous high ligation, using sharp dissection with ligation of scar and lymphatic tissue using absorbable suture material as controls.

Material and Methods

The study was approved by the Human Ethics Committee of the Regionalspital Thun, Switzerland. All patients included in the study have informed preoperative consent. Thirty-six consecutive unselected patients underwent redo saphenous high ligation procedures during a period of thirteen months (1st April 2002–30th June 2003).

The study population comprised 34 female patients and two males. The age ranged from 24 to 73 years (mean 53 years). Thirty-two patients had undergone one previous procedure in the groin, two patients had two previous operations and the youngest patient had four previous operations at this site. Seven female patients underwent bilateral procedures. The patients were randomised to receive either dissection with ultrasound (Ultracision Harmonic Scalpel, Ethicon Endo-Surgery, Johnson and Johnson Company, Spreitenbach, Switzerland) or electrocoagulation...
(Elektrotom Berchtold GmbH&Co, Tuttlingen, Germany) or sharp dissection with ligation of scar and lymphatic tissue using absorbable suture material (Vicryl, Ethicon Endo-Surgery, Johnson and Johnson Company, Spreitenbach, Switzerland).

The groin was reopened via a transverse incision. The femoral artery was visualised as a landmark, after which the femoral vein was dissected and recurrent veins ligated and divided. Fascia and subcutaneous tissue was closed in two layers and included a vacuum wound drain. The skin was closed with sutures. The drain was removed 1 day postoperatively. The wound was observed for lymphatic fistula and formation of a lymphocoele. The amount of fluid output from the wound and wound drain were measured daily. After 3 months a clinical and colour duplex ultrasonography investigation (Acuson Aspen, Acuson Corporation, Mountain View CA, USA) were carried out to detect lymphatic complications.

Statistical comparisons between the three groups were performed by Kruskal–Wallis rank sum test. Differences were considered significant at an $\alpha$ level of 0.05. Significant global results were followed by pairwise group comparison using multiple Wilcoxon–Mann–Whitney tests at the Bonferroni corrected significance level $\alpha = 0.0167$. The software used was S-Plus Professional 6.2, Insightful Corp., Seattle, USA.

**Results**

The three patient groups were not significantly different with respect to age, gender or previous groin surgery. No detectable complications were observed from dissection using ultrasound, electrocoagulation or sharp dissection with ligation of scar and lymphatic tissue. There was no perioperative death.

Six cases of lymphatic fistula developed in the wound and this occurred only in the ultrasound group ($p = 0.0014$ for the global Kruskal–Wallis test, $p = 0.0137$ for the two group comparison of the ultrasound group with each of the two other groups). The amount, however, was less than 5 ml, requiring only one to two additional changes of dressings within the first 24 h after the operation. This did not prolong hospitalisation time, which was the longest in the suture ligation group. The mean length of stay overall was 1.8 days (1.7 days for ultrasound, 1.5 days for electrocoagulation and 2.0 days for suture ligation). Statistically there was no significant difference. The drain was removed after 1 day in all patients.

The mean drain output per patient was 13.5 ml in the ultrasonic group, 15.4 ml in the electrocoagulation group and 8.3 ml in the suture ligation group (Fig. 1). These differences were statistically not significant. One 1 cm lymphocoele was observed following ultrasonic dissection, but resolved within 36 h with minimal compression. No wound infection was seen in any patient.

Follow-up duplex after 3 months were available for 25 patients (69%). No lymphatic problem observed amongst these patients. At this review 10 patients (40%) had no clinical or radiological sign of venous recurrence. Minimal sonographic recurrence was seen in eight patients (32%), moderate sonographic recurrence in six patients (24%), but only one patient had ultrasonographic recurrence with clinical symptoms (4%).

**Discussion**

Surgery for recurrent varicose veins in the groin can be demanding due to scarring from the previous operations. A careful surgical technique is important. In all patients an indirect access technique was chosen by first exposing the common femoral artery and subsequently the femoral vein and its inflows beneath the fascia.1

*Fig. 1. Drain output within the three groups. The boxes indicate lower quartiles, medians and upper quartiles of the three groups (for the ligation group, median and upper quartile coincide). Minima and maxima are given by the whiskers. Additionally, the mean is indicated by a dot. There were no significant differences between the three groups.*
A retrospective meta-analysis in more than 184,000 patients described lymphatic complications occur with an incidence of 0.87%. This number is made up of predominantly of lymphatic fistulas (0.54%) and lymphoceles (0.26%). In our 36 patients we observed one self-limiting lymphocele (3%) and six cases of minor lymphatic fistula present only on the day of operation (17%). In this series there was no wound infection nor haematoma requiring surgical or antibiotic therapy. Other studies report wound infection rates of 11% and haematomas in 6%.1

In our series 96% of the patients were clinically symptom free at 3 month follow-up. Our recurrence rate was consistent with other series.3,4 A retrospective study with 125 patients followed-up 34 years after primary vein surgery3 reported an overall clinical recurrence rate of 47%, and a 60% recurrence rate detected by duplex sonography.

In summary, our series reported no significant difference between the three types of groin dissection for sapheno-femoral incompetence other than the more frequent occurrence of lymphatic fistula on the day of operation in the ultrasound group. The latter had no clinical consequences. We, therefore, conclude that there is no detectable advantage for the use of ultrasound or electrocoagulation in recurrent saphenous high ligation, and the choice of technique can be left to the discretion of the surgeon.

References