

## SKIN EXCISION AND GROIN LYMPHADENECTOMY: TECHNIQUES AND OUTCOMES

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### ABSTRACT

*A 10-year retrospective review of 25 patients undergoing groin lymphadenectomy for cutaneous malignancy in the Tayside region of the UK was conducted. Comparison was made between patients undergoing the procedure with an elliptical incision orientated as a long oblique of at least 4cm width (group 1) and those undergoing a similarly oriented incision with no skin excision (group 2). Outcome measures including survival, post-operative complications, operative time and hospital stay were analyzed. Patients in group 1 suffered significantly fewer complications ( $p < 0.004$ ) and shorter hospital stay ( $p < 0.008$ ). Elliptical excision of at least 4cm width is our preferred technique for groin lymphadenectomy in the treatment of cutaneous malignancy of the lower limb.*

**Keywords:** inguinal lymphadenectomy, lymph node dissection, skin excision, lymphedema, cutaneous malignancy, complications

The ideal incision for groin lymphadenectomy would allow adequate exposure while minimizing wound related complications. The numerous different approaches to the superficial lymph nodes of the groin that have been described give an indication that this has still to be achieved. The procedure continues to be associated with significant postoperative morbidity, and

particularly local wound problems such as skin edge necrosis and wound breakdown are common. In order to prevent this, previous authors have recommended skin edge excision to be carried out either at the time of the initial incision or just prior to closure of the wound. Vordermark et al (1) showed that excision of a long straight elliptical portion of skin of at least 4cm width carried out at the start of the procedure showed a reduction in complications when compared to primary closure of an S-shaped incision without sacrifice of any skin. These are differently oriented incisions and to our knowledge there have been no studies to date assessing the value of skin excision in similarly oriented incisions. The purpose of this study was to compare two groups of patients who had undergone lymphadenectomy in the treatment of metastases from cutaneous malignancy, either with or without skin edge excision in order to identify the optimal surgical technique in our unit.

### PATIENTS AND METHODS

The study was a retrospective case note review of a ten-year period (1993-2003) of patients from the Tayside region of the UK who had undergone superficial inguinal lymphadenectomy for regional lymph node metastases following cutaneous malignancy. Twenty-five patients were identified who had undergone lymphadenectomy under the care

**TABLE 1**  
**Comparison of Groups**

	Group 1 (Ellipse >4cm)	Group 2 (Excision <4cm)
Number of patients	13	13
Male: Female ratio	3:10	6:7
Mean Age (range)	63 (34-90)	65 (33-87)
Primary pathology		
Malignant melanoma	9	11
Squamous cell carcinoma	3	2
Malignant Schwannoma	1	
Preoperative radiotherapy	1	1

of the plastic surgery team over this period. In none of the cases did the dissection extend more proximally than the inguinal ligament. Data was collected with regard to the site of original disease and associated medical conditions. The primary lesion, co-morbidities, operative technique, histopathology, postoperative complications, follow-up and survival were all examined.

Patients were divided into one of two groups according to the incision used with no randomization being carried out. Group 1 included patients whose procedure involved excision of tissue at the time of the initial incision. The incision was designed as an ellipse of 4cm extending from the anterior superior iliac spine to the base of the femoral triangle as described by Vordermark et al (1) (this is the senior author's usual practice). Patients in group 2 underwent a technique that used a similarly orientated incision to that of patients in group 1 but with either no or minimal skin excision (the usual technique of other senior surgeons in the department is to assess the skin edges at the end of the procedure and only excise tissue believed to be non- or of doubtful viability). The procedures were all either carried out by or under the supervision of the senior surgeon in each case. Because of the small sample size,

outcomes were compared statistically between the two groups using Fisher's exact test. The Mann-Whitney U test was used to compare time of operation and length of hospital stay.

### RESULTS

There were 26 lymphadenectomies carried out in 25 patients, with one patient undergoing metachronous procedures. This patient had different incisions used on either side, and therefore both groups contained 13 incisions. The patients in each group were coincidentally found to be well matched for age, sex, original pathology and co-existing morbidity (*Table 1*). The operations had been carried out in a similar fashion with the exception of the incision used. One patient in each group had received preoperative radiotherapy. Unfortunately data relating to smoking status was found to have been poorly recorded and incomplete, and therefore no comparison could be made between the two groups with regard to this.

Outcomes for the two groups were assessed (*Table 2*). At the time of the study six patients (50%) from group 1 and nine patients (75%) from group 2 had died, with or without evidence of disease. The only early complication (i.e. complications occurring

**TABLE 2**  
**Comparison of Groups**

Outcome	Group 1 (Ellipse >4cm) n (% of total)	Group 2 (Excision <4cm) n (% of total)	p Fisher's test
Early Complications			
Overall	1 (7.7)	9 (69.2)	p<0.004
Seroma	1 (7.7)	4 (30.8)	N.S.
Wound Infection	1 (7.7)	3 (23.1)	N.S.
Wound Breakdown	0	2 (15.4)	N.S.
Late Complications			
Lymphedema	3 (23.1)	4 (30.7)	N.S.
Cellulitis	1 (7.7)	0	

**TABLE 3**  
**Comparison of Operating Time and Hospital Stay**

Outcome	Group 1 (Ellipse >4cm)	Group 2 (Excision <4cm)	p Mann-Whitney U
Operating time (mins)			
Mean (range)	111 (90-135)	131 (60-195)	N.S.
Hospital stay (days)			
Mean (range)	9 (6-14)	16 (8-28)	p<0.008

prior to discharge from hospital) noted in group 1 was of one seroma (8%). In group 2 the early complication rate was 69.2% (four seromas, three wound infections and two wound breakdowns). Using the Fisher's exact test this was found to be statistically significant ( $p < 0.004$ ).

Late complications (i.e., complications occurring any time after discharge from hospital) were similar for both groups. Three patients (23%) from group 1 and four patients (31%) from group 2 developed chronic lymphedema. One patient from group 1 (8%) developed cellulitis, which responded to antibiotic treatment.

The mean operating time was 111 minutes (range 90-135) in group 1 and 131

minutes (range 60-195) in group 2. The average (mean) length of hospital stay was nine days (range 6-14) for group 1 and 16 days (range 8-28) for group 2 (*Table 3*). This was found to be statistically significant ( $p < 0.008$ ).

#### DISCUSSION

Groin lymphadenectomy is associated with significant morbidity (1-6). Of the numerous outcome studies previously published, wound dehiscence, infection, seroma or lymphocele formation and long-term lymphedema feature prominently regardless of the indication for lymphadenectomy or the type of incision used (*Table 4*).

**TABLE 4**  
**Complications Following Inguinal Lymphadenectomy**

Author and indication	Type of incision <sup>a</sup>	# of patients	Infection	Skin edge necrosis/wound breakdown	Seroma	Lymphedema
Hacker et al (4) 1981 Vulval malignancy	Groin crease	100	9	minor <sup>b</sup> 30 major 14	13	14 permanent 9 temporary
Vordemark (1) 1985 Skin malignancy	S-shaped Vertical ellipse 4cm wide	27 14	22 14	37 0	0 14	not stated not stated
Ravi (2) 1993 Penile carcinoma	Vertical Groin crease T-shaped	57 38 136	16 18 19	40 42 74	5 5 5	21 24 27
Karakousis (3) 1994 Malignant melanoma	Vertical	205	16	8	5	40
Gaarenstroom (5) 2003 Vulval malignancy	Groin crease	101	39	17	40	28

<sup>a</sup>Incisions described for groin dissection have been divided into broad categories according to position and orientation of incision (See references for exact details of incision used); <sup>b</sup>Minor breakdown described as involving less than half the incision.

With all incisions the dissection may lead to extensive undermining of the skin flaps, which can compromise the circulation, predisposing to delayed wound healing and infection. To reduce the likelihood of wound problems, tissue of doubtful viability should obviously be excised, and this can be carried out toward the end of the procedure, prior to closure of the wound (4,7). The use of fluorescein has been described to try to accurately delineate viable tissue (8) but this intervention has not been widely accepted in routine clinical practice, where careful observation of the skin flaps and examination of the wound edges for dermal bleeding will usually suffice to allow a reasonably accurate assessment of the viability or otherwise of the skin.

Some surgeons recommend the skin excision to be done at the time of the initial incision (1,6,9). This is the senior author's preferred technique as he feels that this avoids unnecessary undermining of the skin flaps and allows en bloc resection, thereby avoiding unnecessary handling of the specimen as traction can be applied to the skin paddle itself rather than the subcutaneous tissue. Harris et al (6) proposed excision of the specimen with a narrow ellipse of skin (about 1.5cm), with subsequent authors advocating wider skin excision. James (9) included a 3-5cm wide strip of skin in the excised tissue, and Vordermark et al (1) recommended 4cm. In their study they showed that an elliptical incision of at least 4cm width was associated with fewer complications compared to primary closure of an S-shaped incision without sacrifice of any skin (21.4% compared to 85.2%, respectively, for total complications and 14.3% and 63% for major complications). However their incisions (S-shaped and linear ellipse) are orientated differently, and this could be a factor in explaining the different outcomes in their two groups. Tonouchi et al (10) concluded in a study of 20 patients undergoing 25 groin dissections that S-shaped incisions more often resulted in more lymphatic collection and stagnation, with a higher incidence of wound infections and leg

edema than straight incisions. Spratt (11) states that an oblique incision is associated with a reduction in morbidity compared to S-shaped or vertical incision, and Ravi (2) found that in ilioinguinal lymphadenectomy dissections, a vertical incision was preferable to S-shaped incision, with reduced rates of wound infection and skin edge necrosis.

The groups in our study are both left with a scar, which is oriented in the same direction as a long oblique, with the only difference being excision or not of the 4cm strip of tissue.

Our results show a significant reduction in early complications, including wound breakdown, when adequate skin is excised, leaving skin flaps which are not excessively undermined. We believe that by avoiding or at least reducing the wound related problems subsequent complications can also be avoided, and the reduced length of hospital stay demonstrates this point.

### CONCLUSION

Although not formally randomized, this retrospective study had two well-matched groups. Notwithstanding the lack of data regarding smoking status, which could have influenced the outcome, the results are still very interesting, with the group of patients having an elliptical incision and excision of at least 4cm width of skin having a significantly lower rate of early complications and a shorter hospital stay compared to those having little or no skin excision. A prospective study would be useful subsequently to assess more accurately these initial findings. In terms of complications and hospital stay, our results are in line with previous studies using the same incision. We have now adopted this technique for inguinal lymphadenectomy in our unit.

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