



MORBIDITY FOLLOWING INGUINAL LYMPHADENECTOMY – A SINGLE INSTITUTIONAL STUDY

Dr. H. Prasanna Srinivasa Rao*

Assistant Professor, Department of Surgical Oncology, Govt. Arignar Anna Memorial Cancer Hospital, Kanchipuram, TamilNadu *Corresponding Author

ABSTRACT

Inguinal node dissections is one of the commonly performed oncological surgeries in our part of the world. Most common indications include carcinoma of the penis, carcinoma vulva and cutaneous malignancies of the lower limb.

Objectives: Despite various methodology and strategies to minimise the complications and morbidity of inguinal lymphadenectomy, the complication rates are quite high. In this study, we attempt to analyse the inguinal lymphadenectomies performed at our centre over a 5 years span, various complications and identify risk factors for the same.

Materials & Methods: Medical records of patients who had undergone inguinal node dissections from 2014 to 2018 for various indications at our centre were identified and retrospectively analysed. Clinical information including age, BMI, type of primary cancer, stage, procedure, type and indication for inguinal nodal dissection, type of incision used, duration of unilateral or bilateral suction drainage, number of nodes resected, use of flap to cover the groin defect, use of extended postoperative prophylactic antibiotics, and need for adjuvant therapy was abstracted from patient records.

Results: Our study has reported a significantly high complication rate for inguinal lymphadenectomies (72.29%). The significant risk factors correlating with incidence of complications are BMI>25, presence of palpable inguinal nodes and primary closure of inguinal wound rather than flap cover.

Conclusions: Hence it may be inferred that judicious use of flap cover should be preferred over primary closure of groin wound particularly in obese patients with palpable nodes where the thin skin flaps may jeopardise the vascularity and hence result in higher complication rate.

KEYWORDS : Inguinal lymphadenectomy, dissection, complications, wound morbidity

INTRODUCTION:

Inguinal node dissections are commonly performed oncological surgeries in our part of the world. Most common indications include carcinoma of the penis, carcinoma vulva and cutaneous malignancies of the lower limb.

Strategies concerning the indication to inguinal node dissection as well as surgical technique vary significantly. Thus, different template extension and perioperative management on one hand and inconsistent methodology of complication definition, grading, reporting and way of data acquisition (prospectively/retrospectively) on the other contribute to a great variability of inguinal node dissection complication rates reported in literature.

Despite various methodology and strategies to minimise the complications and morbidity of inguinal lymphadenectomy, the complication rates are quite high (Table 5). In this study, we attempt to analyse the inguinal lymphadenectomies performed at our centre over a 5 years span, various complications and identify risk factors for the same.

PATIENTS & METHODS:

Medical records of patients who had undergone inguinal node dissections from 2014 to 2018 for various indications at our centre were identified and retrospectively analysed.

Clinical information including age, BMI, type of primary cancer, stage, procedure, type and indication for inguinal nodal dissection, type of incision used, duration of unilateral or bilateral suction drainage, number of nodes resected, use of flap to cover the groin defect, use of extended postoperative prophylactic antibiotics, and need for adjuvant therapy was abstracted from patient records.

Lymphadenectomies were classified as unilateral or bilateral. Based on the indication and primary cancer inguinal lymphadenectomies were further classified as superficial inguinal, inguino femoral and ilioinguinal block dissections. Standard techniques for lymphadenectomy were utilised. Saphenous vein was not routinely preserved. Sartorius transposition was used whenever a flap cover was not used for skin. Closed suction drains were placed in each groin incision and removed when the total output was less than 30 ml/24 hour.

Complications were classified as early or late: early complication was an event observed during the 30 days after the procedure; late complication was event present after hospitalisation or after the first month. Early complications included skin necrosis, seroma formation

requiring puncture or drainage, wound infection, deep venous thrombosis and specific death during hospitalisation. Late complications included skin necrosis requiring a skin graft, persistent seroma formation, and especially leg oedema (pitting and thigh circumferential size, comparatively with the other leg). Objective measurements of lymphedema were not commonly used in the study period.

Variables were analysed using the chi square tests with P value < 0.05 considered significant.

RESULTS:

A total of eighty eight patients undergoing inguinal node dissections between 2014 and 2018 for various indications were studied. The total number of inguinal dissections among these patients were 231 as a majority of them have undergone bilateral node dissections. The various indications for node dissection included carcinoma penis(n=78), carcinoma vulva(n=31) and cutaneous malignancies of the lower limb(n=39). There were 154 inguinal dissections whereas 77 ilioinguinal therapeutic block dissections. Regarding closure of the inguinal wound 163 were closed primarily while 68 required tensor fascia lata flap cover.(Table 1)

Table 1: Characteristics of the Patients:

Characteristic		n	%
Total no. of patients		148	
Total no. of inguinal dissection		231	
Age	Median 58.2(33-84)	<50 = 46	31.08
		>50 = 102	68.92
Sex	Male	93	62.84
	Female	55	37.16
Primary tumour	Carcinoma Penis	78	52.70
	Carcinoma Vulva	31	20.95
	Cutaneous malignancy lower limb	39	26.35
Laterality	Right side	34	14.72
	Left side	31	13.42
	Bilateral	83*2=166	71.86
Extent of Node Dissection	Superficial inguinal	92	39.83
	Inguinofemoral	62	26.84
	Ilioinguinal	77	33.33
Closure of wound	Primary Closure	163	70.56
	TFL Flap	68	29.44

The overall complication rate was 72.29% . The significant early

complications were wound infection(18.1%), minor skin necrosis(33.77%), major skin necrosis / wound dehiscence(13.85%), seroma formation(11.26%) & deep venous thrombosis(1.3%). The commonest long term side effect was lymphedema(36.79%).(Table2)

Table 2: List of Complications

Type	N	%
Wound Infection	39	16.88
Minor skin necrosis	78	33.77
Major skin necrosis & Wound dehiscence	32	13.85
Seroma formation	26	11.26
Lymphedema	85	36.79
Deep Venous thrombosis	3	1.30
Overall complications(no. Of patients)	167 / 231	72.29

The factors significantly affecting wound complication were BMI(p=0.019), presence of palpable inguinal node(p<0.001) and type of wound closure-primary closure rather than use of flap cover(p=0.047). Age, addition of iliac nodal dissection and history of smoking did not significantly affect the outcomes. (Table 3)

Table 3: Risk Factors and Complications:

Risk Factor		No. of patients with complications /total no. of patients (or) dissections	p value
Age	<50 years	30/46	0.86
	>50 years	68/102	
BMI	<25	39/69	0.019
	>25	59/79	
Smoking	Yes	57/93	0.443
	No	41/74	
Extent of Dissection	Inguinal dissection only	109/154	0.466
	Ilioinguinal dissection	58/77	
Inguinal Nodal Status	cN+	89/103	<0.001
	cN0	78/128	
Wound Closure	Primary closure	121/163	0.047
	Use of TFL Flap	46/68	

Wound complications were mostly managed by debridement and primary closure or healing by secondary intention, while only a very few cases needed split skin grafting or secondary flap cover.(Table 4)

Table 4: Management of wound complications:

Procedure	N
Debridement and primary closure	81
Secondary intention	33
Split skin graft	5
Flap cover	3
Conservative	30

DISCUSSION:

Complete ilioinguinal block dissection is the standard of care for management of node positive groin for carcinoma of penis. Elective superficial inguinal node dissection is indicated in appropriate candidates with non-palpable nodes who are at high risk for occult regional lymphatic involvement and might benefit most likely from surgery is challenging but crucial for long-term survival.[1] Similarly inguinofemoral dissection is therapeutic in carcinoma vulva in both node positive groin as well as in primary tumours with increased risk of harbouring occult regional nodal disease.

The most common cited complications following inguinal dissections included wound infection (10-20%), lymphocele/seroma (19-45%), particularly mutilating skin edge necrosis (14-65%), and lymphoedema (2-100%).[5] Johnson et al.[6] reported that only 18% of patients experienced no postoperative complications during 101 groin dissections in 67 patients. Similarly, Kamat et al.[7] observed an overall complication rate of 87% in 31 patients and Horenblas et al.[1] described a complication rate of 53% in 32 patients with inguinal lymphadenectomies. A recently published large series from the Netherlands by Stuijver et al.[8] including 237 RILs reported 195 complications (82.3%). In contrast, Koifman et al.[9] observed in a large series of 170 patients with 340 RILs without muscle transposition an overall complication rate of only 10.3%.

Few authors have compared the morbidity of radical inguinal lymphadenectomy according to the different types of incisions used. Ornellas found a skin edge necrosis in 82% of patients with a bi-iliac incision, 72% with an S-shaped incision and only 5% with a Gibson incision .[6] Ravi et al did not report any skin flap necrosis in patients undergoing radical inguinal lymphadenectomy with myocutaneous flap reconstruction, compared with patients undergoing lymphadenectomy without flap reconstruction (40 to 100%). [10]

Table 5: Previous studies on complications of Inguinal dissections:

Study	Year	Data Collection	Malignancy	n	Complication rate
Ravi et al[10]	1992	Retrospective	Carcinoma Penis	375	Overall -61%
Kulkarni et al[7]	1993	Retrospective	Carcinoma penis	27	Wound dehiscence 26% Lymphedema-77%
Bevan et al[15]	2002	Retrospective	Carcinoma penis	53	Infection 10% Dehiscence 8% Lymphedema 23%
Gaarenstrom et al [16]	2003	Retrospective	Carcinoma vulva	101	Infection 39% Seroma 40% Dehiscence 17% Lymphedema 28%
Rouzier et al[17]	2003	Retrospective	Carcinoma vulva	206	Infection 30% Dehiscence 39% Lymphedema 47%
Sabel et al [18]	2007	Retrospective	Melanoma	212	Infection 19% Lymphedema 27%
Philippe et al [17]	2009	Retrospective	Carcinoma penis	43	Minor 29% Major 24%
Chang et al[19]	2010	Prospective	Melanoma	53	Overall 77%
Glarner et al [20]	2013	prospective	Melanoma	281	Overall 14%

Despite numerous modifications over the past 30 years to prevent lymphedema and other postoperative morbidity, the incidence of complications after inguinal lymphadenectomy remains significant.

Our study has similarly reported a significantly high complication rate for inguinal lymphadenectomies(72.29%). The significant risk factors correlating with incidence of complications are BMI>25, presence of palpable inguinal nodes and primary closure of inguinal wound rather than flap cover.

Muscle and myocutaneous flaps, although suitable for covering defects of the groin, led to defects at the donor site and a bulk at the recipient site. [11][12][13] The problem of adding bulk to the recipient area was overcome by the use of a fasciocutaneous flap. This was practised by Pontén and Maruyama et al. [14] The use of the TFL flap has the benefits of the myocutaneous flap without having any functional deformity at the donor site.

Hence it may be inferred that judicious use of flap cover should be preferred over primary closure of groin wound particularly in obese patients with palpable nodes where the thin skin flaps may jeopardise the vascularity and hence result in higher complication rate.

Moreover, taking into account that experience with minimally invasive inguinal node dissection (endoscopic/robotic) [2][3] and dynamic sentinel LN biopsy (DSNB) as diagnostic procedure with favourable complications rate is still limited to several centers [4], reduction of morbidity of inguinal nodal dissection is utmost important.

Methods to prevent complications:

Prophylactic broad spectrum antibiotics must be given to cover gram negative and anaerobic organisms. Continuation of antibiotics till the removal of drains should be encouraged. Early intervention and drainage of any hematoma as this may become the nidus for infection. Consider the use of myocutaneous flap cover whenever the skin flap is too thin, previously irradiated or when skin closure is under tension. All the non viable skin edges must be trimmed before closure of skin. Drain removal should be delayed until there is less than 30ml/24 hr drain output to prevent lymphocele formation. Prophylactic heparinisation and early ambulation should be encouraged to prevent occurrence of deep venous thrombosis.

Avoidance of infection in the post operative period, use of graded

compression stockings and early identification & physiotherapy could limit lymphedema.

Limitations:

The current study is limited by its restricted sample size and retrospective nature, which might have contributed to underestimated complication rates.

Whereas the current study was able to link a few risk factors with wound complications, it is unknown whether these risk factors would still be significant, or if additional risk factors would be identified, if an expanded range of wound complications were adequately recorded.

CONCLUSIONS:

Low to middle income countries witness a huge burden of locally advanced genital malignancies as well as advanced stage cutaneous melanomas of the lower extremity. Groin reconstruction is required not only to prevent catastrophic complications but also for early administration of adjuvant radiation. Several factors have been associated with an increased rate of postoperative complications: smoking, age, overweight, multi-morbidity, radiation at the donor site, and previous operations at the donor and the recipient site.

First, this study has identified three significant predictors of wound complications after this procedure— obesity, presence of palpable nodes and primary closure rather than use of a flap—and this information may be useful both for preoperative patient counselling and also to enhance postoperative monitoring of these high-risk patients to recognize and treat wound complications early in their course.

Recently, video-endoscopy[3] and robotic-assisted techniques [2] have been proposed for inguinal node dissection aiming to further decrease peri-operative morbidity. Even though they show promising results, assessment of their reliability and oncologic safety will be possible after studies with larger sample size and longer follow-up in the future, till then open inguinal dissection remains the standard surgical approach. Also, the role of DSNB, currently applied only in a few centres worldwide, should be further elucidated.[4]

REFERENCES:

- [1] C. Protzel, A. Alcaraz, S. Horenblas, G. Pizzocaro, A. Zlotta, and O. W. Hakenberg, "Lymphadenectomy in the Surgical Management of Penile Cancer," *Eur. Urol.*, vol. 55, no. 5, pp. 1075–1088, May 2009.
- [2] S. F. Matin et al., "Phase I prospective evaluation of the oncological adequacy of robotic assisted video-endoscopic inguinal lymphadenectomy in patients with penile carcinoma," *BJU Int.*, vol. 111, no. 7, pp. 1068–74, Jun. 2013.
- [3] M. Tobias-Machado et al., "Single-Site Video Endoscopic Inguinal Lymphadenectomy: Initial Report," *J. Endourol.*, vol. 25, no. 4, pp. 607–610, Apr. 2011.
- [4] J. A. P. Leijte, B. K. Kroon, R. A. Vald's Olmos, O. E. Nieweg, and S. Horenblas, "Reliability and Safety of Current Dynamic Sentinel Node Biopsy for Penile Carcinoma," *Eur. Urol.*, vol. 52, no. 1, pp. 170–177, Jul. 2007.
- [5] S. Horenblas, "Lymphadenectomy for squamous cell carcinoma of the penis. Part 2: the role and technique of lymph node dissection," *BJU Int.*, vol. 88, no. 5, pp. 473–83, Sep. 2001.
- [6] D. E. Johnson and R. K. Lo, "Complications of groin dissection in penile cancer. Experience with 101 lymphadenectomies," *Urology*, vol. 24, no. 4, pp. 312–4, Oct. 1984.
- [7] M. R. Kamat, J. N. Kulkarni, and H. B. Tongaonkar, "Carcinoma of the penis: the Indian experience," *J. Surg. Oncol.*, vol. 52, no. 1, pp. 50–5, Jan. 1993.
- [8] M. M. Stuver, R. S. Djajadiningrat, N. M. Graafland, A. D. Vincent, C. Lucas, and S. Horenblas, "Early Wound Complications After Inguinal Lymphadenectomy in Penile Cancer: A Historical Cohort Study and Risk-factor Analysis," *Eur. Urol.*, vol. 64, no. 3, pp. 486–492, Sep. 2013.
- [9] L. Koifman, D. Hampl, N. Koifman, A. J. Vides, and A. A. Ornellas, "Radical Open Inguinal Lymphadenectomy for Penile Carcinoma: Surgical Technique, Early Complications and Late Outcomes," *J. Urol.*, vol. 190, no. 6, pp. 2086–2092, Dec. 2013.
- [10] R. Ravi, "Morbidity following groin dissection for penile carcinoma," *Br. J. Urol.*, vol. 72, no. 6, pp. 941–5, Dec. 1993.
- [11] K. S. Gopinath, M. Chandrashekar, M. V. Kumar, and K. C. Srikant, "Tensor fasciae latae musculocutaneous flaps to reconstruct skin defects after radical inguinal lymphadenectomy," *Br. J. Urol.*, vol. 41, pp. 366–368, 1988.
- [12] H. Louis Hill, R. Hester, and F. Nahai, "Covering large groin defects with the tensor fascia lata musculocutaneous flap," *Br. J. Plast. Surg.*, vol. 32, no. 1, pp. 12–14, Jan. 1979.
- [13] M. A. Rifaat, W. Sami, and A. Gawad, "The Use of Tensor Fascia Lata Pedicled Flap in Reconstructing Full Thickness Abdominal Wall Defects and Groin Defects Following Tumor Ablation," *J. Egypt. Nat. Cancer Inst.*, vol. 17, no. 3, pp. 139–148, 2005.
- [14] B. Pontén, "The fasciocutaneous flap: its use in soft tissue defects of the lower leg," *Br. J. Plast. Surg.*, vol. 34, no. 2, pp. 215–20, Apr. 1981.
- [15] R. Bevan-Thomas, J. W. Slaton, and C. A. Pettaway, "Contemporary morbidity from lymphadenectomy for penile squamous cell carcinoma: the M.D. Anderson Cancer Center Experience," *J. Urol.*, vol. 167, no. 4, pp. 1638–42, Apr. 2002.
- [16] K. N. Gaarenstroom et al., "Postoperative complications after vulvectomy and inguinofemoral lymphadenectomy using separate groin incisions," *Int. J. Gynecol. Cancer*, vol. 13, no. 4, pp. 522–527, Jul. 2003.
- [17] R. Rouzier, B. Haddad, G. Dubernard, P. Dubois, and B.-J. Paniel, "Inguinofemoral dissection for carcinoma of the vulva: effect of modifications of extent and technique on morbidity and survival," *J. Am. Coll. Surg.*, vol. 196, no. 3, pp. 442–450, Mar. 2003.
- [18] M. S. Sabel et al., "Inguinal node dissection for melanoma in the era of sentinel lymph node biopsy," *Surgery*, vol. 141, no. 6, pp. 728–735, Jun. 2007.

- [19] S. B. Chang et al., "Prospective Assessment of Postoperative Complications and Associated Costs Following Inguinal Lymph Node Dissection (ILND) in Melanoma Patients," *Ann. Surg. Oncol.*, vol. 17, no. 10, pp. 2764–2772, Oct. 2010.
- [20] C. E. Glarner, D. Y. Greenblatt, R. J. Rettammel, H. B. Neuman, and S. M. Weber, "Wound Complications after Inguinal Lymph Node Dissection for Melanoma: Is ACS NSQIP Adequate?," *Ann. Surg. Oncol.*, vol. 20, no. 6, pp. 2049–2055, Jun. 2013.