

COMPARATIVE STUDY BETWEEN SUPERFICIAL VIDEO ENDOSCOPIC INGUINAL LYMPHEDENECTOMY (VEIL) VS SUPERFICIAL OPEN INGUINAL LYMPHEDENECTOMY (OIL) IN A SINGLE PATIENT

General Surgery

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ABSTRACT

Penile cancer is a rare malignancy with a high propensity for regional dissemination. For many years, Inguinal lymphadenectomy procedure was performed with a traditional open approach and carried significant morbidity due to severe lymphedema, flap necrosis, wound infections, and seroma formation. The evolution of inguinal lymphadenectomy surgery for patients with penile cancer to a more minimally invasive approach has greatly reduced the morbidity of the procedure. Complications of inguinal lymphadenectomy can be minimized with modifications in surgical approach with the use of endoscopic methods.

AIMS: To compare the efficiency and complications of superficial video endoscopic inguinal lymph node dissection and superficial open inguinal lymph node dissection in terms of Surgical time, operative blood loss, lymph node harvest, incidence of complications, length of stay, suture removal time, drainage removal time and cosmetic outcome in a single patient.

KEYWORDS

superficial open inguinal lymph node dissection, superficial video endoscopic inguinal lymph node dissection, penile cancer, complications.

INTRODUCTION:

Penile cancer is a rare malignancy with an annual incidence of less than one in 100,000 men worldwide (1). The presence of inguinal adenopathy is a likely indication of metastatic disease as the earliest site of regional dissemination of penile cancer is the superficial and deep inguinal nodes followed by the pelvic lymph nodes, including the external and internal iliac nodes (2). However, metastatic disease to the groin can be present without palpable inguinal lymph nodes. In both circumstances meaning palpable and nonpalpable adenopathy, groin lymphadenectomy has become the procedure of choice as a diagnostic and therapeutic modality in appropriately selected patients.

Current guidelines recommend inguinal lymphadenectomy in patients with penile cancer for palpable inguinal lymph nodes or in the event of nonpalpable lymph nodes where pathologic stage T2 or greater, the presence of lymphovascular invasion, or poorly differentiated histology (3).

However, this procedure carries great morbidity and current literature estimates complication rates greater than 50% for radical inguinal lymphadenectomy (4). The most common complications are lymphedema, deep venous thrombosis (DVT), wound infection, skin necrosis, lymphocele, and seroma (5). Our aim is to identify complications of inguinal lymphadenectomy that may be minimized with modifications in surgical approach.

Thereafter, an endoscopic technique for performing inguinal lymphadenectomy was described by Bishoff and associates in 2003 on human cadavers (6). Tobias-Machado *et al.* demonstrated that surgical morbidity could be reduced while maintaining adequate oncological outcomes utilizing the endoscopic technique proposed by Bishoff *et al.* (4). In a comparison of video endoscopic inguinal lymphadenectomy (VEIL) versus the conventional open approach, Tobias-Machado found a 20% complication rate in the VEIL group versus a 70% complication rate in patients who underwent conventional open lymphadenectomy. Most notably, there was a decrease in wound breakdown in the patients who had undergone the endoscopic procedure versus those who had open surgery (7).

Patient and method

In Our study a 45 year old male patient came to SMIMER Hospital, Surat with chief complain of penile swelling since 2 years. Clinically, there is 6*4 cm² hard mass over shaft of penis without palpable inguinal lymph nodes. Radiologically, CECT findings s/o enhancing soft tissue density lesion in penis measuring 8.3*4.5cm²-likely Carcinoma penis. We also took penile biopsy for HPE, result of which s/o moderately differentiated squamous cell carcinoma.

We done total penile amputation + bilateral orchidectomy + perineal urethrostomy and send it for HPE. HPE report of this specimen s/o moderately differentiated squamous cell carcinoma. Tumor cells

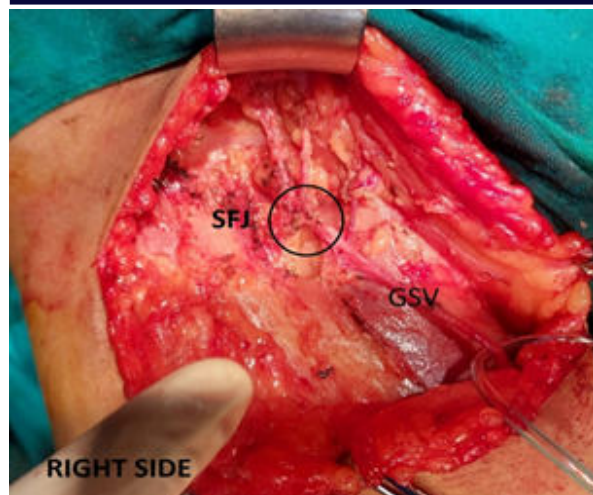
invading corpora cavernosa and spongiosa and glans with perineural invasion. There is no evidence of lymphovascular invasion and lymph node status is negative. All resected skin, soft tissue margins and urethral margins are free of tumor cells. [AJCC classification T₂- tumor invade into corpus spongiosum, cavernosum and glance.]

After a period of 1 month, we done prophylactic bilateral superficial inguinal lymph node dissection by video endoscopic approach on left side and the conventional open approach on right side randomly and send it for HPE. HPE report of this inguinal lymph node specimen shows only reactive lymphadenitis without any lymphovascular invasion or positive node status. Then patient undergone course of chemotherapy for 21 days and there was no tumor recurrence in follow up period of 1 year.

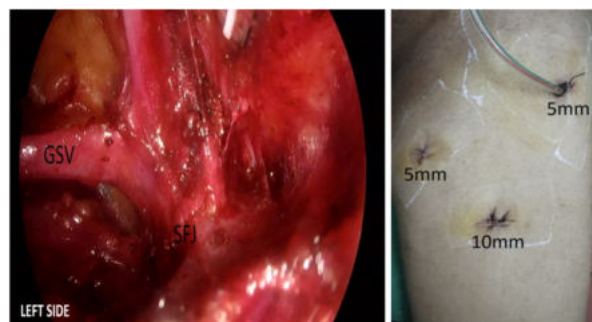
Surgical technique

Open surgery: open superficial inguinal lymphadenectomy was performed with the patient in a supine position. A 10-15 cm transverse skin incision is kept 3-4cm below inguinal arch on right side. Flap is elevated retaining some amount of fat in the skin to avoid skin flap necrosis. Superiorly flap is elevated upto inguinal ligament, laterally over Sartorius, medially over adductor longus, below upto apex of femoral triangle. Above deep fascia, Great saphenous vein identified and trace it upto SFJ and vertical group of lymph nodes along course of GSV dissected and removed. Below inguinal ligament, medial and lateral horizontal group of lymph nodes then dissected and removed. Adequate hemostasis achieved. A 14Fr subcutaneous drainage tube was inserted and full-thickness suture was used to reduce the subcutaneous space. Skin is closed and sterile dressing applied.





VEIL Surgery: The patient was placed in a supine position with the thighs apart at 30 degrees of abduction and external rotation (frog leg position). On left side, a 1-cm skin incision is made 2cm distal to the apex of the femoral triangle for 10mm trochar placement. With help of blunt obturator, Subscarpa's plane is created for insertion of other two working ports. Now 10-mm trocar is introduced while an insufflation pressure of 15 mmHg is reached. The pressure allows for the creation of visual space after an endoscope is introduced into the port site. Under visualisation, two 5mm working ports inserted at 5-6cm superomedially and superolaterally to the apex of femoral triangle. All the ports are fixed to the skin to prevent from slipping out. All fibrofatty areolar tissue above deep fascia dissected superiorly till level of inguinal ligament, medially along adductor longus, laterally along Sartorius and inferior margin was apex of femoral triangle. Great saphenous vein identified, branches of saphenous vein were safely managed with bipolar cautery and vertical group of lymph node along its 15cm course dissected upto level of SFJ. Below inguinal ligament, lateral and medial horizontal group of lymph node dissected along inguinal ligament, lateral and medial to SFJ respectively. Adequate hemostasis achieved and all this fibrofatty areolar tissue specimen removed through the first 10mm port with help of endobag. A 14Fr romovac subcutaneous drain placed through 5mm lateral working port. Full-thickness suture was taken to close the subcutaneous space at 10mm trochar site and then skin is closed and sterile dressing applied.



Postoperatively proper antibiotics and dressing care done. The drain is left in place until the output is less than 10 cc per day. In addition, all patients are instructed to wear compression stocking.

Observation targets: Length of procedure, operative blood loss, lymph node harvest, drainage tube removal time, drain output, complications, length of hospital stay, pathology and suture removal time were analysed and compared between the two groups.

RESULTS:

TYPE OF SURGERY	VEIL (left side)	OPEN (right side)
Operative time	180 min	100 min
Intra operative blood loss	5-10 ml	10-15 ml
LN harvest	6	6

Drainage tube removal time	7 day	10 day
Drain output chart: Day 1	100ml	150ml
Day 2	100ml	150ml
Day 3	80ml	120ml
Day 4	60ml	100ml
Day 5	40ml	100ml
Day 6	20ml	70ml
Day 7	10ml	50ml
Day 8	-	30ml
Day 9	-	20ml
Day 10	-	10ml
Suture removal time	7 day	12 day
Complications (Skin necrosis, wound infection, lymphedema, lymphocele, hematoma, phlebothrombosis)	No	Mild skin necrosis
Cosmetic outcome	Better	Good
Tumor recurrence in 12 months follow up	No	No
Patient Satisfaction (YES/NO)	Yes	Yes
Patient comfort after surgery (Better/good/poor)	Better	Good

VEIL is a time consuming procedure than open procedure depends on surgeon's expertise.

In both type of surgery, there were no significant difference in Intra operative blood loss and lymph node harvest. However, drain output, drainage tube removal time, suture removal time and complications were significantly reduced in the VEIL surgery compared with the open surgery. There was no tumor recurrence in 12 months follow up period on either side. Overall patients comfort and cosmetic outcome is better in VEIL surgery compared with open surgery.

DISCUSSION

In our study, we compared outcome of prophylactic bilateral superficial inguinal lymph node dissection on both side by different surgical approach in a same patient (VEIL on left side and open approach on right side).

When we compared data between these two surgeries in a same patient, the results demonstrated that VEIL had the advantage of low haemorrhage, low incidence of complications, shorter suture removal time, better cosmetic outcome, better patient's satisfaction and comfort. The reasons for these advantages are: i) VEIL surgery significantly shortens incision length and thus reduces wound healing time; ii) the amplification effect of video endoscopy techniques allows small vessels and lymph vessels to be clearly observed and ligated, resulting in less haemorrhage and less lymphedema; iii) less skin tension may enhance wound healing.

Open surgery was traditionally the most common procedure performed, with Daseler et al. first conducting open ILND in 1948 (9). In 1985, Fraley et al. pioneered a modified ILND, preserving the great saphenous vein in order to reduce morbidity (12).

The work of early pioneers was significant as it established the feasibility of the endoscopic approach. Bishoff et al. performed studies on human cadavers but were not able to successfully complete the endoscopic approach on a patient (4). Later in 2008, Tobias-Machado and others compared their original endoscopic approach to the standard open procedure (7). In this study, they compared 20 VEIL to 10 open procedures to assess morbidity. The researchers found a 70% complication rate in the open approach versus 20% in the VEIL group ($P=0.015$). Major complications within both groups included wound necrosis and varying degree of lymphedema. Overall, operative time was longer in the VEIL group due to technical demands of the approach described by the authors. However, hospital stay and time to resumption of daily activities was shorter in the VEIL group (7).

Romanelli et al. reported the results of 33 VEIL and seven open surgery ILND procedures. The VEIL group operative time was 119 min; the mean lymph node harvest was 8; the length of hospital stay was 5 days; complications occurred in 11 patients, including lymphocele in nine patients; subcutaneous cellulitis occurred in two patients in the VEIL group, however, no skin necrosis occurred. All these results were better than those for the open group (10).

Sotelo et al. carried out VEIL on eight patients with clinical stage T (2)N (0-3)M0. They found no wound related complications and lymphocele occurred in only three patients (8). Recently, with the

development of robotic techniques, Sotelo et al. successfully presented bilateral robot assisted ILND on one patient, the patient present a left-side lymphocele on follow-up, with no other complications (11).

CONCLUSION

VEIL has proven to be an efficient, radical and safe surgical method. Compared to traditional open surgery, VEIL in our study has minimal complications, reduced blood loss in surgery, less in-hospital time, less drainage removal time, less suture removal time and better cosmetic outcome with better patient's satisfaction.

This technique has the potential to reduce post-operative morbidity and also has the potential to become minimally invasive procedure for prophylactic inguinal lymph node dissection but long term studies with a great number of patients are needed to give definitive conclusion.

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