

ORIGINAL ARTICLE

SURGICAL RECONSTRUCTION FOR SCROTAL LYMPHOEDEMA (MANSOURA EXPERIENCE) (PROSPECTIVE STUDY)

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Abstract

Background: It has been estimated that 20% of male population in tropical countries suffer from scrotal lymphoedema. However, in industrialized countries, scrotal lymphoedema is secondary to other pathologies or iatrogenic interventions, chronic infections, oncologic surgery with or without lymphadenectomy and pelvic radiotherapy.

Purpose: To assess our experience in Mansoura Vascular Surgery Unit in surgical treatment of severe scrotal lymphoedema.

Methods: Twelve patients with severe scrotal lymphoedema were operated and followed up during the period from August 2009 to July 2012 by partial scrotectomy.

Results: All patients were followed up between 6 months and 3 years with a mean of 18.08 months. Age of studied group range from 25-72 with mean of 40.67 years. Infection rate was 16.66% in the studied group. Recurrence rate was reported in one patient 8.33%.

Conclusion: Surgical reduction of the scrotal size is a perfect choice for severe scrotal lymphoedema after good surgical planning and choice of the patient.

Keywords: Elephantiasis, lymphoedema, scrota swellings, lymphangiectomy, scrotal flaps.

INTRODUCTION

Lymphoedema results from the accumulation of protein-rich lymphatic fluid in the skin and subcutaneous tissues due to a dysfunction in the lymphatic system. In the chronic stage, lymphoedema is also characterized by the deposition of fat and fibrous tissue. Worldwide, the most common cause of lymphoedema is infestation of the lymph nodes by the parasite Wuchereria bancrofti. In the United States, however, most cases of lymphoedema are either congenital or the results of surgical dissection and radiation. $^{\left(1\right) }$

It has been estimated that 20% of male population in tropical countries suffer from scrotal lymphedema.⁽²⁾

However, in industrialized countries, scrotal lymphoedema is secondary to other pathologies or iatrogenic interventions, chronic infections, oncologic surgery with or without lymphadenectomy and pelvic radiotherapy.⁽³⁾

The involvement of the external genitalia causing a marked enlargement of its volume is an uncomfortable clinical situation, with impairment of movement, hygiene procedures, voiding in the standing position, and sexual intercourse.⁽⁴⁾

Lymphoedema of the penis and scrotum is classified as primary when it is caused by lymphatic malformation, and as secondary when it results from lymphatic obstruction following parasitic and infectious diseases, or from other clinical conditions such as heart, liver and kidney diseases or also from surgical or radiation therapy. Since, the response to medical therapy is poor; excision of the affected tissue is still the best option of treatment.^(5,6)

In severe scrotal lymphoedema, surgical excision with reconstruction either using non scrotal tissue as local flaps, skin grafts or scrotal tissue flaps. In our study, all the surgical excisional procedures were done planning to use an anterior flap of normal scrotal skin and posterior flap of uninvolved perineal tissue and 1-2 cm wide nearly noninvolved scrotal tissues.

The objective of this study is to present our experience in treating scrotal lymphoedema by removing the affected tissues and correcting the penoscrotal region.

PATIENTS AND METHODS

All clinical records of 12 patients, who presented with

genital lymphoedema between August 2009 and July 2012 in Mansoura Vascular Surgery Unit, where they were operated, followed up.

One patient with penoscrotal lymphoedema secondary to neoplastic infiltration of inguinal lymph nodes was excluded at the beginning of our study. Twelve patients aged 25 to 72 years with a mean age of 40.67 years presented by isolated scrotal lymphoedema (10 patients) and penoscrotal lymphoedema (2 patients) were operated and followed up.

All patients were assessed to obtain a diagnosis whenever possible. Investigations included serological tests for venereal and tropical diseases (filariasis), Chlamydia antibodies also were done. Chronic inflammatory markers (C-reactive protein) were done for all patients regardless the cause. Abdominal and pelvic US and CT scan were done for all patients. All excised tissues were sent for pathological evaluation. Conservative therapy with medical therapy was not included in this study.

The aetiology of lymphoedema is shown in (Table 1).

Before scrotal surgery, all patients treated by 48 hours of antibodies (amoxicillin-clavulanic), good local hygiene and anesthetic consultation for all patients.

Postoperative outcomes were assessed by patients, surgical team for a minimum of 6 months and maximum of 3 years follow up period.

Aetiology	Overall (n)	Surgical management
Pelvic surgery and/or (and radiotherapy)	1	Scrotal excision (partial scrotectomy)
Inguinal block dissection	1	Scrotal excision
Liver disease	2	Scrotal excision
Infection (fiblariasis)	5	Scrotal excision, penile reconstruction in one patient
Idiopathic	2	Scrotal excision, penile reconstruction in one patient
Lymphgranuloma venerum	1	Scrotal excision

Table 1. Aetiology of lymphoedema in studied group.

Table 2. Morbidity of studied group.

Infection (n = 2)	(16.66%)	
Wound dehiscence (n=0)	(0%)	
Postoperative oedema (n=12)	(100%)	
Local recurrence (n=1)	(8.33%)	
Lymphorrhea (n=3)	(25%)	
Testicular atrophy (n=0)	(0%)	

Surgical technique: Prior to surgery (Fig. 1) cleaning abdominal and perineal region down to knees with hair removal, prophylactic dose of intravenous vancomycin prior to surgery and postoperative for following 3 days.



Fig 1. Preoperative scrotal lymphoedema.

All patients were operated under spinal anesthesia in 10 patients and general anaesthesia in 2 patients.

A transverse incision is done just below the pulled penis in a transverse direction to develop these flaps in the subcutaneous plane (Fig. 2).



Fig 2. Transverse incision in subcutaneous plan.

The anterior and posterior flaps of normal appearing scrotal tissue were outlined from approximately 3 O'clock to 9 O'clock.

N.B. Posterior flap from normal appearing perineal skin.

The testes were identified and preserved, the tunica vaginalis was everted and large volume of watery scrotal tissue was excised (Figs. 3,4).



Fig 3. Creation of anterior flap.



Fig 4. Identification of the testes and spermatic cord.

All the contents of the spermatic cord were identified preserved and all lymphoedematous tissue around were excised.

The anterior and posterior flaps were closed to cover testis, cord in mattress suture in a transverse direction, and one negative suction drain was placed and the wound was closed (Fig. 5).



Fig 5. Closure of anterior and posterior flaps.

The anterior and posterior flap method was used in all our studied patients and two patients with penile lymphoedema were subjected later on to plastic reconstruction by split thickness skin graft after excision of all affected skin over Buck's fascia and they were followed up by our surgical team and plastic fellows.

All patients were discharged 7 days postoperatively and all histological examination revealed areas of epidermal thickening, smooth muscle, hyperplasia and chronic inflammation cells. Three months follow up was sufficient time so that all cases showed less oedema, good scar.

Statistical Analysis: Data was analyzed using SPSS (Statistical Package for Social Sciences) version 15. Qualitative data was presented as number and percent. Quantitative data was presented as mean ± SD.

RESULTS

Postoperative evaluation was subjective both on the patient and the surgical team, but improvement of the appearance of external genitalia, improvement in ambulation, ability to void in a standing position and improvement in sexual performance which could not be directly assessed, although some patients stated better than, before surgery.

Data regarding aetiology, and surgical procedures were listed in (Table 1).

All patients were followed up between 6 months and 3 years with a mean of 18.08 months. Age of studied group range from 25-72 with mean of 40.67 years.

Lymphatic fluid in drains continued from 4-7 days, infection was reported in one patient and it was treated (by good antibiotic) after culture & sensitivity test.

There was no wound disruption in our series apart from dehiscence in small part of the wound and it was managed conservatively.

Recurrent lymphoedema occurred in one patient who was operated due to inguinal block dissection and the patient showed recurrent lymphoedema 6 months after surgery and he was managed in a conservative way due to anesthetic complications.

Two patients underwent penile reconstruction with split thickness skin graft after excision of all penile affected skin by a plastic surgery that gave good outcome later on.

DISCUSSION

Scrotal lymphoedema can be a functionally and emotionally incapacitating problem for patients. The majority of worldwide cases of scrotal lymphoedema are caused by the parasitic W. bancrofti, and in the United States, the primary cause is pelvic surgery and irradiation. $^{(1)}$

The management should be therefore primarily focused on treating the underlying diseases. In particular, venereal diseases should be treated with the administration of an adequate antibiotic,⁽⁷⁾ inflammatory diseases with systemic steroid therapy, electrolyte imbalances should be corrected promptly and parasitic infections managed with antifilarial drugs.⁽⁸⁾

The presence of neoplastic processes should be excluded. In our series only one patient was excluded from the study when proved non-Hodgkin lymphoma with bilateral inguinal lymph nodes infiltration.

In 2006, Modolin et al. reported surgical reconstruction of penoscrotal lymphoedema by excision of all affected scrotal tissue putting their incision at the transition of healthy skin in inguina, perineal and crural regions and used the remaining skin to cover testes and spermatic cord in midline suture simulating scrotal raphe and the penis was covered with split-thickness skin graft from thigh in a zigzag suture on the ventral surface of the penis.⁽⁹⁾

Several articles concerning the kind of flap or graft used for reconstruction like posterolateral skin flap of the scrotum, thigh or abdomen flaps, or medium thickness grafts.⁽¹⁰⁾

The study conducted by Abdel Mageed 2007, pointed out the role of anteromedial thigh fascio-cutaneous flap for scrotal reconstruction after major scrotal skin loss that preserved sensate coverage, preserve fertility and gave similar advantage to medial thigh fascio-cutaneous flap of Hallock with better flap elevation that avoided kink at the pedicle.^(11,12)

In 2007, Giulio Garaffa, Nim Christopher and David J. Ralph published a paper under title "The management of genital lymphoedema". They studied 90 patients with genital lymphoedema and surgical treatment was done for 34 patients that consisted of excision of affected skin and subcutaneous layers and 7 patients needed grafts for penile shaft (partial scrotectomy) in 8 patients and (total scrotectomy) in 7 patients with primary closure of the unaffected lateral scrotal fold and in penoscrotal lymphoedema, they used inner preputial skin for penile shaft coverage and if not possible they used skin grafts either split thickness skin grafts that showed tendency for contracture, but in conclusion their results were excellent as regard cosmotic figure and functional outcome.

It was very important to confirm that the inner preputial layer is not involved in the lymphoedema process as it goes with dorsal neurovascular bundle into internal pudenal system and the remaining skin of shaft goes to inguinal lymphatic channels and if possible it is important to preserve this layer for reconstruction of penile shaft skin above buck's fascia and usually the outer lateral part of the scrotum is also not affected due to a separate lymphatic drainage, and therefore should be used for primary closure. With time, this skin tends to stretch and resembles a normal scrotum. In penoscrotal lymphoedema the scrotum should be treated first as then there is often spontaneous resolution of the penile lymphoedema. G. Garaffa et al. adopted scrotal excision with primary closure in midline way that resembles scrotal median raphe.⁽¹³⁾

Halperin et al. used posteriorly based perineal flap for reconstruction and it gave advantage of preservation of perirectal lymphatics that provide collateral drainage.⁽¹⁾

Zacharakis et al. in 2008 reported a case study for scrotal lymphoedema. They completely excised scrotal skin and the penis was not affected and reconstruction was done by STSGs from thigh.⁽¹⁴⁾

Another recent study in 2011, Emilio et al. reported a giant scrotal lymphoedema and they completely excised scrotal skin and penile shaft skin with reconstruction with split thickness skin graft (STSG) from lower limb and abdomen with excellent cosmotic appearance.⁽¹⁵⁾

In our case, we reviewed all the literatures regarding genital lymphoedema and its management, we can say that surgical treatment is the best option in moderate and severe conditions as regard failure of the conservative approach and extensive fibrosis that makes conservative treatment is tedious process for many patients. In our study, sexual dysfunction and recurrent genitourinary infections and bad cosmetic appearance were the main reasons for adoption of surgical treatment, most patients were referred from internal medicine department for consultation and it was impressive that all patients were informed about all details of the procedure and informed consent of our medical committee was taken. We operated 12 patients after all investigations were done and all patients underwent partial or near total scrotal skin excision and we adopted the anterior and posterior flaps technique through a transverse elliptical incision, anterior one just deepened below the pulled penis down to testis and spermatic cord where the cord was skeletonized well and the tunical was everted in all patients procedures to reduce hydrocele size in the postoperative time, and the posterior one 1-2 cm wide away from perineal skin and flap thickness of up to 1 cm. All our cases were closed in a transverse manner with one negative suction drain.

It was surprising enough for us that all cases went postoperative smooth period with minor wound complications that was dealt with conservative manner, as regard most of the reviewed articles, papers, all our patients were satisfied enough at least three months postoperative with subsequent resolution of penile oedema and return of sexual activity that was encouraged by us.

In our study and comparing our technique (anterior and posterior flaps) of normally appearing skin (flap width

1/2 cm) with other techniques mentioned before, if gave us similar results with finally good outcome.

We have a recurrence experienced by one patient 6 months later and it was due to recurrent neoplastic infiltration of inguinal lymph nodes in malignant melanoma patient and the patient was not fit for further surgery.

Stokes et al. reported better results with use of negativepressure dressings and split thickness skin graft following penile shaft reduction and reduction scrotoplasty,⁽¹⁶⁾ in our series we had two penile reconstruction process for penile involvement. We used split thickness skin graft from thigh and both were good in follow up period as regard cosmetic appearance and there was no scar contracture and good function outcome.

Conclusion: Although a validated questionnaire to assess quality of life was not applied, we could observe in the follow-up period that, with the exception of one patient who had recurrence due to the underlying disease, the treatment of penoscrotal lymphoedema with a modified Charles procedure with anterior and posterior flaps allowed a more effective hygiene and consequent reduction of infection rate, easier ambulation, voiding in the standing position, better cosmetic results to the external genitalia, and made sexual intercourse more satisfactory, although the latter was only assessed subjectively by some of our patients.

Now we believe that surgical reduction of the scrotal size is a perfect choice for severe scrotal lymphoedema after good surgical planning and choice of the patient.

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