Lichen sclerosus in patients with squamous cell carcinoma.
Our experience with partial penectomy and reconstruction with ventral fenestrated flap

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INTRODUCTION: *The vast majority of penile malignant tumors are squamous cell carcinomas (SCCs). After histological diagnosis of penile carcinoma, when possible, more conservative procedures are performed, otherwise it is necessary to perform a total penectomy.*
MATERIAL AND METHODS: *Ten patients, from 2006 to 2008, underwent to partial penectomy and reconstruction with ventral fenestrated flap technique; five of these patients had lichen sclerosus. All tumors were staged as T2N0M0, involving the corpus spongiosum and cavernosum. Patients were evaluated both the aesthetical and the sexual satisfaction, the first one by patient aesthetical self-assessment score, the second one by the International Index of Erectile Function (IIEF). Patients underwent follow-up for forty months.*
RESULTS: *Of the ten patients, no one encountered severe complications. The average aesthetic satisfaction one month postoperatively was of 2 points, 40 months postoperatively it was of 3 points (scoring scale: 1= complete dissatisfaction, 5 = complete satisfaction). The average IIEF score in the preoperative period was 21.6 points, one month postoperatively it was 13 points, 40 months postoperatively it was 19.7 points (mild erectile dysfunction).*
DISCUSSION: *The technique we presented, compared to other techniques, allows a reduction in operating time and is a one step technique without risk of non-engraftment. The ventral fenestrated flap technique did not result in meatal stenosis in our ten patients series.*
CONCLUSIONS: *The use of a ventral fenestrated flap in the closure of the defect due to partial penectomy has numerous advantages. Aesthetics is highly accepted by patients who are satisfied and report satisfactory sexual activity despite the reduction in penis length.*

KEY WORDS: Amputation, Lichen Sclerosus, Penile Cancer, Surgical Flaps.

Introduction

The incidence of penile cancer varies among different populations and is rare in most developed nations [1]. Penile cancer most commonly affects men aged 50-70 years [2]; however, approximately 19% of patients are 40 years old and 7% are 30 years old [3].
Strong risk factors identified by case-control studies included lichen sclerosus et atrophicus, phimosis and other chronic inflammatory conditions such as balanopostitis [4-5]. A consistent association was found between penile cancer and smoking that was dose-dependent and not explained by investigated confounding factors such as sexual history [6]. Schoen et al [7] reported that of 89 men with invasive penile cancer whose circumcision status was known, 2 (2.3%) had been circumcised as newborns and 87 had not been circumcised.

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In a large number of case series, human papillomavirus (HPV) DNA was identified in penile neoplastic tissue. In penile intraepithelial neoplasia, between 70 and 100% of lesions were HPV DNA positive [8].
The vast majority of penile malignant tumors are squamous cell carcinomas (SCCs) [9]. The disease is considered locoregional with predictable steps of local and regional progression [10] and about one third of patients with penile cancer will die from disseminated metastatic disease [11].
After diagnosis of penile carcinoma confirmed by incision biopsy, patients are elected for surgical treatment. When possible, more conservative procedures are performed, otherwise it is necessary to perform a total penile amputation.
Reconstructive treatments in partial penectomy are numerous and must adhere to the functional and aesthetic needs of the patients. This means that very complex reconstructions are not indicated in those patients not asking for an excellent restore of aesthetic appearance.
Because of psychological and surgical difficulties that may be encountered in penile reconstruction after partial amputation we would like to bring our experience in reconstruction with ventral fenestrated flap.

Materials and methods

Patient data

Ten patients were brought to our attention between January 2006 and January 2008 to underwent surgery for a penile carcinoma. All patients were hospitalized at the Department of Plastic and Reconstructive Surgery of the Policlinico Umberto I hospital and underwent to a partial penectomy and a reconstruction with ventral fenestrated flap technique. The study is based on the analysis of postoperative satisfaction both aesthetic and functional. Patients enrolled in the study had a mean age of 68 years and a median age of 72, with a range from 51 to 81. Of the ten patients, five had a previous diagnosis of lichen sclerosus. All patients were treated within fifteen days from biopsy that confirmed suspected diagnosis of squamous cell carcinoma of the penis. All tumors were then staged as T2N0M0, involving the corpus spongiosum and cavernosum. The average diameter was 1,5 cm from 1 to 2,2 cm.

Surgical procedure

Patients (Fig. 1) are generally operated in the supine position, under spinal anesthetic block. After proper asepsis, a surgical glove or condom secured distally to the proposed line of amputation excludes the lesion. A tourniquet is applied at the base of the penis. The skin is obliquely incised circumferentially

Fig. 1: Preoperative condition.

Fig. 2: Urethra disconnected.

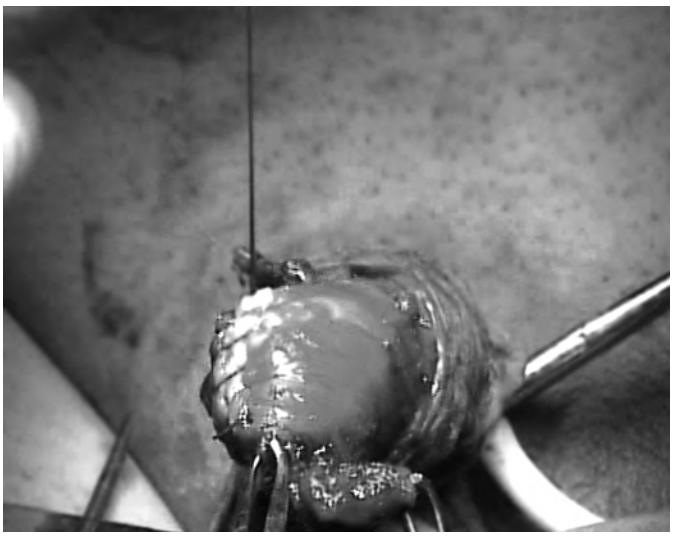

Fig. 3: Corpora cavernosa sutured after amputation.

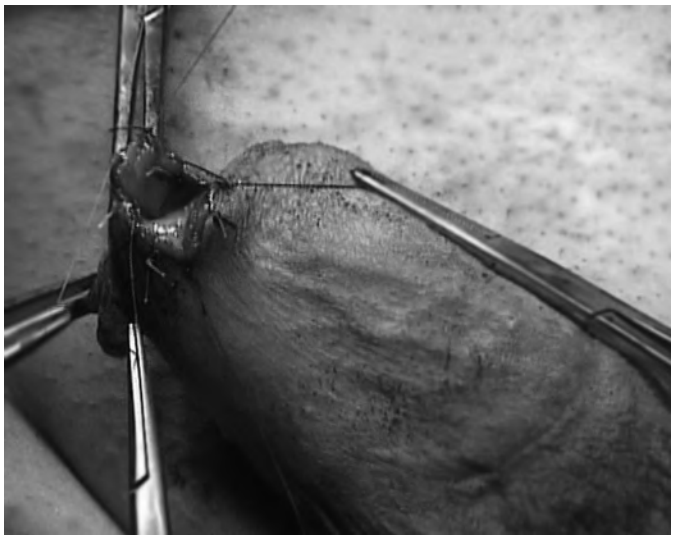

Fig. 4: Urethra stump sutured to flap fenestration.

Fig. 5: Postoperative result.

around the penis, deepening to Buck's fascia, making a ventral skin flap. Neurovascular bundle of the penis is clamped and isolated. Specimen is sent to the laboratory for frozen-section analysis. Disconnected, the proximal stump is sutured with 2-0 Vicryl leaving a length which allows the maximum sensitivity in respect of oncologic radicality. The urethra is clamped, isolated and disconnected by amputating the distal third (Fig. 2). Then the corpora cavernosa are sectioned and the distal third of the penis is amputated: corpora cavernosa stump is closed by suture. (Fig. 3). The urethral stump is spade-shaped at 3 o'clock and 9 o'clock, the ventral skin flap is fenestrated and then is sutured with Vicryl 4-0 to the urethral stump (Fig. 4). A Redon drainage is placed under the Colles' fascia and removed in 24-48h. After urethrocutaneostomy, the skin fenestrated flap is turned up and sutured to the dorsal penile sheath (Fig. 5).

Patients were evaluated both the aesthetical and the sexual satisfaction.

The first was tested, postoperatively, asking patients to give a score from one to five to their satisfaction (one: complete dissatisfaction, five: complete satisfaction) from an aesthetic point of view. The second parameter was assessed before and after surgery, using the international index of erectile function (IIEF) questionnaire, that evaluates patients' erectile capacity [12]. (Tab. I)

Patients underwent follow-up for forty months. They were examined and analyzed in the first post-operative month, then after three months and then every six months during the next three years.

TABLE I - *International index of erectile function (IIEF).*

IIEF score	Classification
6-10	Severe
11-16	Moderate
17-25	Mild
26-30	Good

Results

All patients were treated with a partial penectomy and underwent to the reconstruction with ventral fenestrated flap. Histologically all the lesions were squamous cell carcinomas, five patients had a previous diagnosis of lichen sclerosus. The staging was T2N0M0 in all the patients.

Of the ten patients underwent to surgery no one encountered severe complications such as neomeatal stenosis or flap necrosis secondary to the technique. Only one

TABLE II - *Aesthetic satisfaction (score from 1 to 5)*

Patient	Score reported one month postoperatively	Score reported 40 months postoperatively
1	3	4
2	1	1
3	2	2
4	3	3
5	2	4
6	1	2
7	1	2
8	4	5
9	1	3
10	2	3
Average score	2	3

TABLE III - *Sexual satisfaction evaluated according IIEF (score from 6 to 30)*

Patient	Preoperative score	Score reported one month postoperatively	Score reported 40 months postoperatively
1	20	13	18
2	11	9	9
3	18	13	17
4	22	16	21
5	25	17	23
6	29	27	28
7	19	12	17
8	24	17	22
9	23	18	21
10	25	12	21
Average score	21,6	15	19,7

patient has gone against a minor complication such as dehiscence.

The test to assess aesthetic satisfaction was administered, the first time, one month post-operatively and the average result was of two points, ranging from one to four. 40 months postoperatively, patients underwent again to the test, and declared an average satisfaction of three points, ranging from one to five (Tab II).

In the preoperative period patients were asked to rate their satisfaction according to the IIEF scale referring to the period before the onset of disease. The patients reported an average score of 21,6 with a range from 11 to 29. One month postoperatively patients declared an average score of 13 points, indicating moderate erectile dysfunction, with a range from 9 to 27. At the second interview, 40 months postoperatively, the average score had risen significantly, reaching 19,7 points (mild erectile dysfunction), with a range from 9 to 28 (Tab III).

Discussion

The treatment of patients with partial penectomy must take into account the age of patients and their expectations in terms of both functional and aesthetic point of view.

The first major distinction to be made in reconstructive treatment after partial amputation of the penis is whether implement glans reconstruction. Interventions involving a glans plastic are more muddled and more likely to experience complications such as meatal stenosis. They are therefore not recommended in elderly, noncompliant patients.

Neogland after partial penectomy could be reconstructed by buccal mucosa grafts, however the main disadvantage of this technique is that the receiving site is mobile and, thus, liable to hinder proper neovascular formation for adequate adaptation while it also requires an additional genital incision [13]. Glanuloplasty with a scrotal flap has acceptable cosmesis outcome and good meatal stenosis results. However, it requires definitive scrotal hair removal and above all it is a second-stage surgical technique [14]. Another way to reconstruct glans is based on extragenital skin grafts sutured to the distal end of the cavernous bodies [15]. Anyway meatal stenosis is a common complication of this reconstruction.

Reconstruction with free vascularized flap has been implemented in highly specialized centers. The partial neophallus is sutured to the distal end of the penile stump and reconstructed at only 1 stage [16]. Obviously this technique requires a microsurgeon, microscope technology, operational tools and dedicated team. The risk of necrosis of the flap is a possible and dramatic complication. This event makes microsurgical reconstruction not recommended, especially in patients with poor general conditions.

If a reconstruction of the glans and then an excellent cosmetic result is not necessary, but rather it is preferable an optimal functional result and fewer complications, many techniques can be performed.

Classic partial penectomy by Pack and Ariel does not provide satisfactory cosmesis and has a 6% meatal stenosis rate but it is a quick and not complex solution [17]. It can be used in patients not interested in aesthetic results. The use of flaps in the closure of the defect due to partial penectomy has numerous advantages. First of all, allows rapid reconstruction in a single operative time, permits an early highlight in the case of cancer recurrence and averts the occurrence of complication.

If partial penectomy is indicated, the present technique can bring additional benefits. Reconstruction with ventral fenestrated flap compared to reconstructions recreating a neo-glans with buccal mucosa grafts, allows a reduction in operating time and a decreased risk of non-engraftment. In comparison to the scrotal flap, the technique we presented is a one step technique and avoid re-operation. Although microsurgery techniques allow a good result they are difficult to implement in patients with poor general conditions because of heparinization and long period of hospitalization. Compared to the classical technique of Pack and Ariel [17], the ventral fenestrated flap technique did not result in meatal stenosis in our ten patients series (compared with 6% of the technique of Pack and Ariel).

In conclusion the ventral fenestrated flap has the strengths of a quick execution, the absence of a second operative time, the speed of physical recovery and a low incidence of complications. As a point of weakness aesthetics is not perfect but it is highly accepted by patients who are satisfied. In addition patients report satisfactory sexual activity despite the reduction in penis length.

Riassunto

La maggior parte dei tumori maligni del pene sono squamocellulari. Dopo la diagnosi istologica di carcinoma, qualora sia possibile vengono attuate tecniche chirurgiche conservative, in caso contrario è necessario attuare una penectomia. In questo studio abbiamo preso in considerazione dieci pazienti sottoposti tra il 2006 ed il 2008 a penectomia e successiva riscostruzione tramite lembo ventrale fenestrato. Cinque di questi pazienti avevano una pregressa diagnosi di Lichen sclerosus. Dopo l'intervento i pazienti sono stati valutati sia sul piano estetico-funzionale sia sul piano di soddisfazione sessuale (IIEF). Entrambi gli aspetti valutati nel corso del follow-up sono risultati più che soddisfacenti. Da questo si evince che l'utilizzo di un lembo ventrale fenestrato per la ricostruzione dopo penectomia parziale presenta numerosi vantaggi.

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