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Resurfacing and Reconstruction of the Glans Penis

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Abstract

Objectives: To describe the techniques and results of surgical reconstruction of glans penis lesions.
Methods: Seventeen patients (mean age: 53.2 yr) were treated by resurfacing or reconstruction of the glans penis for benign, premalignant and malignant penile lesions. The aetiology of the lesions was one Zoon's balanitis, four lichen sclerosus, one carcinoma *in situ*, five squamous cell carcinomas, and six squamous cell carcinomas associated with lichen sclerosus. Five cases were treated by glans skinning and resurfacing; five cases by glans amputation and reconstruction of the neoglans, and seven cases by partial penile amputation and reconstruction of the neoglans. Glans resurfacing and reconstruction were performed with the use of a skin graft harvested from the thigh.
Results: The mean follow-up was 32 mo. All patients were free of local premalignant/malignant recurrence. Patients who underwent glans resurfacing reported glandular sensory restoration and complete sexual ability. Patients who underwent glansectomy or partial penectomy with neoglans reconstruction maintained sexual function and activity, although sensitivity was reduced as a consequence of glans/penile amputation.
Conclusions: In selected cases of benign, premalignant or malignant penile lesions, glans resurfacing or reconstruction can ensure a normal appearing and functional penis, without jeopardizing cancer control.

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1. Introduction

Penile neoplasia is an uncommon malignancy affecting 0.1–0.9% per 100,000 males in Europe and 0.7–0.9% per 100,000 males in the United States. Seventy-eight percent of all tumours appear on the glans and/or prepuce [1,2].

The surgical treatment of premalignant and malignant penile lesions has changed over time [1–3]. While radical surgery can locally control the disease

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at a rate greater than 90%, this approach is often mutilating with a high incidence of aesthetic, physical, dysfunctional and psychological post-operative morbidity and disability, with more than 50% of patients developing mental disorders after surgical treatment for penile cancer [1,4–6]. Thus, the use of medical and surgical penis-sparing therapies has been suggested to maintain penis function and appearance [1,2,3,7,8]. Local laser ablation, for example, has shown, in patients with relatively superficial lesions, promising cosmetic and functional outcomes [3]. Brachytherapy provides, in selected cases, preservation of the penis but has a significant number of complications [3]. Despite a 6% local recurrence rate and good cosmetic results, the microscopic control of tumour excision, reported by Mohs and others [2], has failed to gain widespread acceptance by urologists. Two likely reasons for this are that urologists are not generally exposed to this highly specialised technique and that the procedure is very time consuming [2]. To date, only a limited amount of micrographic surgery for penile cancer has been reported in the literature, and no controlled trials comparing the various organ-sparing techniques have been published [2,9,10]. Partial or total penile amputation is the accepted method of treatment in patients who have invasive penile cancer involving the glans and corpora cavernosa [3]. However, in premalignant or superficial lesions, alternative forms of surgical therapy aimed at preserving the phallus without jeopardizing local cancer control have been suggested [1–3]. Recently, organ-sparing techniques have also been suggested for more advanced tumours [2]. The reluctance of many patients to undergo a mutilating penectomy has prompted the search for new reconstructive surgical techniques that can maintain or improve quality of life without compromising patient survival [3].

We herewith report our surgical experience in 17 patients suffering from benign, premalignant or malignant penile lesions, using three different techniques developed to preserve the penis and, at the same time, eradicate the primary local disease.

2. Patients and methods

From 1998 through 2004, 17 patients with benign, premalignant or malignant lesions involving the glans penis or penile shaft and requiring surgical treatment were cared for at our centre. Patient age ranged from 38 to 72 yr, with a mean age of 53.2 yr. All patients underwent preoperative multiple biopsies to confirm the presence of premalignant or malignant lesions and determine the histologic grade. A competent pathologist examined all of the samples. In patients clinically diagnosed with lichen sclerosus (LS), the patient's histology was reexamined to look for past evidence of LS, according to the accepted, strict, pathologic criteria: an epithelial-stromal lesion characterised by squamous atrophy or hyperplasia, a band-like infiltrate, hyalinization of the papillary dermis, hyperkeratosis, pigment incontinence and dermal oedema [11]. A pathologic examination showed one Zion's banalities, one carcinoma *in site*, four LS, four squamous cell carcinomas (Sacs), one SCC associated with carcinoma *in site*, six Sacs associated with LS. Squamous hyperplasia or epithelial dysplasia was associated with the lesions in 10 cases. Eleven patients with SCC underwent a penile magnetic resonance imaging (MRI) to better define the extension of the local tumour. Finally, in patients with penile malignancy, we recorded whether or not there were associated local metastatic lymph nodes following an MRI of the lower abdomen and inguinal region, or distant metastatic lymph nodes following a computed tomography (CT) scan of the abdomen and chest. All patients affected with penile malignancy were staged in accordance with the updated TNM staging system. Three cases were classified T1,N0,M0 and eight were classified T2,N0,MO. Eleven SCCs showed well histologic differentiation (G 1) in 9 cases, moderate differentiation (G 2) in 1 case, and poor differentiation (G 3) in 1 case. All patients with SCC showed no lymphovascular invasion. Of the 11 SCCs, 5 patients underwent glans amputation, and 6 patients underwent partial penile amputation.

All patients underwent reconstruction of the glans penis using a free split-thickness skin graft (STSG) harvested from the thigh via three different surgical techniques. Five patients were treated by removing the glans epithelium and resurfacing the glans, specifically the one Zoon's balanitis, three LS, and one carcinoma *in situ*. Five patients were treated by total glans amputation and reconstruction of a new glans, specifically two SCCs and three SCCs associated with LS. Seven patients were treated by partial penile amputation and reconstruction of a new glans on the penile stump during a single surgical intervention, specifically one case of SCC, two cases of SCCs associated with LS, and one case of SCC associated with carcinoma *in situ*. Three patients were referred to our specialised centre for glans reconstruction after partial penile amputation for SCC previously performed in other hospitals. Two cases showed recurrence of SCC (one case was associated with LS) in the residual penile stump, and one case showed LS involving the distal part of the residual penile stump. Follow-up ranged from 12 to 60 mo (mean: 32 mo), which included a baseline colour photograph with careful examination of the genitalia every 6 mo, including groin inspection and palpation, and a biopsy of any area of penile induration or suspicious reddening. Finally, all patients with SCC underwent a chest x-ray and CT scan every 12 mo.

2.1. *Surgical techniques*

2.1.1. *Glans skinning and resurfacing*

The penis and glans were fully evaluated preoperatively (Fig. 1 A). A circular incision was made under the corona, degloving the penile skin. The glans epithelium was fully removed up to the coronal sulcus (Fig. 1B). In all patients, multiple frozen