

Organ-preserving surgery for penile cancer: description of techniques and surgical outcomes

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Study Type – Therapy (case series)
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OBJECTIVE

- To describe the outcomes of organ-preserving surgery for penile cancer at a UK tertiary referral centre.

PATIENTS AND METHODS

- Patients at Sunderland Hospital (UK) between 2001 and 2008 who had squamous cell tumours limited to the glans penis underwent penile-preserving surgery including total glansectomy and glanuloplasty, partial glansectomy, glans relining and distal penectomy with glans reconstruction.
- Recurrence rates, cosmetic and functional outcomes were recorded.

What's known on the subject? and What does the study add?

Organ-preserving surgeries for penile cancer have been described to reduce the morbidity associated with traditional operations. Patients derive better functional outcomes from penile-preserving surgery, although local recurrence rates can be higher.

Excellent results can be obtained at large-volume centres. With close follow-up, local recurrences can be identified and treated promptly (often with further local excision).

RESULTS

- In all, 65 patients were identified with a median follow-up of 40 months. Local recurrence was present in four patients (6%) despite 72% having intermediate or poorly differentiated tumours and 30% with T2 disease.
- Complications included partial graft loss (1.5%), graft contractures (4.5%) and meatal stenosis (7.5%).
- In all, 5% were deemed to have poor cosmetic outcome and 85% described good erections at 1 year after surgery.

CONCLUSION

- Penile-preserving surgery can achieve good penile cancer control with minimal morbidity and reduced psychosexual side-effects.

KEYWORDS

penile cancer, glansectomy, prognosis

INTRODUCTION

Penile cancer remains a rare tumour in the Western world accounting for <1% of male malignancies. There is worldwide variation in annual incidence with 0.8 per 100 000 cases in the UK but up to 20 per 100 000 in developing countries [1]. Traditionally, radical surgery or radiotherapy has been used for malignant penile lesions with little thought to organ preservation [2,3]. The traditional view that a 2-cm margin was required for local control has been challenged by a significant body of contemporary work [4,5]. These findings paved the way for an era of penile-conserving surgery. Hence, Austoni

et al. [6] proposed glansectomy and wide local excision for management of penile cancer confined to the glans and Bracka [7] pioneered glans resurfacing. In the UK, where only 15% of tumours invade the corpora at presentation, the vast majority are amenable to organ-conserving surgery [8]. In addition, patients with penile cancer are managed in super-regional centres with a catchment population of 4 million and managing at least 25 new cases annually, which leads to a considerable amount of experience concentrated in those centres [9].

Various operative techniques and therapeutic strategies have recently been

developed for organ preservation in penile cancer. These were encouraged by the fact that most recurrences after a penile-preserving approach are surgically salvageable and local failure does not seem to compromise long-term survival [4,10].

We describe our experience with penile-preserving surgery at a tertiary UK referral centre. We describe the operative techniques and long-term outcomes.

PATIENTS AND METHODS

At our institution (Sunderland Royal Hospital, UK) between 2001 and 2008, 65 patients

FIG. 1.

Glansectomy and glanuloplasty. A, Lesion on glans penis; B, Excision of glans; C, Appearance after SSG applied; D, Appearance at 6 months after surgery.



TABLE 1 Pathological findings in patients undergoing penile-preserving surgery

Surgery	Histology		Grade*				Stage*		
	SCC	Other	G1	G2	G3	CIS	T1S	T1	T2
Glansectomy and glanuloplasty	44	2	1	28	5	10	10	24	10
Partial glansectomy and reconstruction with SSG	1	0	-	1	-	-	-	1	-
Glans relining	3	0	-	-	-	3	3	-	-
Glansectomy, distal corporectomy and reconstruction	15	0	2	6	7	-	-	6	9

*Only includes patients with SCC.

with biopsy confirmed squamous cell carcinoma (SCC) of penis or carcinoma *in situ* (CIS) of the glans penis underwent organ-preserving or penile-reconstructive surgery. Patients who were assessed to have SCC limited to the glans (i.e. T1 and T2 tumours of the corpus spongiosum) on clinical examination were offered these techniques, which involved total glansectomy and glanuloplasty, partial glansectomy, glans relining and distal penectomy with glans reconstruction. These surgical techniques are described below. The mean (range) age of the patients was 62 (32–89) years.

Patients underwent close 3-monthly follow-up for the first 3 years then 6-monthly follow-up thereafter. Examination for local recurrence and clinical assessment for inguinal lymphadenopathy were performed at each visit. In addition patients who had high-grade features on histology also had CT assessment looking for groin nodes in the first 3 years as part of their surveillance. Pathological reports were reviewed and recurrence rates were noted. Cosmetic and functional outcomes were recorded.

ORGAN-PRESERVING TECHNIQUES

Glansectomy and glanuloplasty

This was performed as previously described [7]. Under general anaesthesia and with perioperative antibiotic cover, a tourniquet is applied at the base of the penis. A subcoronal circumferential incision is then made down to Buck’s fascia. The glans is then dissected off the corporal heads and an end urethrostomy is created. A split-thickness skin graft (SSG) taken from the lateral thigh is used to cover the corporal heads. The graft is then quilted to secure it using absorbable sutures. In our practice the dressing and urethral catheter is left *in situ* for 5 days after which they are removed (Fig. 1).

Partial glansectomy and reconstruction with SSG

The technique here is performed in more limited tumours on the glans. A section of the glans is excised and SSG performed as described above.

Glans relining [11]

This is usually done in cases of CIS. Here, the glans epithelium and subepithelial tissue are removed off the underlying spongiosum in quadrants from the meatus to the coronal sulcus. The procedure is then completed using SSG.

Glansectomy, distal corporectomy and reconstruction

Sometimes, tumours on the glans can show early invasion of the corpora. While traditionally these would have been treated by partial penectomy, using glansectomy and a ‘fish mouth’ incision involving the corpora, a good surface can be obtained to lay the SSG, yielding a good phallus and cosmetic result. In those cases, division of the suspensory ligament of the penis can improve penile length [8].

RESULTS

In all, 65 patients underwent organ-preserving penile surgery. The final histology showed 63 patients with SCC and two with verrucous carcinoma. Glansectomy and glanuloplasty was performed in 46 cases (70%) with partial glansectomy in one (2%), glans relining in three (5%) and glansectomy, distal corporectomy and reconstruction in 15 cases (23%). In all, 20% of patients had CIS on final histology and 72% had moderate (G2) or poorly differentiated tumours (G3); 75% of tumours were stage T1 or T2 with the rest being CIS (Table 1).

The mean (range) follow-up period was 40 (12–72) months. There were no fatalities during the study period. In all, 60 patients (92%) had been followed up for ≥2 years. During the follow-up period, there were four local recurrences (6%). In two cases the patients had verrucous carcinoma, one of which had a positive margin at initial excision. These two cases were managed by further wide local excision. One patient required a redo glansectomy and the other required a partial penectomy due to high-risk disease and positive margin. The median time to recurrence was 15 months (Table 2). Inguinal lymph node involvement was clinically or radiologically evident in 10 cases at presentation and inguinal lymph node dissection was performed in those cases with four being positive.

TABLE 2 Positive margin and local recurrence rates in penile-preserving surgery

Surgery	N	Positive margin, %	Local recurrence, %
Glansectomy and glanuloplasty	46	13	4
Partial glansectomy and reconstruction with SSG	1	0	0
Glans relining	3	33	0
Glansectomy, distal corporectomy and reconstruction	15	20	13

Early complications included partial graft loss in one patient requiring re-grafting. In the medium term, there were graft contractures in three patients requiring redo procedures. Meatal stenosis was the commonest long-term complication occurring in five patients and this required meatal dilatation under general anaesthetic.

Three patients (5%) were deemed to have had a poor cosmetic outcome from the procedure with the rest being classified as 'good' or 'excellent'. Cosmetic outcome was assessed by one of the authors (D.G.). In terms of functional outcomes at 1 year, 85% of patients reported 'good' erections.

DISCUSSION

Penile carcinoma has traditionally been managed by partial or radical penectomy or radiotherapy. While traditional teaching advocated radical surgery with at least a 2-cm margin, it led to good disease control at the expense of penile function [2,3]. Radical radiotherapy on the other hand allowed penile preservation but with high recurrence rates of up to 50% [12]. However, 80% of penile carcinomas involve the glans, coronal sulcus, or prepuce and may therefore be amenable to penile-preserving rather than amputative surgery. This has been supported by a body of evidence challenging the traditional 2-cm margin. For instance, histological studies of penectomy specimens have shown that microscopic extension beyond the gross tumour margin can be as low as 5 mm [4]. In addition, local recurrence rates after operative intervention with a surgical margin of <1 cm have been shown to be as low as 4% [5]. Austoni *et al.* [6] was one of the first groups to emphasise the anatomical distinction between the corpora cavernosa and corpus spongiosum and to propose glansectomy as an effective treatment for

glans-confined penile cancer. Since then different organ-preserving techniques have been developed that lead to good functional outcomes [8].

Despite better functional outcome, it is recognised that organ-preserving surgery can lead to poorer local control, although overall survival is not affected. This was highlighted in a study by Lindegaard *et al.* [13] who compared 26 patients undergoing partial or total penile amputation, and 37 who were treated with some form of penis-conserving therapy. They found that local control rates were significantly lower for conservative therapy than amputation (5-year actuarial control rates of 69% and 100%, respectively, for T1 tumours), although overall survival was not affected as most patients could be salvaged with radical surgery.

In the present paper, we describe 65 patients who underwent penile-preserving surgery. Local recurrence rates were excellent (6%), despite 72% having intermediate or poorly differentiated tumours and 30% with T2 disease. In patients who had recurrence, it was possible to achieve control by further surgery. Overall, the patients had better functional outcomes (compared with traditional amputative surgery) and although no validated questionnaire was used to assess postoperative outcomes, 85% of patients reported achieving erections at 1 year. There were graft contractures in three patients who eventually required redo procedures, emphasising the importance of close follow-up in patients in whom organ-preserving surgery is offered. In addition, this is also important as the long-term recurrence rates for these techniques are still unknown.

However, there is no doubt that organ-preserving surgery has revolutionised penile

cancer management and reduced the psychosexual morbidity associated with treatment. Good results can be achieved in large-volume tertiary referral centres.

CONFLICT OF INTEREST

None declared.

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Abbreviations: SCC, squamous cell carcinoma; CIS, carcinoma *in situ*; SSG, split-thickness skin graft.