Reconstruction with scrotal skin flaps after wide local resection of penoscrotal extramammary Paget’s disease


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OBJECTIVE

- To introduce an effective procedure for reconstruction of large skin defects after wide local resection of penoscrotal extramammary Paget’s disease (EMPD) in selected patients using scrotal skin flaps without compromising oncological control.

PATIENTS AND METHODS

- From January to June 2010 this procedure was carried out in five selected patients with penoscrotal EMPD who underwent wide local resection with subsequent reconstruction using scrotal skin flaps.
- Patient demographics, lesion characteristics, surgical margins and outcomes were evaluated.

RESULTS

- Flaps survived with satisfactory functional and aesthetic results.
- All patients survived without local or systemic recurrence of tumour.

CONCLUSIONS

- Wide local resection can provide cure in superficial penoscrotal EMPD.
- The described method using scrotal skin flaps seems to be a safe and effective procedure for the reconstruction of large defects.

KEYWORDS

extramammary Paget’s disease, scrotal skin flaps, wide local resection

INTRODUCTION

Extramammary Paget’s disease (EMPD) is a rare cutaneous neoplasm that usually occurs in the elderly. It usually involves the penoscrotal area in men. In general, wide surgical excision might be the best choice for EMPD because it offers the possibility of a cure [1]. If the defect is too large to enable primary closure after resection, simultaneous reconstruction by a split-thickness skin graft or local flaps is recommended. In the present study, we introduced an effective reconstruction procedure for penoscrotal EPMD in selected patients using scrotal skin flaps.

MATERIALS AND METHODS

From January to June 2010, five selected patients with penoscrotal EMPD (57–70 years; median 66), were admitted to our institute. They had a history of penoscrotal lesions for 4–54 months (median 30) before the diagnosis was made. The lesions involved the penile shaft and scrotum, and covered an area of 40–72 cm² (median 54).

Physical examination, laboratory investigations for tumour-specific markers (PSA, alpha-fetoprotein [AFP] and carcinoembryonic antigen [CEA]) in serum, and imaging (abdominal ultrasonography, thoracic radiography, CT of the pelvis) were undertaken to detect malignancy and exclude metastases. None of these patients had penoscrotal EMPD secondary to a urogenital malignancy. No positive regional lymph nodes or other systematic metastases were identified upon hospital admission.

We carried out wide local resection deep to the superficial fascia with a 2-cm
tumour-free boundary according to the shape of the lesion. This was guided by analyses of an intraoperative frozen-section biopsy obtained in suspect areas along the border of the resection. The surgical margin was extended until a negative frozen section biopsy was reported. Prophylactic regional lymph node dissection was not routinely carried out.

After wide local resection, the posterior scrotal wall and skin of the distal penis (2–3 cm) usually remained. The superficial arteries contained in the superficial fascia of the penis (dartos fascia) were preserved. Skin defects covered an area of \( \approx 48–96 \text{ cm}^2 \) (median 72). We introduced a three-step procedure for reconstruction of the defects: (i) cut through the full thickness of the residual scrotal skin; (ii) pull the penile shaft through the space spared after step (i); (iii) cover and close the defect using scrotal skin flaps (Fig. 1). After surgery, low-dose oestrogen was prescribed to prevent erection for 3–5 days. The median (range) duration of follow-up was 24 (22–27) months.

RESULTS

All lesions were confirmed to be penoscrotal EMPD confined to the epidermis. Surgical margins were histopathologically negative (as confirmed using paraffin-embedded specimens) and complementary resection was not required. Grafts healed with satisfactory functional and aesthetic results 1 month after surgery (Fig. 2). Only one patient complained of erectile pain 1 week after surgery. This was due to a larger defect and because a shorter frenulum was preserved, but the pain resolved 1 month later. There were no other major perioperative comorbidities or complaints. There was no local or systemic recurrence in any patient, and all the patients survived.

DISCUSSION

Extramammary Paget’s disease usually occurs in the anogenital region and frequently presents as a pink eczematoid area accompanied by pruritus. The diagnosis of EMPD is often delayed due to the non-specific nature of common initial presenting signs and symptoms. Penoscrotal EMPD has been more commonly reported...
than vulval and anal EMPD in case series in Asian subjects [2–6]. In those series, for localized EMPD, resection was the first-line treatment, although all surgical procedures (even extensive resections) were complicated by a high prevalence of local recurrence. In general, wide local resection might be the best choice for EMPD because it offers the possibility of a cure [1]. The prevalence of local recurrence after wide local resection of penoscrotal EMPD has been reported to be 19.4–27.3% of patients [3,4,7]. Early studies by our research team indicated that frozen section-guided wide local resection produces an acceptable prevalence of recurrence (16%) when treating penoscrotal EMPD. In general, the prognosis for primary penoscrotal EMPD confined to the epidermis is excellent [2].

We carried out wide local resection to the superficial fascia. Ensuring the depth as well as the extent of resection was an important feature of the operation. First, deep invasion of EMPD into subcutaneous tissues is possible [4,8], and vertically inadequate resection could also lead to local recurrence. We controlled the surgical margin (horizontally and vertically), and the prevalence of local recurrence was much lower than that reported previously. Secondly, resection of sufficient depth could guide the grouping of patients with different recurrence risks and enable appropriate evaluation of the prognosis. This is because deep invasion not only increased the risk of residual tumours, but was also an important risk factor for systemic recurrence [2].

If the defect is too large to enable primary closure after resection, simultaneous reconstruction by a split-thickness skin graft or local flaps is recommended, and several procedures have been introduced [1,9,10]. In the present study, in selected cases, we carried out an effective procedure with satisfactory functional and aesthetic results. Scrotal flaps are widely used in plastic surgery in neonates for complete correction of bladder extrophy, failed epispadias, failed hypospadias, necrosis of penile skin and severe circumcision injuries. The use of scrotal flaps leads to quick primary cicatrization without leakage. In the present study, for the first time, this method was introduced for reconstruction of large skin defects after resection of penoscrotal EPMD in selected patients.

Blood is supplied to the skin of the penis by the left and right superficial external pudendal vessels. These vessels arise from the first portion of the femoral artery, cross the upper medial portion of the femoral triangle and divide into two main branches, running dorsolaterally and ventrolaterally in the shaft of the penis, with collateralization across the midline. The arteries are accompanied by venous tributaries that are more prominent and more readily seen than the arteries. In the penis, the dartos fascia is loosely attached to the skin and the deep fascia. It contains the superficial arteries, veins and nerves of the penis. For cancers confined to the epidermis, complete resection of tumours might not necessarily damage the main blood supply of the distal skin. In the present cohort, superficial arteries contained in the dartos fascia were carefully preserved; we believe this contributed to the blood supply of the subsequent skin graft to the penile shaft. The blood supply to the scrotal wall and ventral penile skin is based on the posterior scrotal artery (a superficial vessel from the deep internal pudendal artery). As with the superficial external pudendal tributaries, the posterior scrotal system provides a series of tributaries carried within the tunica dartos. Scrotal flaps are quite rich in blood supply with remarkable extensibility, so they could serve as an ideal substitute for coverage of the skin defect. If the lesion is confined around the root of the penile shaft (as in our selected cases), sufficient scrotal skin could be preserved, making reconstruction of skin defects easier.

This procedure is not applicable to all defects after wide local resections. First, complete resection of tumour is most important, and the range of resection can be extended to obtain negative surgical margins. If not enough scrotal skin is preserved, complete reconstruction will be quite difficult; if the preserved frenulum of the penis is too short, and even if coverage by a scrotal flap is possible, patients might experience painful erections. In the present cohort, low-dose oestrogen was prescribed immediately after surgery and had to be taken for 3–5 days. We believe that the application of oestrogen reduced the chance of early erections after surgery, which consequently reduced the chance of secondary bleeding and early painful erection. As with graft recovery, the scrotal skin can extend to fit the penile shaft, thereby diminishing erectile pain.

All five patients had disease confined to the epidermis with negative surgical margins. A median surveillance period of 24 months is not very long, but we can cautiously state that wide local resection probably provides a cure in individuals with superficial penoscrotal EMPD according to our previous research [2]. Conversely, if deep invasion of tumours into subcutaneous tissues is suspected intraoperatively, this method should be reserved with caution not only for the sake of oncological control, but also because aggressive resection can damage the underlying blood supply for future grafts (especially for the distal skin of the penis).

Despite the caveats mentioned above, we have introduced an effective procedure for reconstruction after wide local resection in penoscrotal EMPD. The procedure seems to be relatively simple for oncological urologists. Wide local resection can provide a cure in patients with superficial EMPD. The use of scrotal skin flaps seems to be a safe and effective procedure in selected patients, with satisfactory functional and aesthetic results.

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CONFLICT OF INTEREST

None declared.

REFERENCES


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Abbreviations: AFP, alpha-fetoprotein; CEA, carcinoembryonic antigen; EMPD, extramammary Paget’s disease.