Vertical rectus abdominis flap reconstruction in patients with advanced penile squamous cell carcinoma

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OBJECTIVES

To evaluate the role of radical surgical debridement and excision with a vertical rectus abdominis myocutaneous (VRAM) flap reconstruction in patients with advanced penile cancer and subcutaneous metastatic disease, as the quality of life in such patients is extremely poor, multimodal treatments often fail and the outlook for the patient is limited with the development of uncontrollable disease.

PATIENTS AND METHODS

Four patients with advanced penile cancer presenting with fungating, cutaneous tumour deposits received palliative surgical resections for abdominal and inguinal disease. A VRAM flap was used in all cases to achieve tissue coverage.

RESULTS

All grafts were viable and the mean inpatient stay was 14 days. There were no immediate complications after surgery; patient satisfaction and symptom relief was excellent.

CONCLUSIONS

Aggressive palliative resection with a VRAM flap can dramatically improve the patients’ quality of life in advanced penile cancer, permitting disease control with satisfactory cosmesis. However, a multidisciplinary approach involving both the urological reconstructive and plastic surgeon is essential.

KEYWORDS

penile cancer, advanced, vertical rectus abdominis myocutaneous flap

INTRODUCTION

Disease progression in patients with penile cancer is well described, with loco-regional spread to inguinal and pelvic lymph nodes, followed by the development of distant metastases [1]. Common sites include the liver, bone, chest and brain. In addition, some patients with advanced penile squamous cell carcinoma (SCC) can develop cutaneous metastases involving the inguinal, subapubic and anterior abdominal wall areas. This can lead to a large, fungating mass of tumour with local loss of the epidermis and destruction of significant amounts of surrounding tissue (Figs 1 and 2). There is also a greater incidence of vascular vessel involvement, with subsequent bleeding and possible exsanguination. The role of palliative surgical resection in this patient group is poorly reported, although there are a few articles showing the efficacy of reconstructive surgical approaches to advanced inguinal lymph node involvement [2–4]. Patients with advanced disease often have a poor quality of life, with offensive, painful, fungating wounds. Notably, the response to medical intervention through radiation and chemotherapy is poor [5]. Often, these patients are treated terminally, with very little quality of life, which can be distressing to both the patient and their family.

We report the outcome in a few patients who developed extensive cutaneous metastatic disease and had a radical resection with reconstruction using a pedicled myocutaneous flap.

PATIENTS AND METHODS

Four men presenting to our institution were diagnosed with advanced penile SCC after developing cutaneous tumour deposits. Three patients had had a primary tumour resection with partial penectomy and radical ilio-inguinal lymphadenectomy, but also received adjuvant chemoradiation therapy. All patients had developed extensive s.c. metastases. The fourth patient presented from another hospital having received primary chemotherapy for positive inguinal SCC metastases. The primary lesion was not immediately recognized. He failed to respond to two cycles of chemotherapy and presented with a large inguinal tumour with associated satellite cutaneous deposits. His wounds were fungating and produced an offensive discharge. He underwent radical en bloc resection to help secure disease control. All patients were reviewed through the super-regional multidisciplinary team conference and all patients were fully counselled before surgical intervention. The patients’ demographic and pathological data are shown in Table 1.

All patients had extensive surgical debulking and debridement (Fig. 3), with a total penectomy and perineal urethrostomy in patients 1–3, in conjunction with radical excision of cutaneous and deep disease. These specimens were sent for pathological review to determine the presence of cutaneous and s.c. metastatic disease and to assess for the presence of positive lymph node involvement. The resulting defect was assessed by a senior plastic surgeon and in all cases the decision was made to reconstruct using an ipsilateral vertical rectus abdominis myocutaneous (VRAM) flap [Fig. 4] [6], as the most appropriate technique for tissue coverage and overall cosmetic outcome. Bilateral tensor...
Fascia lata flaps were used, in conjunction with a VRAM procedure, to complete skin coverage in patient 3.

The patency of the deep inferior epigastric artery (DIEA) was confirmed from within the defect. A skin paddle was then designed in a vertical orientation on the ipsilateral abdominal wall such that the defect would be fully covered. The medial incision was planned as per a standard midline abdominal laparotomy skin incision. The lateral incision was extended, if necessary, where it is dependent on the Anastomosis between the DIEA and the sixth intercostal artery [7]. The lateral border of the rectus abdominis was identified and the rectus sheath incised close to the lateral row of perforating vessels, to allow direct closure of the anterior wall of the sheath. Similarly, the rectus muscle was dissected from a medial approach, and released from the rectus sheath. The muscle and overlying skin paddle were then raised in a cephalad to caudal fashion until the DIEA was visualized, as it enters the muscle. The VRAM flap can be ‘islanded’ by disconnecting the insertion of the rectus abdominis at the pubis, should extra length be required. The whole flap was then rotated to lie transversely within the defect (Fig. 5).

A polypropylene mesh was used to assist in closing the abdominal wall in two patients. In the other two patients, the rectus sheath was closed directly with looped Nylon, and the skin defect closed directly with absorbable sutures. The flap was inset over two large bore suction drains with absorbable dermal sutures, and an absorbable monofilament subcutaneous running suture.

After surgery patients were placed on bed rest for 3 days, maintaining the legs in an abducted position. Anti-thromboembolic prophylaxis was commenced and antibiotic cover for skin commensals given under the

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**TABLE 1 Patient demographics, treatment and histopathological information**

<table>
<thead>
<tr>
<th>Patient no./age, years</th>
<th>Primary treatment</th>
<th>Lymph node treatment</th>
<th>TMN/pathology</th>
<th>Site of metastases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/78</td>
<td>Partial penectomy</td>
<td>Bilateral groin/pelvic dissection</td>
<td>T2N2M1, G2</td>
<td>Suprapubic + anterior abdominal wall</td>
</tr>
<tr>
<td>2/68</td>
<td>Partial penectomy</td>
<td>Bilateral groin/pelvic dissection</td>
<td>T1N2M1, G3</td>
<td>Suprapubic + left groin</td>
</tr>
<tr>
<td>3/48</td>
<td>Partial penectomy</td>
<td>Bilateral groin/pelvic dissection</td>
<td>T2N2MX, G3</td>
<td>Suprapubic + anterior abdominal wall + scrotum</td>
</tr>
<tr>
<td>4/43</td>
<td>Chemotherapy</td>
<td>Chemotherapy</td>
<td>TnxN3M1, G3</td>
<td>Left groin + thigh</td>
</tr>
</tbody>
</table>

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**FIG. 1.** Preoperative MRI showing extensive cutaneous metastases from penile SCC (blue arrows) with epithelial destruction (green arrow). The extent of inguinal disease encasing the femoral vessels necessitated surgical control. The femoral vein is invaded with tumour and contains thrombus (red arrow).

**FIG. 2.** Extensive and fungating inguinal metastases with cutaneous deposits involving the suprapubic and left thigh areas. The wounds are painful and discharging offensive material. The risk of further tissue destruction and vessel erosion is high.

**FIG. 3.** After radical excision of in situ disease and associated satellite lesions, the patient is left with a large skin defect.

**FIG. 4.** The VRAM flap is raised on its vascular pedicle and re-orientated to lie within the defect. Adapted from Kopf-Maier [6].

**FIG. 5.** The patency of the DIEA is confirmed and a skin paddle then designed in a vertical orientation on the ipsilateral abdominal wall. The flap is rotated to lie transversely within the defect.
direction of the microbiologist. Patients were encouraged to become ambulatory at 3 days, after a review of their wounds.

RESULTS

The recovery from surgery was uncomplicated in all cases. Patient no. 3 developed a small, local area of necrosis at the inferior part of the flap, requiring debridement; otherwise all the flaps were viable (Fig. 6). The mean inpatient stay was 14 days, with no immediate complications after surgery. Patient satisfaction was high and symptom relief was reported by all patients.

The patients were followed jointly through the urology and oncology services, with two patients receiving subsequent chemotherapy. The mean (range) follow-up was 3.5 (3–5) months, with two patients dying from disease progression and two currently alive and under treatment. The mean (range) defect was 386 (144–900) cm². Thus, even in the presence of very large defects, reliable and adequate wound cover with primary closure of both donor and recipient sites can be achieved. Relative contraindications for this type of procedure include obesity (fat necrosis) and pre-existing midline and paramedian scars, although two of the present patients had had lower midline incisions for pelvic lymphadenectomy.

Traditional medical intervention with radiation and combination chemotherapy treatments remains insufficient in resolving cutaneous metastatic SCC disease, with response rates of 5–45% [5,17–19]. These studies are based on response rates (complete and partial) in the presence of high-volume inguinal disease and distant metastases. Aggressive surgical approaches permit adequate disease control and should be used in conjunction with chemotherapeutic regimens. Radiation therapy does not seem to increase morbidity after flap reconstruction, whether before or after surgery. The use of radical reconstruction in this patient group will help to improve the quality of life and slow disease progression, especially with low-volume disease. Clearly, selecting patients for surgery is very important; patients must be well motivated, medically fit and aware of the risks and limitations of major surgery of this nature.

In summary, this is a very difficult patient group to treat but we have shown that an aggressive surgical approach can alleviate the symptoms associated with cutaneous disease and avoid potentially disastrous outcomes (i.e. exsanguination) by achieving local disease control.

Advanced penile cancer presenting with metastatic cutaneous deposits confers a significant survival disadvantage and traditionally patients would receive palliative chemotherapy and radiation treatments. In patients with good performance status and high levels of motivation, aggressive surgical excision permits disease control whilst improving patient quality of life by alleviating associated symptoms; such as offensive discharge and pain. We recommend the VRAM flap as an excellent means to achieving wound cover with low morbidity.

CONFLICT OF INTEREST

None declared.

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Abbreviations: SCC, squamous cell carcinoma; VRAM, vertical rectus abdominis myocutaneous (flap); DIEA, deep inferior epigastric artery.