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Original Article

V-Y BILATERAL GLUTEUS MAXIMUS MYOCUTANEOUS ADVANCEMENT FLAP IN THE RECONSTRUCTION OF LARGE PERINEAL DEFECTS AFTER RESECTION OF PELVIC MALIGNANCIES

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ABSTRACT

Objective: To evaluate the role of the VY bilateral gluteus maximus myocutaneous flap (GLM) in the reconstruction of large perineal defects after wide surgical resections for pelvic malignancies.

Patients and Methods: twelve consecutive patients (7 females, 5 males), of mean age 59 years (36 - 78), with primary or recurrent pelvic malignancies (rectal, anal, vulvar carcinoma), underwent either abdomino-perineal rectum excision with partial sacrectomy or total pelvic exenteration. The perineal defect was reconstructed by means of a GLM flap. Intraoperative blood loss, operative time, hospital stay, postoperative complications and long-term outcome were retrospectively assessed.

Results: One patient died postoperatively. All the remaining patients had at least one early and/or late complication. After a mean follow-up of 31.2 months, seven patients were alive. No major functional impairment in daily activities was observed. Five patients experienced a slight discomfort in either walking, sitting or cycling.

Conclusion: GLM flap is a useful technique for the repair of perineo-pelvic defects after abdomino-perineal rectum excision with partial sacrectomy.

KEYWORDS: GLUTEUS MAXIMUS MYOCUTANEUS FLAP – PERINEAL RECONSTRUCTION – ABDOMINO-PERINEAL RECTUM EXCISION
INTRODUCTION

Large perineal defects after wide resection can be filled by myocutaneous flaps. Although there are no current guidelines on the use of a specific technique, many authors refer to the rectus abdominis muscle (RAM) flap as the best option [1-6]. In general, the main arguments in favour of the RAM flap are good blood supply, a large skin paddle, a good arc of rotation, satisfactory bulk, the possibility of vaginal reconstruction, and the same operating field as abdomino-perineal resection of the rectum (APR) with no need to reposition the patient for reconstruction [7,8].

In recent years, APR has been modified to obtain a cylindrical specimen without waisting at the level of the levator ani muscle. To do so, the patient is turned into the prone jack-knife position after completion of the abdominal part then using uni- or bilateral flaps of the gluteus maximus muscle (GLM). [9] There is, however, limited information on this form of reconstruction [10-12]. We report our experience.

PATIENTS AND METHODS

The records of twelve consecutive patients who underwent a perineal reconstruction after surgical resection for pelvic malignancy between March 2002 and September 2005 were retrospectively reviewed. There were seven females and five males of mean age 59 years (range 36 – 78). All underwent a wide pelvic and perineal resection for anal (4), rectal (6) or vulvar (2) cancer. Seven patients presented with locoregional disease after previous surgery for cancer (rectum cancer 4, vulva 2, anal 1). Preoperative staging, including whole body FDG-PET scan, had demonstrated the absence of metastatic disease in all except one patient with a resectable liver metastasis. Resection with curative intent was planned in all patients. Histopathologic examination showed the resection to be R0 in 9 patients and R1 in three. The pelvic and the perineal defect was too large for primary closure.
Six patients had had previous chemo-radiotherapy, and one radiotherapy alone up to a median 16 months (range 3-24 months) before surgery. All underwent APR, with distal sacrectomy. In addition, a left hemihepatectomy was performed in one of the patients and a segmental small bowel resection in another. A partial vaginal or vulvar resection was carried out in four patients and a radical prostatectomy in one and total pelvic exenteration in a further two. In both patients with partial vaginal excision, a right gracilis muscle flap was added to the GLM for reconstruction of the vagina, while a bilateral gracilis muscle flap was used to fill the middle part of the pelvis in both patients with recurrent vulvar cancer.

Postoperatively, three patients received chemotherapy (1-4 months after the operation). Brachytherapy was administered in another patient with recurrent anal cancer with a close tumour-free margin on histopathology. The patient with locally advanced rectal cancer and single liver metastasis underwent adjuvant radio-chemotherapy, 4 months after primary surgery.

The V-Y gluteus maximus advancement myocutaneous flap (GLM) involves elevation and a V-Y advancement of the superior half of the muscle and overlying skin. After the resection and stoma construction(s), the abdomen is closed and the patient is turned into the prone jack-knife position (Fig. 1a). Two myocutaneous gluteus maximus flaps are prepared, leaving the lower 50% of the underlying muscle intact (Fig. 1b). Both flaps are dissected free and raised. After de-epithelialization of its media part, one of the two flaps is then advanced into the pelvic defect (Fig. 1c). After partial sacrectomy, even large cavities can be filled completely (Fig. 1f). A drain is inserted. The second flap is advanced towards the midline and sutured in layers to the first flap, resulting in a solid midline reconstruction (Fig. 1d). Both donor defects are closed using a V-Y-technique, after insertion of a suction drain (Fig. 1e). Postoperatively, the patient is kept on his or her side for 24 hrs to avoid any pressure on the flap. Standing is allowed as soon as the patient is able to do so. Tension caused by sitting
must be avoided for 6 weeks or, adopting a more progressive regime, the patient is not
allowed to sit for two weeks, followed by a progressive mobilisation with increasing sitting
time over one week. Regardless of the type of mobilisation, the patient must sit on a special
pillow for at least 6 months.

One patient died postoperatively. Eleven patients were followed up by a
multidisciplinary team, including a medical and a radiation oncologist, and an abdominal and
a reconstructive surgeon. Oncological investigations included pelvic imaging (CT or MRI)
every 3-6 months. One patient was referred to another hospital 2 months after the operation.

Intraoperative blood loss, intraoperative time, length of hospital stay, postoperative
complications and long term outcome were all recorded. Postoperative complications were
defined as early when occurring during the hospital stay and as late when observed after
discharge.

RESULTS

Blood loss, operation time, length of hospital stay

The average values (ranges) of the operating time, intra-operative blood loss and
length of hospital stay were 453 min (285-665), 1102 ml (380-2250), and 32 days (17-
52), respectively.

Postoperative complications

One patient died postoperatively (8.3%). This patient, with anal spinocellular
epithelioma, underwent an APR with partial vaginal resection, followed by partial
vaginoplasty with a right gracilis muscle flap and GLM flap. She developed septic shock on
day 15 and died 26 days later.

All the remaining patients had at least one early and/or late complication (Tables 1
and 2). Seven out of 11 patients developed limited perineal or donor site wound dehiscence.
Of these, four cases were managed by either surgical debridement or primary wound closure and three received conservative treatment. One patient with perineal wound dehiscence also developed a partial midline dehiscence of the GLM flap. Both of these complications were treated surgically. A pelvic collection occurred in three other patients. Other major surgical complications were not related to the reconstructive part of the operation. They included a small bowel anastomosis requiring operation from the neurological deficit in one leg owing to the anticipated level of the sacrectomy.

At a mean follow-up of 31.2 months (median 36 months), seven of the eleven patients were alive. All had had an R0 resection. One patient with recurrent anal carcinoma died three months after the operation owing to disease progression. Another patient developed lung metastases 18 months postoperatively but is alive without any evidence of disease following chemotherapy. Three patients had an R1 resection and none of them survived. Two patients (recurrent rectal and vulvar carcinoma) died owing to disease progression 11 and 32 months after the operation, a third died from a road accident 21 months postoperatively.

Long term analgesic home therapy was required in three of the eleven patients. The first two cases needed opiates because of local tumour recurrence. They died at 3 and 32 months after the operation. The third patient is still alive and takes NSAID and opiates for leg pain.

Long-term functional outcome.

All seven surviving patients were interviewed. Although each were living a normal life without functional limitation in daily activities, five experienced a slight impairment in walking, sitting down or riding a bicycle. One patient who had a posterior pelvic exenteration could not walk long distances due to neurologic weakness. Four other patients could not sit down without a pillow. Of the three patients who could not ride a bicycle, two had a gracilis
muscle reconstruction combined with a GLM flap, one of whom also underwent a partial sacrectomy. Only one patient, who underwent a posterior pelvic exenteration had discomfort in climbing stairs. Another patient had pain in one leg after preoperative radiotherapy. She had had an APR with bilateral GLM and gracilis muscle flaps. Two of the seven patients had perineal wound dehiscence and another developed dehiscence at the donor site. All the patients were satisfied with the result of surgery.

DISCUSSION AND CONCLUSIONS

The use of muscular or myocutaneous flaps to reconstruct large perineal defects after wide resective surgery for cancer improves wound healing and reduces complications.

The gluteus maximus flap is supplied by the superior and inferior gluteal arteries which communicate with the profunda femoris and medial femoral circumflex arteries. The muscle is important in running, jumping, standing and climbing, it is therefore not expendable. However, either the superior or the inferior half of the muscle can be elevated as a flap, leaving the remaining part to work normally. Gluteal rotation or island flaps enable mobilisation of substantial muscle bulk for central and posterior perineal defects. In contrast to Holm et al[9] , who used a uni-or bilateral myocutaneous rotation flap, we extended the gluteal dissection to create a bilateral V-Y advancement flap to increase the arc of rotation and freedom of transposition.

There are few recent data assessing the role of the GLM flap for perineal reconstruction after major cancer resection procedures[9-12]. Some authors feel that GLM flap is not reliable to cover deep defects because of its poor extensibility resulting in excessive traction and risk of dehiscence[7,10,14]. With the recent experience with perforator flaps, this argument is no longer valid[15]. Others comment that GLM flaps do not fill up the deeper part of the pelvic cavity, with a risk of a collection and/or delayed healing[11]. If sufficient access
to the deep defect is warranted, as in cases of partial sacrectomy, the GLM flap offers more tissue than an unilateral rectus abdominis flap, assuring complete cover of the defect. A postoperative perineal wound dehiscence rate after GLM flap of 44% has been reported\[^{15}\]. In our series this was 33.3% but when donor site complications are considered this rises to 66.6%. By improving the postoperative treatment, especially the mobilisation regime, a reduction in this is possible.

The functional outcome after perineal reconstruction is another important aspect. In our series, all patients were able to live normally, without severe functional limitations. As reported by Diaz et al.\[^{14}\], our data confirm that the patients’ complaints mainly depend on the type of surgical resection rather than on the type of reconstruction. However the latter may also impair functional outcome\[^{11}\].

Although there is general agreement on the need for perineal reconstruction after a wide pelvic resection\[^{1-5}\], the best form of reconstructive technique is not established. For large and deep defects the main discussion arises around the RAM flap and its variations and the gluteus maximus flap and its variations. Each flap has its specific indications. The RAM flap is the treatment of choice when the perineal defect involves the anterior or urogenital pelvic compartment but it is not sufficient to fill the central and/or posterior pelvic compartments particularly after partial sacrectomy.

The unilateral gluteus maximus myocutaneous flap is not bulky enough to fill large defects but the results in our small series and the literature indicate that it is safe and versatile with a constant anatomy. It offers an adequate arc of rotation to the posterior and central perineum even to fill huge defects. Furthermore there is no interference with the placement of an abdominal stoma and it also results in an intergluteal cleft providing good sensitive cover\[^{24}\]. The GLM flap is contraindicate for perineal defects without partial sacrectomy, as it
then does not reach sufficiently into the pelvic cavity. Thus its best indication is for patients having abdomino-perineal rectum excision with partial sacrectomy.
REFERENCES


TABLES

Table 1. Early complications in 12 patients having V-Y bilateral gluteus maximus myocutaneous advancement flap.

<table>
<thead>
<tr>
<th>COMPLICATION</th>
<th>COUNT</th>
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<tbody>
<tr>
<td>Perineal wound dehiscence</td>
<td>4</td>
</tr>
<tr>
<td>Donor site wound dehiscence</td>
<td>3</td>
</tr>
<tr>
<td>Flap dehiscence</td>
<td>1</td>
</tr>
<tr>
<td>Small bowel fistula</td>
<td>1</td>
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<tr>
<td>Urinary (sepsis, ureteric leakage, retention)</td>
<td>6</td>
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<tr>
<td>Cardiac failure</td>
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Table 2. Late complications in 12 patients having V-Y bilateral gluteus maximus myocutaneous advancement flap.

<table>
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<tr>
<th>COMPLICATION</th>
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<tr>
<td>Pelvic collection/sinus</td>
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<tr>
<td>Intestinal obstruction</td>
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</tr>
<tr>
<td>Parastomal hernia</td>
<td>2</td>
</tr>
<tr>
<td>Urinary (stress incontinence, urethra &amp; stenosis)</td>
<td>2</td>
</tr>
<tr>
<td>TIA</td>
<td>1</td>
</tr>
<tr>
<td>Gynaecomastia</td>
<td>1</td>
</tr>
<tr>
<td>Leg weakness</td>
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Addendum. Check list used for evaluation of long-term outcome

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<th>SUBJECTIVE</th>
<th>WHERE</th>
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<td>Anesthesia</td>
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<tr>
<td>Paresthesia</td>
<td>YES</td>
</tr>
<tr>
<td>Pain</td>
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</tr>
<tr>
<td>Analgesia required</td>
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<th>FUNCTIONAL OUTCOME</th>
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<tr>
<td>Perin. wound dehiscence</td>
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<td></td>
</tr>
<tr>
<td>Walking</td>
<td>IMPROVED</td>
<td>WORSENED</td>
</tr>
<tr>
<td>Sitting down</td>
<td>IMPROVED</td>
<td>WORSENED</td>
</tr>
<tr>
<td>Cycling</td>
<td>IMPROVED</td>
<td>WORSENED</td>
</tr>
<tr>
<td>Getting on the stairway</td>
<td>IMPROVED</td>
<td>WORSENED</td>
</tr>
<tr>
<td>Need of rehabilitation</td>
<td>IMPROVED</td>
<td>WORSENED</td>
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<table>
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<tr>
<th>GENERAL</th>
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</thead>
<tbody>
<tr>
<td>Working capability</td>
<td>IMPROVED</td>
<td>WORSENED</td>
</tr>
<tr>
<td>Satisfaction with surgery</td>
<td>IMPROVED</td>
<td>WORSENED</td>
</tr>
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</table>
LEGENDS TO ILLUSTRATION

Figure 1. GLM flap for reconstruction of the sacral and anal subunit of the perineum after APR with partial sacrectomy. **a)** Clinical aspect after APR with patient in prone position.

Planning of the GLM flap. **b)** After dissection of both flaps the right one is advanced into the deep defect. After deepithelialization of its medial part, it is sutured to the surrounding tissue.

**c)** The left myocutaneous flap is advanced towards the midline and is sutured in layers to the right flap, thus resulting in a solid midline reconstruction. **d)** The donor defects are closed using the V-Y technique. Clinical aspect at the end of the operation.

**e)** Clinical aspect 1 year after surgery. **f)** Radiologic aspect 1 year after the reconstruction. The perineal and parasacral defects are completely filled up with viable tissue.