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CASE REPORT
Reconstructive

Transretroperitoneal Pedicled Omental Flap for Coverage of Traumatic Sacral Defect: A Case Report

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Summary: The greater omentum is a reliable choice for salvage soft-tissue reconstruction. Benefits include consistent anatomy, long pedicle length, and a high concentration of lymphatic tissue that is resistant to infection. We report the case of a 46-year-old man with a complex traumatic sacral wound resulting in severe limitation of reconstructive options. A pedicled greater omentum flap was transposed through the retroperitoneum via the lumbosacral triangle, resulting in durable soft-tissue coverage. *(Plast Reconstr Surg Glob Open 2022;10:e4298; doi: 10.1097/GOX.0000000000004298; Published online 6 May 2022.)*

INTRODUCTION

The greater omentum is a reliable option both as a pedicled flap and free tissue transfer for salvage soft-tissue reconstruction. Its natural immunoregulatory function in the peritoneum with a high concentration of lymph nodes is valuable for coverage of contaminated wounds, and more recently vascularized lymph node transfer for the treatment of lymphedema.[1] Although violation of the peritoneum to provide soft-tissue coverage is rarely the first choice, it proves consistently reliable for reconstruction of infected sternotomy wounds.[2] Outside of sternotomy coverage, it has been reported for a variety of salvage indications including coverage of thoracotomy, spine,[3–5] and pelvic floor defects,[6] as well as reconstruction of the scalp,[7] scrotum,[8] and breast.[9,10]

Here, we describe the authors' technique for laparoscopic harvest, transretroperitoneal tunneling, and inset of a pedicled greater omentum for durable soft-tissue coverage of a traumatic posterior trunk defect including extensive Morel-Lavallée injury and comminuted sacral bone fractures.

CASE REPORT

A 46-year-old man was admitted after motor vehicle trauma. Initial evaluation revealed multiple comminuted pelvic fractures, left femur fracture, and an extensive Morel-Lavallée injury of the lower posterior trunk with associated rectal and urethral injuries. The wound was markedly contaminated with ischemic gluteal musculature and suprafascial dissection with disruption of skin perforating vessels from mid thighs to the thoracic spine, extending laterally to the anterior right trunk. The patient underwent embolization of the internal iliac arteries for stabilization of pelvic bleeding and diverting loop colostomy and suprapubic catheter placement for diversion of the related visceral injuries. Femur and pelvic fractures were fixated followed by staged debridement of devitalized gluteus muscle and free-floating portions of sacrum and temporization with negative pressure wound therapy (NPWT). The resulting defect included extensive loss of muscle and soft tissue overlying the bony prominences of the remnant sacrum (Fig. 1).

Due to the severe tissue deficit, extensive undermining of remaining soft tissue, and embolization of the internal iliac arteries, there was concern for unpredictable perfusion of the typical local and regional pedicled flaps for sacral reconstruction. A free flap would be susceptible to pedicle compression due to the location of the wound and patient's functional status. For this indication a reliable flap, resistant to contamination, able to fill a large soft-tissue defect and provide tissue over a bony prominence without functional donor morbidity was required. The decision was made to perform a laparoscopically harvested pedicled omental flap transferred through the retroperitoneum.

SURGICAL TECHNIQUE

In the supine position, ureteral stents were placed. Four 5-mm laparoscopic ports were utilized to evaluate the omentum. Minimal intraabdominal adhesions were lysed.

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Received for publication February 24, 2022; accepted March 15, 2022.

DOI: 10.1097/GOX.0000000000004298

Disclosure: *The authors have no financial interest to declare in relation to the content of this article.*

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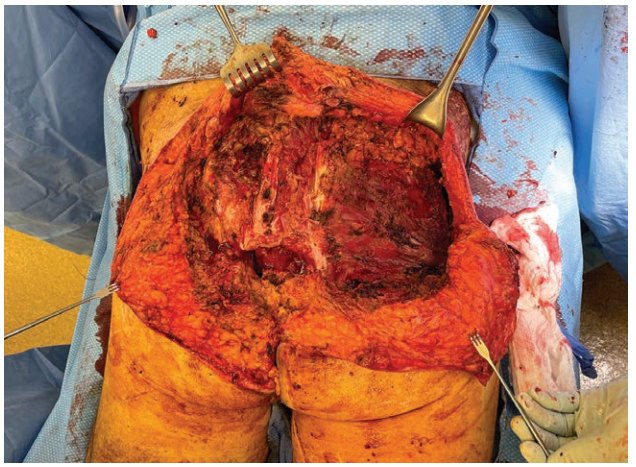

Fig. 1. Traumatic sacral wound status post debridement. A 46-year-old man following extensive sacral and pelvic trauma with Morel-Lavallée lesion of the lower posterior trunk. Ischemic gluteal musculature, free-floating sacrum, and surrounding soft tissue have been extensively debrided, and the internal iliac arteries embolized. The resulting defect is as shown.

The omentum was mobilized using Ligasure (Medtronic, Minneapolis, Minn.)—first off the transverse colon, then subsequently the hepatic and splenic flexure. Elevation continued off the stomach, taking care to preserve the right gastroepiploic vessels as the flap pedicle. The left

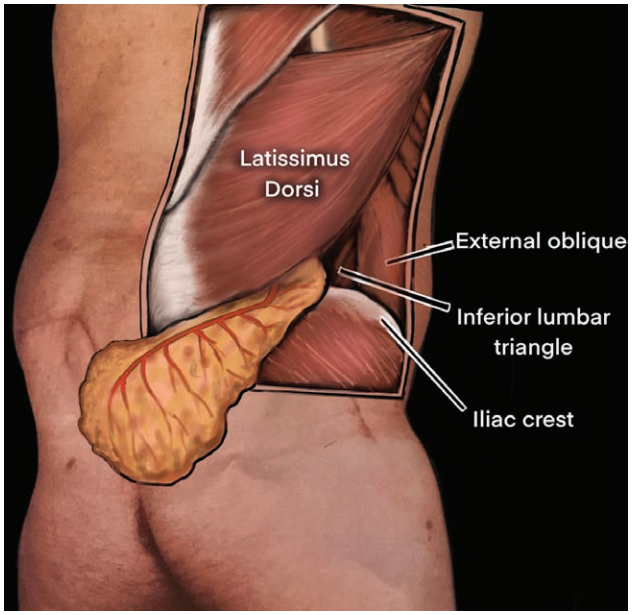

Fig. 2. Lumbosacral triangle interval used for transretroperitoneal passage of the omental flap. The lumbosacral triangle is an avascular space suitable for passage of the omental flap directly through the retroperitoneal space without compression of the vascular pedicle. This is identified on the deep surface by locating the aponeurotic junction between the quadratus lumborum and transversus abdominus muscles at 2 cm inferior to the 12th rib, whereas externally this is identified as the space bound by the iliac crest inferiorly, the latissimus dorsi posteromedially, and the external oblique muscle anterolaterally.

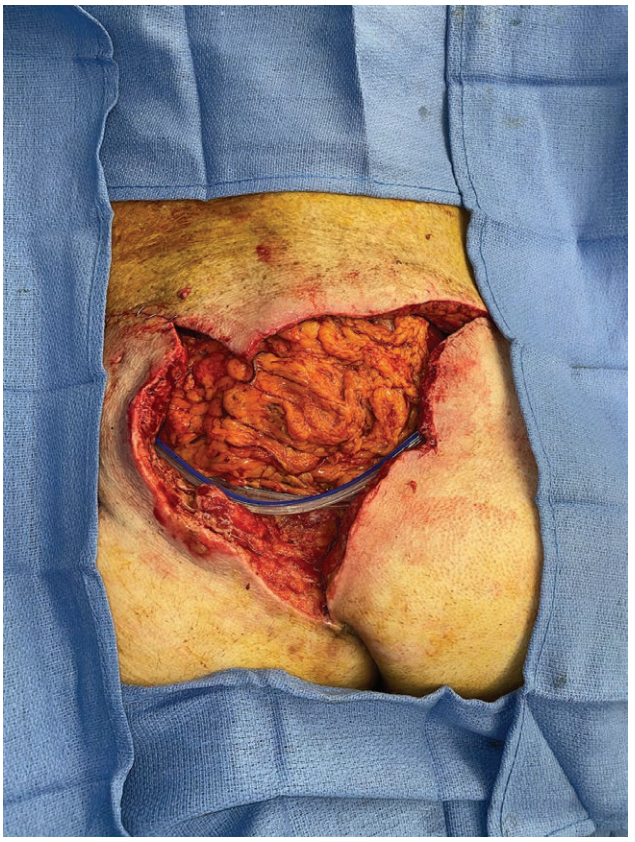

Fig. 3. Omental flap inset into the surgical wound before closure. The omental flap is shown in place over the sacral defect following harvest, indocyanine green fluorescence perfusion assessment, and transretroperitoneal passage into the wound.

gastroepiploic artery was proximally ligated and the remaining omentum was pedicalized. The right colon and hepatic flexure were mobilized in a lateral to medial fashion to expose the inner surface of Petit's triangle lateral to the quadratus lumborum and psoas muscles (**see Video 1 [online]**, which demonstrates landmarks for harvest and transretroperitoneal passage of the omentum).

The patient was transitioned to a left lateral decubitus position. As the skin was widely undermined from the initial injury, Petit's triangle on the right was identified by direct subcutaneous palpation of its borders—the iliac crest inferiorly, the latissimus dorsi posteromedially, and the external oblique muscle anterolaterally (Fig. 2). Laparoscopic instruments were palpated through this interval for confirmation. Under laparoscopic visualization, a long tonsil was used to bluntly dissect the internal oblique muscle and enter the retroperitoneum. The omentum was laparoscopically passed to the tonsils through the inferior-most aspect of Petit's triangle and into the undermined space superior to the sacral wound (Fig. 3).

The sacral wound underwent final debridement and irrigation, with tissue sent for culture. Indocyanine green fluorescence angiography was used to assess perfusion of the omentum, and the flap was trimmed back to well-vascularized tissue.

The omentum was folded upon itself to provide bulk and durable coverage over the exposed sacrum. The

Fig. 4. Three-month postoperative photographs following omental flap inset and split-thickness skin grafting. The patient demonstrates a healed wound with durable soft-tissue coverage over the sacral bony prominences.

surrounding skin was advanced medially to the edges of the omental flap. Closed suction drains were placed underneath the flap. Absorbable suture was used to inset the omental flap with minimal tension on the pedicle, and a split-thickness skin graft was placed for coverage of the exposed omentum. NPWT was applied to the skin graft and the surrounding incisions and was placed in contact with the subcutaneous drains to eliminate dead space.

Postoperatively, NPWT continued for 1 week, and excellent take of the graft was noted (Fig. 4). The patient was maintained in a fully supine or left lateral decubitus position to avoid direct compression of the pedicle and shear of the skin graft during this time.

DISCUSSION

The large apron of omental tissue has consistent and easily visualized anatomy, can be dissected in a relatively bloodless manner either laparoscopically or through a laparotomy incision, and can be transferred as a free or pedicled flap. The omentum is relatively quick to harvest, has low donor morbidity, and has the volume and malleability to fill large soft-tissue defects without sacrificing functional muscle.[2] In addition, its robust vascularity lends well to adherence of a split-thickness skin graft which can be performed at the same time of flap harvest and inset.

CONCLUSIONS

The pedicled greater omentum flap can be safely and simply transposed through the retroperitoneum to cover a wide range of posterior trunk and buttock defects. This highlights the versatility of this flap as a reliable salvage option for complicated wounds at a high risk for infection.

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