Use of a Total Leg Fillet Flap to Cover Multiple Pelvic Pressure Ulcers

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Summary: The authors present the surgical strategy in the treatment of a morbidly obese paraplegic patient with a massive sacral pressure ulcer as well as bilateral trochanteric ulcers in a 1-step leg-sacrificing procedure utilizing the “spare-part” concept. It is the intention of the authors to reinforce the use of fillet flaps as a last resort option in paraplegic patients with pressure sores. (Plast Reconstr Surg Glob Open 2019;7:e2084; doi: 10.1097/GOX.0000000000002084; Published online 7 January 2019.)

The use of total thigh musculocutaneous flaps—free or pedicled—in the treatment of extensive pressure ulcers was first published in 1956 by Georgiade et al.1 Since then, there has been numerous publications dealing with so-called fillet flaps, which are defined as axial-pattern flaps lifted from amputated, nonfunctioning, or non salvageable body parts allowing defect reconstruction. Reconstructive flap surgery utilizing the “spare-part” concept offers the advantage of little to no donor-site morbidity, as well as sufficient tissue cushioning with a reliable blood supply at the same time.2–4 Fillet flaps are reserved as a last resort option and are indicated in extensive, recurrent or bilateral defects, commonly as a result of pressure sores, trauma or tumor disease.

Pressure sores or ulcers are defined as soft-tissue injuries that arise from unrelied pressure over a bony prominence. According to the most widely accepted pressure sore staging system proposed by the National Pressure Sore Advisory Panel Consensus Development Conference, there are 4 stages, the last one of which—stage IV—involves skin, fat, muscle, and bone.5 Pressure sores, especially stage IV ulcers, pose a serious challenge in the medical world. They are very difficult and costly to treat, have a tendency to recur, and are associated with a more than 2-fold increase in mortality.6 Incidence in spinal cord injury patients varies greatly—Stal et al.7 cites an incidence of 20% in paraplegic patients.8 The surgical management of pressure sores not only helps in the prevention of progressive osteomyelitis, but also leads to improvement in quality of life.8

PATIENT PRESENTATION

Our male morbidly obese patient has been wheelchair-bound for almost 40 years after a fall resulting in a compression fracture of the upper lumbar spine (American Spinal Injury Association [ASIA] Impairment Scale Grade A). At the time of admission, the patient presented with a massive sacral pressure ulcer as well as ulcers over both greater trochanters—all grade IV. The situation was made all the more difficult due to the copious mucus discharge from his rectal stump. Magnetic resonance imaging of the pelvic region revealed osteomyelitis of the sacrum and the left greater trochanter. Accompanying diagnoses included diabetes mellitus type 2, morbid obesity, colonization with Methicillin-resistant Staphylococcus aureus (MRSA), as well as inactivity osteoporosis. The patient had a suprapubic catheter as well as a colostomy. The patient had undergone multiple reconstructive operations to cover the numerous past pressure sores that developed over the years. The last surgical procedures performed were a posterior thigh flap from the right thigh to cover a sacral ulcer, as well as a Girdlestone procedure of the left hip. Due to the multiple surgical procedures and prolonged hospital stays, as well as the current wound status, the patient expressed a significantly diminished quality of life. Furthermore, he exhibited total emotional detachment from his lower extremities as result of the spinal cord injury some 40 years ago. After thorough discussion with the patient regarding therapy options, and a psychiatric consultation of the patient, we concluded that a total leg fillet flap was a viable last resort option for wound coverage. Before the definitive flap surgery, wounds had been debrided and conditioned by the use of vacuum-assisted closure therapy. Additionally, a rectal stump amputation was carried out in co-operation with the visceral surgeons of the clinic.

Surgery

With the patient in the prone position on the operating table, meticulous disinfection was carried out using a...
povidone-iodine solution (Braunol). The first step of the surgery was the thorough debridement of the sacral and trochanteric ulcers (Fig. 1), as well as obtaining a sacral bone biopsy. The 3 pressure sores were connected into 1 large single wound, and a final evaluation of the wound size was carried out for the preparation of the flap markings. A flap length of the entire thigh and lower leg is decided, which would necessitate a flap preparation from the thigh to the ankle joint—a total of 75 cm in length. The wound was covered with laparotomy sponges soaked in a polyhexanide-containing solution (Lavanid). A posterior longitudinal thigh incision running proximally to distally was performed for flap elevation. During the preparation, attention was paid to remain between the individual muscles so as to avoid unnecessary tissue damage. The sciatic nerve was identified, ligated proximally, carefully dissected and buried into the surrounding tissue to provide sufficient cushioning. The incision was continued over the popliteal fossa all the way down to the calcaneal tuberosity. Next, the peroneal, anterior tibial and posterior tibial vessels were identified and distally ligated. Using an oscillating saw, the tibia and fibula were osteotomized distally and the foot amputated. Following the exarticulation of the knee, the tibia and fibula were removed in their entirety. Special attention was paid throughout to the integrity of the popliteal vessels. The patella was carefully removed without dissecting into the overlying soft tissue, allowing it to be part of our flap. Next followed the subperiosteal preparation of the femur which was removed in its entirety without damaging the deep femoral artery (Fig. 2). The laparotomy sponges were removed from the wound area, a thorough hemostasis was performed, and the flap was folded into the wound. All 3 compartments of the thigh were utilized to provide as much cushioning as possible. Special care was taken over the sacral bone, where the lateral posterior and the anterior compartment is placed for good padding. The medial and medial posterior compartment was used to cover the area over the old rectal stump. Because of the massive size of the defect, and the patient’s relative wide size and short stature, the entirety of the lower leg part of the fillet flap was placed over the right contralateral trochanter, again allowing as much padding as possible. This was necessary to ensure tension-free insetting. Vicryl 0 suture was used to inset the flap, and multiple drains were placed to manage the dead space under the flap. Vicryl 2.0 was used for the subcutaneous tissue and Prolene 2.0 for skin closure (Fig. 3). Upon completion of the operation, the patient spent one night in the intensive care unit in an air-fluidized bed (Clinitron). All drains were removed after 10 days. The patient was discharged with closed wounds after sufficient mobilization on a custom-prepared wheelchair with sufficient padding. On the sixth month follow-up, the patient exhibited no new pressure sores (Fig. 4).

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**Fig. 1.** Patient in prone position on operating table after thorough debridement of the sacral and bilateral trochanteric pressure sores. Blue dotted line: incision line. Red line area: de-epithelization area.

**Fig. 2.** Depiction of the raised flap after removal of the femur.
DISCUSSION

Bed- or wheelchair-bound patients tend to suffer from multiple pressure sores and often undergo several operations over the years for reconstruction of the tissue’s integrity. This makes every pressure sore recurrence over previously reconstructed and therefore scarred tissue more complex to treat. Fillet flaps from nonfunctioning body parts not only impose little or no donor-site morbidity but can also prolong pressure sore recurrence by offering robust tissue for padding. In paraplegic patients with massive or bilateral pressure sores, where all other reconstructive measures have been exhausted, fillet flaps offer a last resort option for pressure sore management.

Fig. 3. Immediate postoperative result. Multiple drains were placed to manage the dead space under the flap.

Fig. 4. Closed wounds after discharge of the patient.

REFERENCES