A Giant Neurovascular Lower Limb Fillet Flap Can Simultaneously Cover Pelvic and Abdominal Defects

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Summary: The first description of simultaneous pelvic and abdominal soft-tissue reconstruction with a giant lower limb fillet flap after hip exarticulation and open abdomen is presented. The unfortunate circumstances of a 67-year-old female patient are described leading to soft-tissue necrosis over a periprosthetic femur fracture and open abdomen after emergency implantation of an aortic bifemoral Y-prosthesis because of thrombotic obliteration of the aortic bifurcation. After removal of the hip prosthesis, the neurovascular pedicled myocutaneous fillet flap of the entire left leg was raised and folded proximally at the level of the exarticulated joint of the hip and set into the pelvic and abdominal defect. A giant pedicled neurovascular myocutaneous fillet flap raised over the entire lower extremity is a safe, effective, durable, and sensation-preserving treatment to reconstruct combined pelvic and abdominal soft-tissue defects. (Plast Reconstr Surg Glob Open 2017;5:e1626; doi: 10.1097/GOX.0000000000001626; Published online 22 December 2017.)

Tissue of amputated or nonsalvageable limbs may be used for reconstruction of complex defects. Fillet flaps can be used to treat traumatic, oncologic, or pressure-induced wounds. The classical fillet flap is defined as an axial-pattern flap harvested from amputated, discarded or otherwise nonfunctioning or nonsalvageable areas of the body that can be used as a pedicled, island, or microvascular free flap, allowing regional or heterotopic defect reconstruction. Its advantage is little or no donor-site morbidity, as it serves as “spare part” of otherwise discarded body parts. We present the case of a giant neurovascular pedicled myocutaneous lower limb fillet flap for pelvic and abdominal soft-tissue reconstruction after hip exarticulation and open abdomen. Informed consent was given by the patient.

PATIENT

A 67-year-old, multimorbid female patient was referred from a secondary hospital with acute thrombotic obliteration of the aortic bifurcation due to heparin-induced thrombocytopenia type 2 9 days after revision surgery of a periprosthetic luxation fracture of the left hip and 16 days after unilateral implantation of a hip prosthesis. An aortic bifemoral Y-prosthesis and a femorofemoral crossover bypass from left to right were implanted and replaced the following day because of recurrent thrombosis. Bilateral fasciotomies of the lower extremities were necessary, and amputation of the right lower leg was inevitable. Abdominal compartment syndrome developed, necrotic intestine had to be removed, and a Hartmann’s procedure followed. The open abdomen was treated with negative-pressure wound therapy. Further soft-tissue necrosis developed over the periprosthetic fracture, eventually leaving the left femur and the femoral stem of the hip prosthesis uncovered (Fig. 1). Distal to the aortic femoral bypass, the left leg was fully perfused with preserved sensibility.

PROCEDURE

With the patient in supine position, all wounds were thoroughly debrided, the components of the total hip prosthesis removed, and the exposed bony pelvis debrided until reaching healthy bleeding bone. Deep bone samples were sent for bacteriological and histological analysis. The iliopsoas tendon was attached to the ramus superior of the pubic bone. The fillet flap was raised with the ventral incision beginning at the distal end of the wound over the lateral left femur, curving laterally of the patella down to approximately 2 cm above the fibular head at which point the incision is brought anterior toward the anterior border of the peroneus longus muscle to preserve the peroneal artery and common peroneal nerve. The incision was then continued caudally to the ankle so gaining sufficient

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soft tissue for coverage of the pelvic and abdominal de-
fect where a circumferential incision was made. Following
the distal ligation of the posterior tibial, peroneal, ante-
rior tibial artery and veins, the distal leg and foot were
amputated. The peroneal nerve branches (superficial and
deep) and posterior tibial nerves were divided sharply dis-
tally and buried in the adjacent musculature to prevent
neuroma formation.

Superiorly, after dissection of the remaining quad-
riceps muscle, the femur and its remaining perios-tem
were lifted, meticulously protecting the posterior po-
liteal vessels and the saphenous and sciatic nerve. The tibia
was removed after dissecting the posterior tibial artery and
nerve bluntly and separating the tibia from its periosteum.
The fibular periosteum was incised medially and the fibula
stripped, carefully sparing the anterior tibial and peroneal
vessels (Fig. 2). The flap was folded proximally at the level
of the exarticulated joint of the hip with the hamstring
musculature filling the dead space and held by Vicryl 0
sutures. After removal of the remnants of the quadriceps
muscle, the fillet flap was set into the defect by suturing
the deep fascia to the recipient fascial layer after place-
ment of drains. The dermal and superficial layers were
approximated using 2-0 Vicryl and 2-0 Prolene sutures and
skin staplers (Fig. 3).

Minor wound dehiscence occurred laterally after 4
weeks and was treated with negative wound pressure and
secondary closure. The remaining fascioto-
ymy of the left lower leg and amputation of the right lower leg are
still in place.

Fig. 1. Preoperative evaluation. Extensive soft-tissue defects of the
left groin and femur, right groin, right upper leg, and open abdo-
men 4 weeks after implantation of the second aortic bifemoral Y-
prosthesis. After disinfection with povidone-iodine, a sterile ostomy
bag is already put into place. The stem of the hip prosthesis is seen
anteriorly to the luxated femoral fracture. The sutures after fascioto-
ymy of the left lower leg and amputation of the right lower leg are
still in place.

Fig. 2. Intraoperative coaptation of the fillet flap. Creation of the
neurovascular pedicled myocutaneous fillet flap after removal of the
hip prosthesis, fractured femur, knee joint, tibia and fibula, and am-
putation of the foot. Note the remaining patella just below the lower
hook. The clamp holds the sutures to attach the iliopsoas tendon to
the ramus superior of the pubic bone.

Fig. 3. Fillet flap put into position. Pelvic and abdominal soft-tissue
coverage after drain placement and proximal folding of the flap. The
remaining soft-tissue defects over the left groin and femur were
treated with negative pressure and closed secondarily.

Fig. 4. Postoperative evaluation. Four months after the first opera-
tion and 3 weeks after secondary closure of a minor lateral wound
dehiscence, the flap is entirely integrated and fully sensate.
and systemic symptom syndrome, complete and stable wound healing was achieved 4 months after the initial operation (Fig. 4). The patient was consequently mobilized into a chair for several hours a day without development of pressure ulcerations over the flap.

**DISCUSSION**

Excision of the femur and lower extremity bones with preservation of the soft tissue (ie, fillet) for pressure ulcer reconstruction was initially described in 1956 and named “total thigh flap.” More case series followed mainly for pressure ulcer coverage in paraplegic and nonparaplegic patients. The classical fillet flap emerged from the “spare part” concept, using tissues from amputated or otherwise discarded body parts to replace important functional structures. However, the fillet flap was never described to simultaneously cover both a pelvic and abdominal soft-tissue defect. We presented the flap elevation technique and coverage of these defects after hip exarticulation and burst abdomen. The advantages of using a neurovascular pedicled myocutaneous fillet flap are (1) the robust vascular supply; (2) also for larger or giant flaps; (3) the possibility of using musculature to fill dead space; and (4) the possibility of having a fully sensate flap. We are convinced that these advantages outweigh the obvious functional, social, and psychological difficulties that accompany the flap described.

In contrast to a free neurovascular fillet flap, the success is dependent neither on the patency of the microvascular anastomosis nor on the process of reinnervation after microsurgical nerve coaptation requiring additional sensory re-education. A theoretical disadvantage includes the possibility of destabilizing the pelvis when sitting, which may lead to a high pressure located over the contralateral Tuber ischiadicum.

In this case, the fillet flap was spared from a damaged limb with considerable soft-tissue damage over an open, periprosthetic fracture of the femur. In view of the morbidity of the patient, we chose a 1-step leg-sacrificing procedure over a multistep, perhaps leg-retaining alternative with hip prosthesis removal and necessary free-flap soft-tissue coverage to cure osteomyelitis of the femur. After an interval of usually 3 months, fracture fixation of the femur and reimplantation of a new hip prosthesis would have been necessary. The open abdomen on the other hand would have continued to need temporary closure followed by fascial defect closure as quickly as clinically feasible without increasing intraabdominal pressure, and definitive closure through one of the multiple techniques described.

In summary, a giant pedicled neurovascular myocutaneous fillet flap from the lower extremity is a safe, effective, durable, and sensation-preserving treatment to reconstruct combined pelvic and abdominal soft-tissue defects.

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