Abdominal aorta as a recipient artery: Using a free latissimus dorsi myocutaneous flap to close hip and pelvic defects

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**Abstract**

**INTRODUCTION:** Free tissue transfer (FTT) is now a common procedure in many surgical centres around the world and it has shown well established results especially in the field of reconstructive surgery. The choice of FTT depends on the size of defect, nature of tissue, length of pedicle and donor site morbidity. Notwithstanding, FTT is complex and always depending on a sufficient recipient vessel.

**PRESENTATION OF CASE:** Herein, we report a case in which the abdominal aorta was used as arterial recipient vessel for microvascular transfer of a free latissimus dorsi myocutaneous flap. It was utilized to reconstruct an extensive pelvic and hip defect following a massive gas gangrene with a prior debridement of other potential recipient vessels.

**DISCUSSION:** In this case, the patient had a large defect that demanded a choice of a large flap such as the free latissimus dorsi myocutaneous flap. The iliac system has been sacrificed during the debridement procedure together with other potential recipient vessels. In the presented case, arterial anastomosis of the free latissimus dorsi myocutaneous flap was performed to the distal part of the aorta without complications.

**CONCLUSION:** Using the abdominal aorta as a recipient arterial vessel seems to be a reliable alternative that should be considered in difficult reconstructive scenarios such as the “vessel-depleted” pelvis.

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1. Case report

A 62-year-old male patient was admitted to the emergency room (ER) of the RWTH Aachen University Hospital. He was transferred from another hospital because of reported gas gangrene over the left pelvic region and the upper thigh. A history approach referred that the patient had bypass surgery prior to the infection. A wound swab was performed prior to admission to our department, demonstrating clostridium perfringens colonization. Furthermore, the patient had a history of diabetes type 2 associated with diabetic polyneuropathy and peripheral vascular disease. Examination in the ER showed that the patient (weight: 50kg, height: 170 cm BMI: 17.3) was conscious and oriented, but in pain. Blood pressure was stable (120/75 mmHg) with sinus tachycardia (heart rate 124/min). The body temperature was in normal range. The patient experienced an extreme pain of the affected area with and without movement. The pain was located on the site of the previous operation (aorto-femoral bypass) and was radiating laterally and downward to the upper side of the thigh. The skin in the affected area showed gray-black necrotic patches. Neurovascular examination showed no abnormality except of sensation loss in the affected area. Blood tests showed elevated C-reactive protein (214 mg/l); normal range <5 mg/l and the patient exhibited a massive leucocytosis (31.7 g/l); normal range 4.3–10.0 g/l. Furthermore a hypoalbuminemia and severe loss of protein was detected (35 g/l); normal range 66–83 g/l. After admission, the patient was taken to the operating room (OR) for initial debridement of the necrotic tissue. Afterwards, the patient was admitted to the intensive care unit (ICU) and hyperbaric oxygen therapy was started daily. Again, a full debridement was performed to all necrotic and infected tissues which resulted in negative swabs for clostridium perfringens and a defect of the pelvic and hip region measuring 20 cm x 30 cm (Fig. 1). Due to the large defect; the patient was suffering from superficial necrosis of the acetabulum (colonized by enterococci and E. coli). Thus, a further debridement was conducted.

A free latissimus dorsi myocutaneous flap was raised for defect closure (Fig. 2). It was utilized to reconstruct the extensive pelvic and hip defect. During the debridement procedure, the common iliac artery was ligated just 2 cm below the bifurcation. It was then...
noticed, during the flap surgery, that the dead end of the com-
mon iliac artery was completely filled by a thrombus. So the flap
was connected more proximal to the distal part of the aorta (1 cm
above bifurcation) and to the internal iliac vein without the need of
vein graft (Fig. 3). An end-to-side anastomosis was performed and
a Satinsky clamp was used for this anastomosis in the aortic side.
The vessel wall was splayed in order to increase the diameter of the
anastomosis side. An interrupted suture technique has been used
for this anastomosis by 7-0 sized Sutures and the angel of the end-
to-side anastomosis was 110. The muscular part of the flap was
covered by a split thickness skin graft. The post-operative status
was stable. The patency of the anastomosis was judged clinically
as well as by Doppler ultrasound (Fig. 4). A minor superficial skin
defect (2 × 3) was covered with a split thickness skin graft after 31
days. The patient was discharged and transferred to a rehabilita-
tion center where further mobilisation was performed.

2. Discussion

Beside the selection of flap type, analysis of the recipient site is
an essential component of successful free tissue transfer. Free flaps
depend upon the reconstitution of their blood supply via vessel
anastomosis.2,3 They are technically challenging and require spe-
sial surgical expertise. For massive hip and pelvic defects, there are
many options for reconstruction which start from the option of split
thickness skin grafting procedure after effective vacuum dressing
(see pressure wound therapy). Furthermore, the upper trans-
verse rectus abdominis flap (the flag flap) can be used but this flap
leaves a donor site defect, although it can be closed in a second
step by a reverse type abdominoplasty.4 Another option has been
reported by Arco et al.: a double pedicled perforator flap based
on 2 independent perforators; a lumbar artery perforator, and a
lateral intercostal artery perforator.5 However, this kind of recon-
struction is more appropriate for defects located in the flank and
trunk region. Contralateral vessels can be also used for microvas-
cular anastomosis by using a vein graft for temporary A-V fistula
in the first stage and then to divide the C loop to obtain a recipient
artery and a recipient vein in the second stage for a successful free
flap transfer.

In this case, the patient had a large defect that demanded a
choice of a large flap such as the free latissimus dorsi myocu-
taneous flap. The surgical history revealed aorto-femoral bypass
surgery and diabetes complicated by peripheral vascular disease.
The iliac system has been sacrificed during the debridement pro-
cedure. Thus, the pedicle of the free flap could not be connected
to the iliac system or the femoral artery. Furthermore, the defect
was so extensive and demanded a prior debridement of other
potential recipient vessels, i.e. the superficial inferior epigastric
artery and deep inferior epigastric artery. None of these men-
tioned vessels could be used for anastomosis. Thus, the choice
of the recipient vessel was challenging. In the presented case,
arterial anastomosis of the free latissimus dorsi myocutaneous
flap to the distal part of the aorta was conducted without com-
plications providing a possible alternative for hip and pelvic
defects.

Fig. 1. Defect of pelvic and hip region (the right is the head end and the left is the
foot end).

Fig. 2. Raised free latissimus dorsi myocutaneous flap.

Fig. 3. The free latissimus myocutaneous flap was connected to the distal part of
the aorta (1 cm above bifurcation) and to the internal iliac vein without the need of
vein graft.

Fig. 4. Postoperative outcome (the right is the head end and the left is the foot end).
3. Conclusion

A free latissimus dorsi myocutaneous flap has a broad muscle and long pedicle, allowing a good and flexible reconstruction of extensive large pelvic and hip defects. It should be noted that the use of abdominal aorta as a recipient vessel is limited and not easy to conduct. Furthermore, this option would not be considered if the femoral or the external iliac artery exists. However, using the abdominal aorta as a recipient arterial vessel seems to be a reliable alternative that should be considered in difficult reconstructive scenarios such as the “vessel-depleted” pelvis.

Conflict of interest statement
None.

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None.

Ethical approval
Written informed consent was obtained from the patient’s guardian for publication of this case report and accompanying images.

Author contributions
Gerrit Grieb and Ziyad Alharbi wrote the manuscript draft. Andrzej Piatkowski and Paul Fuchs operated the patient. Savas Tsolakidis and Jan-Phillip Stromps treated the patient on the ICU.

Norbert Pallua wrote the final form of the manuscript. All authors corrected and approved the manuscript.

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