Baltic Journal of CLINICAL MEDICINE and RESEARCH • 2024/01 • 009-015
https://doi.org/10.25143/rsu-bjcmr.2024.01.009-015
BJCMR

Reconstruction of Multiple Location Bedsores

Klinta Luīze Sprūdža [1], Dr. Mārtiņš Malzubris [2]

Affiliation: [1] Faculty of Medicine, Rīga Stradiņš University, Riga, Latvia,
[2] Department of Traumatology, Hospital of Traumatology and Orthopaedics, Riga, Latvia

E-mail: 040214@rsu.edu.lv

Summary

Fillet flaps and autografts are reserved as a last resort option of reconstructive surgery and are indicated in extensive, recurrent, or bilateral defects especially caused by spinal trauma, commonly as a result of pressure sores trauma or tumour disease. No early and late-term complications were seen post-operatively that led to improvement in quality of life of the patient. The patient is able to perform a lot of daily routines – replacement of a long urinary catheter, getting dressed, is aware of the health condition, and behaves responsibly.

An auto-flap creation with the right leg exarticulation was a reconstructive manipulation to maximise physiology and integrity of the spinal trauma patient. In the evaluated clinical case, fillet flaps and autografts were reserved as a last resort option for reconstructive surgery and were indicated because of extensive, recurrent, bilateral pressure sores caused by immobility.

Keywords: reconstruction, bedsores.

Aim of the demonstration

The aim of the demonstration is to assess a reconstructive flap surgery that was performed for a spinal patient.

Introduction

To perform a successful surgery, one of essential aspects is to ensure an individual approach, mainly to familiarise oneself with the anamnesis and the present condition of the patient. According to the World Health Organisation (WHO), approximately 25% of the patients suffer from complications of ill-considered actions that are not aimed at weighing the risks. (1) Especially for spinal patients, an important aspect is the reconstruction of the damaged area (bedsore) with tissues from an incompletely innervated area. It should be kept in mind that there is a higher risk of postoperative complications such as osteomyelitis, sepsis, and fluid loss (including proteins) and an inferior improvement in quality of life compared to an innervated tissue flap transplant. (2)

Case report

In the anamnesis of the patient, in 2018, after jumping into water on his head, he received an injury of the cervical spine with a C6-C7 fracture and an inclusive transverse spinal cord injury, lower paraparesis and dysfunction of the pelvic organs. A history of Covid-19 infection. European Pressure Ulcer Advisory Panel (EPUAP) stage IV bedsores of multiple locations had developed – in the sacrum area, the greater trochanter area, the ischial tuberosity area (Fig. 1, 2, 3), as well as septic arthritis of both hip joints and adherent osteomyelitis.

Figure 1. Photo from personal archive of Dr Mārtiņš Malzubris

Figure 2. Photo from personal archive of Dr Mārtiņš Malzubris

Figure 3. Photo from personal archive of Dr Mārtiņš Malzubris

With the patient in the supine position in endotracheal anaesthesia on the operating table, meticulous disinfection was carried out using a povidone-iodine solution and sterile application. The first step of the surgery was thorough debridement of both trochanteric ulcers – the right on 01/02/2021 and the left on 04/02/2021, that were excised within healthy tissue. As regards

the rotator cuff, the hip joint was also affected (Fig. 4, 5). Obtaining multiple bindings – colonisation with poli-resistant *Acinetobacter baumannii.*

The team of surgeons performed total leg fillet flap preparation to cover multiple pelvic pressure ulcers on 11/02/2021. That included resection of the right hip joint, exarticulation of the right leg, creation of a fillet lever, necrectomy of bedsores of the sacrum and both buttocks (Fig. 6), closure of 5 bedsore defects with a fillet lever. The soft tissue was separated from the bone architecture, as well as the patella resection and tibia exarticulation in the knee, hip joint arthrotomy and femur exarticulation from acetabulum were carried out (Fig. 7). After repeated debridement of ulcers, the flap was folded from the front surface of the right side across the right trochanter area, the sacrum area towards the left pelvis. The shape of the flap was created by adjusting it to the bedsore areas. At the end, flap fixing, drain insertion (Fig. 8, 9), application of aseptic bandage were carried out.

Figure 4. Photo from personal archive of Dr Mārtiņš Malzubris

Figure 5. Photo from personal archive of Dr Mārtiņš Malzubris

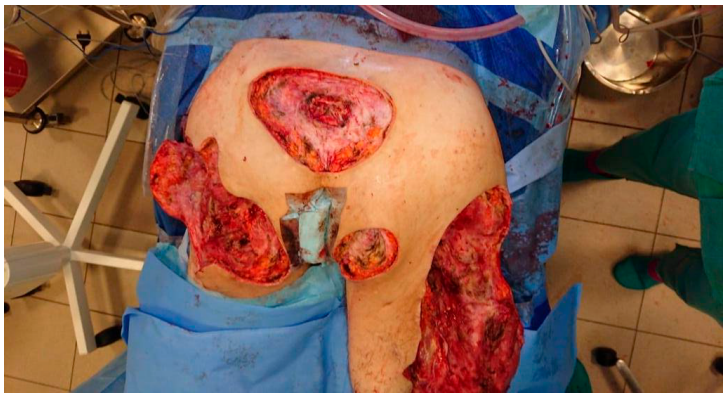

Figure 6. Photo from personal archive of Dr Mārtiņš Malzubris

Figure 7. Photo from personal archive of Dr Mārtiņš Malzubris

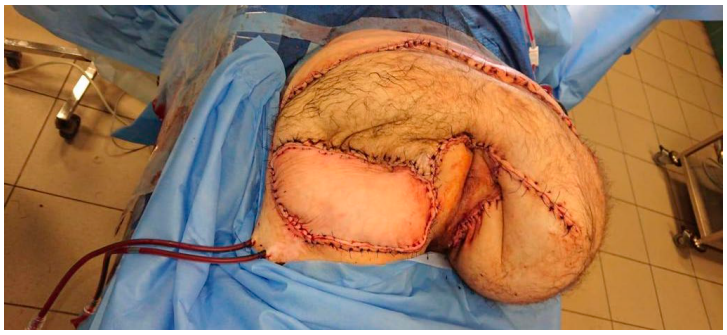

Figure 8. Photo from personal archive of Dr Mārtiņš Malzubris

Figure 9. Photo from personal archive of Dr Mārtiņš Malzubris

On 22/02/2021, revision of wounds in the pelvic region, necrectomy, drainage, and resuturation were performed. When removing sutures from individual perianal areas, dehiscence due to faecal contamination was found. Due to difficult wound healing, on 04/03/2021, under intubation anaesthesia, a sigmostomy was created by making cuts in the left hypogastrium above the *colon sigmoideum* and redistributing it. The distal end of the intestine was double sutured with tobacco pouch sutures and fixed to the back wall of the abdominal cavity. The proximal end of the intestine was brought out into the anterior abdominal wall, fixed with skin sutures. Wound closure, aseptic dressing, and stoma bag fixation were performed. Revision of buttock wounds, necrectomy, drainage, and resuturation under endotracheal anaesthesia performed on 11/03/2021.

Post-operative wounds in the buttock healed primarily, in some places in the perianal region healed secondarily, without discharge. Characteristic seromas under the fillet flap. The patient received intrahospitaly symptomatic pain-relieving and antibacterial therapy, which was discontinued on 13/04/2021 and no recurrence of the infection was observed. Blood components were transfused 32 times. After the last operation, the wounds healed completely.

After a double puncture of seromas in postoperative areas, seromas did not recur. One of the main complications commonly is osteomyelitis, but through successful postoperative management latest results reveal a successful scarring process (Fig. 10, 11, 12, 13).

Figure 10. Photos from the author's personal archive.

Figure 11. Photos from the author's personal archive.

Figure 12. Photos from the author's personal archive.

Figure 13. Photos from the author's personal archive.

Discussion

In the world there are different approaches to how to manage wound closure. In the scientific conference in Riga the author met a Professor from Israel who introduced his experience with wound closures. The highlight is a universal suturing technique that is based on the tension different from the other ways placed on the skin. The possibility is to close sternal wounds, open abdomen, putting all the tension on the skin. Through this technique more elasticity is gained and, in this way, it provides better blood supply to the wound. (3) On the other hand, reconstructive flap surgery utilises the "spare-part" concept, that offers the advantage of little to no donor-site morbidity and a sufficient tissue cushioning with a reliable blood supply at the same time. (4) Ultra-high stress by tension sutures enables the skin to heal without inflicting ischemia, necrosis, and wound failure. Further the skin is stretched by the visco-elastic properties to the extreme. The tension/stress-relaxation occurs from both sides of the skin and the wound is closed completely. It is kept for about four to five weeks depending on the wound. One of the benefits is that no marks are visible, because the alignment of the plates is not cutting the skin. There can be superficial damage to the skin by the pressure of the plate.

Another example is that the stress-relaxation mechanism is applied together with tension sutures for rapid stretching to the skin (stress-relaxation for twenty minutes) with partial closure of the wound. The wound can be closed in stages primarily by stress-relax, closed partly, and then completely or closed completely by check-phases. No signs are observed of the tension sutures, as the skin is protected by the plate, because the defect could be closed primarily. The staples can be taken off early. It is important to remember that if applied vertically it can cause development of compartments, on the other hand, it will be hard to be closed horizontally. The preferred way is obliquely. Also, one should remember that the wound must be covered by oxygen and antibiotics introduced, if applicable. This is one of the possibilities to gain the mobility of the tissue and successful postoperative period, as well as a body part sparing approach.

For reconstruction of large defects can be applied mathematically standardised unilateral bilobed or multilobed perforator flaps. (5) Factors, like donor site morbidity, initial defect size, operating time, intraoperative blood loss, salvage options in case of recurrence, should be considered while choosing a flap to reconstruct a defect. (6)

Conclusions

No long-term complications were seen post-operatively that led to improvement in quality of life of the patient. The patient is able to perform a lot of daily routines – replacement of a long urinary catheter, getting dressed, is aware of the health condition, and behaves responsibly.

References

1. World Health Organisation. Safe Surgery [Internet]. Geneva: World Health Organisation; 2019 [cited 2023 Nov 10]. Available from: https://www.who.int/teams/integrated-health-services/patient-safety/research/safe-surgery
2. Zwanenburg PR, Verdijk RWA, Lapid O, Obdeijn MC, Gans SL, Boermeester MA. A Systematic review and meta-analysis of sensate versus non-sensate flaps for the prevention of pressure ulcer recurrence among individuals with spinal cord disease. Spinal Cord. 2021 Mar;59(5):463–73.
3. Topaz M, Carmel NN, Topaz G, Li M, Li YZ. Stress–Relaxation and Tension Relief System for Immediate Primary Closure of Large and Huge Soft Tissue Defects. Medicine. 2014 Dec;93(28):e234.
4. Georgiou I, Kruppa P, Ghods M. Use of a Total Leg Fillet Flap to Cover Multiple Pelvic Pressure Ulcers. Plast Reconstr Surg Glob Open. 2019 Jan;7(1):e2084.
5. Özkan B, Albayati A, Tatar BE, Uysal CA. The use of mathematically standardized bilobed design perforator flaps for coverage of sacral pressure ulcers. Microsurgery. 2022 Oct;43(3):229–37.
6. Vathulya M, Praveen AJ, Barik S, Jagtap MP, Kandwal P. A Systematic Review Comparing Outcomes of Local Flap Options for Reconstruction of Pressure Sores. Ann Plast Surg. 2022