

Bilateral Thigh Flaps: A Case Report and Review of Literature.

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Background: Pressure ulcer management is difficult for the patient, relatives, doctor, and nursing staff and requires enormous resources. Management of multiple pressure ulcers in the spinal cord injured patient is a near-impossible task, especially in resource-deprived environments. The paraplegic, with multiple pressure ulcers, will frequently be managed under palliative care in these settings. A case report of a young motivated paraplegic with multiple infected pressure ulcers managed using total thigh flaps, in a rural hospital in Kenya is made. The surgical procedure is detailed, and a review of literature made.

Case Report: A 16-years old school boy presented to AIC Kijabe Hospital in extremis because of severe sepsis from multiple infected pressure ulcers. He had sustained a spinal cord injury 4 years previously, after a fall from a tree. After initial resuscitation, including nutritional support, blood transfusion, urinary drainage and stool diversion; bilateral hip disarticulation, pressure ulcer excision and defect closure using bilateral total thigh flaps was performed. All the pressure ulcers were successfully covered.

Rehabilitation enabled him to find a new level of independence and self care. He returned to school.

Conclusion: Bilateral hip disarticulation with bilateral thigh flap utilization for the coverage of multiple pressure ulcers is a useful, life-saving tool. This procedure enhanced the patients' independence and self-esteem. It is however, a tool to be used only as a last option.

Case Report

P.P. presented to AIC Kijabe Hospital, at the age of 16 years, with a 2-years history of progressively worsening pressure ulcers. He had sustained a spinal cord injury (SCI) at the age of 12 years, after a fall from a tree. On initial examination, the patient was pale, tachycardic, tachypneic and mildly jaundiced. He had a sensory level loss up to T6. He was grossly wasted, and had deep infected sacral, bilateral ischial, trochanteric and knee pressure ulcers (Fig. 1). The left hip was open and dislocated, with a copious purulent discharge. He had bilateral spastic hip and knee flexion contractures. He was incontinent of both urine and stool. He had poor family support, but was himself highly motivated, wanting to live, and willing to undertake a difficult post-operative rehabilitation program. He wanted to be able to go back to school, and move on into Law School. He actively participated in directing his own care, and prioritizing his needs. Initially, antibiotic therapy, a diverting colostomy and

a clean intermittent bladder catheterization program were initiated, along with a high protein, high calorie feeding program, to address his poor nutritional status. He was prepared psychologically for his post-operative self-care and needs, and three weeks after the initiation of these measures, bilateral hip disarticulation with utilization of total thigh flaps (TTFs) for the coverage of all the pressure ulcers was performed.

Operative Procedure

The patient under general anesthesia is placed on one side. The flaps are marked out, along with the defects to be covered. The thigh incision is placed over the lateral intermuscular septum, down to the linear aspera. (The classical incision goes below the knee, but since both knees were breached by ulcers, a circumferential incision was made at the knee, just above the ulcers¹).



Figure 1. Multiple pressure ulcers. All were communicating deep in the pelvis.

This incision is continued into the popliteal fossa, where the popliteal vessels are identified and ligated. The tibial and common peroneal nerves are also divided. The incisions are taken down to bone. The periosteum over the femur is raised. Using a periosteal elevator, the flap is raised off the entire length of the femur. No bleeders are encountered in this plane, except for a generalized ooze. The capsule is divided at its attachment to the pelvis and division of the ligamentum teres completes the disarticulation. The pressure ulcers are then saucerized, with a radical excision of all the infected tissue, underlying bursa and prominent bone as well as a thin rim of normal tissue. (In our patient, all the pressure sores communicated and extended into the pelvis). After hemostasis is achieved, the total thigh flap (TTF) is turned on itself, and the deep muscles sutured into place, within the depths of the excised pressure ulcers craters. Layered closure with a closed suction drain completes the procedure.

Sub-periosteal dissection along the whole length of the femur minimized blood loss, to about 100 ml. However, the radical excision of the pressure ulcer along infected bone led to a loss of about 1200 ml of blood. The suture

line must be kept away from pressure for at least 3 weeks, a very taxing requirement for these patients, hence the importance for good preoperative patient preparation. Four weeks later, the contralateral femur was disarticulated and the reconstruction carried out as described above (Fig. 2). He was discharged back to school (Fig. 3).



Figure 2. After bilateral total thigh flap, with healed wounds, the patient is ready for discharge



Figure 3. Stable on a wheelchair, he has found a new level of independence and health.

Discussion

Spinal Cord Injuries result from a variety of causes, the commonest of which is trauma. The incidence as well as the prevalence of SCI has been on the rise, estimated at between 15 to 40 cases per million worldwide. Improved care and life expectancy, along with an increased number of traffic accidents have led to an increase in the number of SCI patients and concomitantly, pressure ulcers²⁻⁵.

Enormous resources are invested annually, in the management of pressure ulcers. The annual cost of treatment per pressure ulcer in the West was estimated at between £1,000 and £20,000 in 2004⁶. Highly specialized rehabilitation centers for SCI aim to optimize self-independence, reintegration into the workplace and pre-trauma social structures⁷. Hammell in a QOL study amongst patients with SCI concluded that life, even with a high SCI can be rich and fulfilling if society is prepared to enable and support this⁸. Unfortunately for patients managed in resource-poor environments, the strains placed on the family and health systems by these injuries cannot be borne for long.

Constant, unrelieved pressure, as well as ignorance and poor nursing support at the primary health facilities and at home, leads to the development of multiple pressure ulcers, alongside other common complications suffered by SCI patients. SCI is the commonest predisposing factor in the development of pressure ulcers, in young patients^{9, 10}. Onche et al, in a prospective study on SCI admissions found a high percentage of and high grade of pressure ulcers in their patients. They attributed these poor outcomes to the limited number of trained manpower and inadequate pressure relieving devices¹⁰.

The frequency of pressure ulcer recurrence and the need for multiple procedures, discourage the patient, family and health care providers. In resource-poor environments, this easily leads on to a practice of 'benign neglect' of these patients. Thus economic realities, the scarcity of available management resources including skilled manpower and technological support quickly transform SCI patients into palliative care patients.

An overwhelming burden of other surgical pathologies drains resources away from patients with pressure ulcers.

The status of SCI in most parts of Africa is not well established. What is established however, is the fate of most SCI patients. Manley, in South Africa, reported a 4.5% incidence of pressure sores in 1978, with an additional 5.2% of patients showing signs of discoloration from excessive or prolonged pressure¹¹. Munish of Tanzania painted a dismal picture prevalent in many parts of Africa. He reported that many patients died within 2 months of an SCI. Those who eventually survive, live on to face tremendous difficulties because of their disability lack of resources, needed information and rehabilitation services¹².

Surgical closure of pressure ulcers, permits early patient rehabilitation, shortens hospitalization and leads to a reduction in

ulcer recurrence¹³. Sørensen et al. recommended strict indications for surgical therapy of pressure ulcers, clear treatment protocols, realistic treatment goals and a clear improvement in the patient's quality of life. They observed that in debilitated patients, debridement without subsequent reconstruction may be the optimal treatment⁶.

The surgical management of single pressure ulcers in SCI patients is a difficult task. Though, a variety of options of musculocutaneous flaps exist for wound coverage, surgical therapy of multiple pressure ulcers especially in SCI patients, is fraught with frustrations and disappointments, especially in environments that have limited resources such as ours. A clear understanding of patient and relative expectations from the outset is crucial to the final outcome. Hip disarticulation and the use of TTFs for the coverage of all the pressure ulcers was used as a life-saving procedure in our patient.

Gorgiades et al¹. described the use the TTFs for trochanteric pressure ulcers, in 1956. They used the procedure in 6 patients, five of who had a unilateral TTF, with bilateral TTF reconstruction in the sixth. Authors using this procedure, advocate its use only after exhaustion of all other forms of reconstruction^{1,6,14}. Conway et al¹⁵. used TTFs bilateral high thigh amputations. They struggled with frustrating chronic recurrent pressure ulcers despite multiple attempts at closure. They, along with others helped establish the principles and techniques of surgical management of pressure ulcers, that rest primarily on nutritional support and excision of all involved tissue, including underlying bony prominences, heterotopic bone with local flap coverage¹⁵⁻¹⁷.

While Reis et al¹⁷ in a relatively recent series of 301 patients, used the TTF in only one patient, others have found it extremely useful in the management of the difficult multiple pressure ulcer patient^{18, 19, 20}.

Chase and White²¹, in 1956, espoused on the advantages and disadvantages of bilateral high thigh amputations, with use of TTFs to provide coverage for large trochanteric pressure sores. Their conclusions are as true for TTF for coverage of defects after a hip disarticulation, as they are after high thigh amputation. They identified the most important desires of most paraplegics as independence, social acceptance, freedom from discomfort and a feeling of adequacy. They noted that properly motivated paraplegics welcomed procedures which contributed improvement in any of these spheres²¹. Amongst other advantages, they highlighted improved maneuverability, weight reduction and elimination of local pathology. The TTF is a well-vascularized bulky myocutaneous flap, based on the femoral vessels²². The TTF provides valuable viable tissue, improves the cosmetic and psychological status of the paraplegic patient with multiple pressure ulcers. Poor cosmesis, loss of body image and loss of legs as a stabilizing tether were the most notable disadvantages of this procedure²¹. Unfortunately, the TTF, like most other regional flaps in SCI patients are insensate, and thus are prone to pressure ulcer recurrence.

Modification of the concept of TTFs has been successfully applied to cover extensive abdominal defects, as well as defects after hemicorporectomy and hemipelvectomy²³⁻²⁵. The TTF modifications have also been used as free flaps for multiple pressure ulcer coverage^{26,27}. Alternatives to the traditional TTF have been used, in an attempt at achieving wound coverage while preserving the limbs, and thus maintain the body image.^{17, 28-31}. Free flaps are becoming increasingly popular in the coverage of surgical defects and including pressure ulcers, offering fresh options³².

Conclusion

Total dependence on others for activities of daily living may doom SCI patients to a life

of depression. Helplessness and hopelessness may drive the paraplegic to suicide. This state of mind may also initiate a vicious cycle of immobility leading to the development of pressure ulcers, infection and ultimately death¹⁵. It is thus important to understand that treatment involves the total patient, and not just his decubiti¹⁶. The TTF is an invaluable tool for the plastic surgeon practicing in the third world. It must be emphasized however, that it is to be used only as a last resort.

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