Pressure Sore Surgery in Najaf, Personal Experience

Kadhum Jawad Shabaa MB ChB, FICMS (plastic surgeon)
Head of plastic surgery and burn department in Alsader Teaching Hospital-Najaf

ABSTRACT
Pressure sore is a common problem in medical and surgical wards, and entails considerable workload for medical and nursing staff. A prospective study of 20 patients was done to evaluate the different treatment modalities of pressure sore in Najaf. There were 25 sores in those patients, there sores were 12 (48%) sacral sores, 6 (24%) ischial sores, 5 (20%) trochanteric, 2 (8%) heel sores and one sore was seen on the anterior ankle region. The main treatment modality in those patients was rotation fasciocutaneous flap 10 (40%), wound excision and healing by secondary intention 6 (24%) mainly for small ulcers, using of Tensor Fascia Lata FTL myocutaneous flap 3 (12%), skin graft 3 (12%), Biceps Femoris muscle flap in one sore in a patient with poliomyelitis, Gluteus Maximus flap in other patient.

One flap showed partial necrosis. Partial wound dehiscence was noticed in 2 (2%) cases, which was managed by secondary suturing in one case and by split skin graft in other case. The recurrence rate was 1 (4%) seen in a patient with stage III sacral sore. We conclude that simple rotation flap is useful and effective way of managing sacral sores while Tensor Fascia Lata flap is very beneficial in trochanteric sores that reach stage III and IV.

INTRODUCTION
J. Thompson Rowling described pressure sores in unearthed Egyptian mummies in 1961, and scientific writings have addressed them since the early 1800s. Pressure sores continue to be an ever-present problem within our society. The prevalence of pressure sores in hospitalized patients has been reported to be from 14-21% over the last decade. The cost to heal a single full-thickness pressure sore may be as high as 70,000 dollars.
Anatomically, the buttock region is by far the most common area for pressure sores to develop. These account for over 70% of all occurrences, with sacral (46%) and ischial (26%) locations being most common. The lower extremities account for an additional 15% of all pressure sores, with malleolar, patellar, pretibial, and especially heel locations being most common. The remaining approximately 15% of pressure sores may occur in any location that experiences long periods of uninterrupted pressure.2

It often occurs in patients who are debilitated, paralyzed or with dependent anesthetic parts. Prolonged pressure on dependent surfaces obstructs microcirculation to skin, subcutaneous tissues or fascia, and necrosis results. Local mechanical and chemical trauma such as faecal or urinary soiling, shearing of wrinkled bed sheets, skin scratches and blisters will contribute to the process of tissue breakdown. While bacteriological infection is not a necessary condition, the presence of osteomyelitis, a discharging sinus or an infected bursa will often complicate the local scene.3

Barczak et al. staged pressure ulcers as: Stage 1: Erythema of intact skin > 1 hour after pressure relief. Stage 2: Blister/ulcer into dermis with or without infection. Stage 3: Subcutaneous destruction into muscle with or without infection. Stage 4: Involvement of bone or joint with or without infection.4

The standard hospital mattress is less effective at preventing sores than some low pressure foam mattresses. There is some evidence which suggests that large-celled alternating pressure mattresses and certain low-air loss and air-fluidised beds are more effective than foam and silicone-based surfaces in preventing and healing sores.5

Several other treatments have been tested to see if they help heal pressure sores. But there’s not enough research to show whether they work. They include: suction treatment to remove excess moisture, electrical therapy, ultrasound massage and laser treatment.6

Moist chronic pressure ulcers are an ideal medium for bacterial growth. Pressure ulcers may have a varied bacterial flora, with aerobic organisms cultured more frequently than anaerobes. Staph. aureus, Streptococcus species, Proteus species, Escherichia coli, Pseudomonas, Klebsiella and Citrobacter species are the most common isolates, in serious cases, infected pressure ulcers can lead to osteomyelitis and septicaemia.7

The management of patients with pressure sores is a team effort, in which surgery is one component. Active participation of nurses, physiotherapists, occupational therapists and nursing staff is vital to the success of treatment.5

Simple layered suture of the debrided space is the most commonly used means to achieve closure of decubitus ulcers. However, there are instances where an alternative provides a better result. Split thickness skin graft can only be a second choice mainly due the fact that they cannot stand pressure and tend to form blisters or can be broken down easily. For these reasons, skin flaps are commonly utilized to achieve closure and coverage of pressure sores. A myocutaneous flap coverage after a thorough debridement has the following advantages over a simple layered closure:2

It provides skin of good quality to cover defects.
1. The presence of subcutaneous tissue improves the resistance of the skin to stand shear.
2. The muscle and subcutaneous tissues serve as a cushion, providing better pressure absorption and redistribution.
3. It brings in a well vascularised structure to fill up tissue defects left over from debridement and therefore enhances healing.
4. The increased vascular supply to the area of repair helps to combat any residual infection.
MATERIALS AND METHODS
This is a prospective study of 20 patients (15 males, 5 females) with (25) pressure sores at various sites admitted in Department of Plastic Surgery in Alsader Teaching Hospital-Najaf in the period between 2004 to 2008. Those patients were referred from neurology or neurosurgery department.

12 (48%) of the sores were sacral, 6 (24%) were ischial sores, 5 (20%) were trochanteric, 2 (8%) were heel sores and one sore was seen on the anterior ankle region.

We classified pressure ulcers into four stages as mentioned below:

Stage I. Partial thickness of skin (superficial) involvement (redness, abrasion, blistering)

Stage II. Soft tissue involvement (full thickness skin or deeper tissue).

Stage II sub classified after excision of necrotic tissue on the basis of deeper tissue involvement:

IIA. Full thickness skin and subcutaneous tissue involvement without skin undermining (II A1) or with skin undermining (II A2).

IIB. Muscle, tendon and/or bursa involvement

IIC. Exposed bone, joints and ligaments without osteomyelitis

Stage III. Osteomyelitis and septic arthritis

Stage IV. Pressure ulcer with septicemia

Both general and local control were done by treating anemia, malnutrition, UTI, hyperglycemia. Wound swab was routinely taken to determine the bacterial growth and appropriate antibiotics were given accordingly.

Only in 3 cases we needed to do wound excision prior to the reconstruction session, otherwise we did the excision in the same time. Removal of the protruded bone by osteotomy was routinely done in most of the patients.

Stage I and II pressure ulcers were treated conservatively, while stage III and IV resistant pressure ulcers require flap reconstruction. Conservative management includes antibiotics, serial dressing, physiotherapy, nutritional support, pressure relief and management of primary illness; but is not always successful. If a superficial ulcer does not reduce by 30% after two weeks, management should be reviewed.

We used rotation flap for sacral type ulcer, one sore was closed with gluteus maximus flap.

For ischial sore rotation flap was also used, only one patient with poliomyelitis needed Biceps Femoris muscle flap covered by medially based thigh flap. The trochanteric sores were closed by TFL flap in most of the patients.

The patients were followed up for a period of 2 to 6 months.
Table (1) Tubular Presentation of cases summaries

<table>
<thead>
<tr>
<th>Case No.</th>
<th>AGE</th>
<th>SEX</th>
<th>PARAPLEGIC</th>
<th>TYPE &amp; STAGE of SORE</th>
<th>TYPE of TREATMENT</th>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td>MALE</td>
<td>+</td>
<td>Sacral II B</td>
<td>Rotational Flap TFL flap</td>
<td>Partial necrosis</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>MALE</td>
<td>+</td>
<td>Sacral I</td>
<td>Secondary intention</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>45</td>
<td>MALE</td>
<td>+</td>
<td>Ischial II B</td>
<td>Rotaional flap</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sacral II B</td>
<td>Rotaional flap</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>MALE</td>
<td>+</td>
<td>Sacral II C</td>
<td>Gluteus Maximus Rotaional flap</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ischial II C</td>
<td>Rotaional flap</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>MALE</td>
<td>-</td>
<td>Sacral II C</td>
<td>Rotational flap</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>50</td>
<td>MALE</td>
<td>+</td>
<td>Sacral II B</td>
<td>TFL</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>45</td>
<td>MALE</td>
<td>+</td>
<td>Trochanteric II C</td>
<td>TFL</td>
<td>Dead 2 years later because of DM complication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td>Trochanteric III</td>
<td>Rotaional</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>45</td>
<td>MALE</td>
<td>+</td>
<td>Sacral II B</td>
<td>Rotational</td>
<td>Recurrence</td>
</tr>
<tr>
<td>9</td>
<td>40</td>
<td>Female</td>
<td>+</td>
<td>Sacral II B</td>
<td>Rotational</td>
<td>Wound dehiscence</td>
</tr>
<tr>
<td>10</td>
<td>35</td>
<td>MALE</td>
<td>+</td>
<td>Sacral II B</td>
<td>Biceps Femoris + Medially based thigh</td>
<td>Wound dehiscence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ischial II B</td>
<td>Rotational</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>25</td>
<td>MALE</td>
<td>+</td>
<td>Ischial II C</td>
<td>Secondary intention</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rotational</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>40</td>
<td>MALE</td>
<td>+</td>
<td>Sacral II B</td>
<td>Secondary intention</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ischial II B</td>
<td>Secondary intention</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>40</td>
<td>MALE</td>
<td>+</td>
<td>Trochanteric II C</td>
<td>Skin Graft</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>40</td>
<td>Female</td>
<td>+</td>
<td>Sacral I</td>
<td>Skin graft</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>35</td>
<td>MALE</td>
<td>-</td>
<td>Trochanteric I</td>
<td>Secondary intention</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>63</td>
<td>MALE</td>
<td>+</td>
<td>Heel II A</td>
<td>Skin Graft</td>
<td></td>
</tr>
</tbody>
</table>
RESULTS
The majority of the sores were in stage II B 9 out of 25 (36%), stage II C 7 out of 25 (28%), for both stage I &IV 4 out of 25 (16%) and one case with stage III (4%).

The main treatment modality in those patients was rotation fasciocutaneous flap 11 (44%) , using of Tensor Fascia Lata TFL myocutaneous flap 3 (12%) , wound excision and healing by secondary intention 6 (24%) mainly for small ulcers , skin graft 3 (12%) , Biceps Femoris muscle flap in one sore in a patient with poliomyelitis, and Gluteus Maximus myocutaneous flap in one sore. Table 2 and Chart 1.

For those patients with sacral sores and ischial sores, rotation advancement fasciocutaneous flap was the main treatment modality. While TFL was the main treatment modality in trochanteric sores.

Partial necrosis of the flap was seen in one patient with stage II B sacral sore , which was healed spontaneously by secondary intention. Wound dehiscence occurred in 2 sores, one patient with sacral type sore treated by secondary suturing after 4 days, the other sore was treated by skin graft. Recurrence rate was 4%.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Gender</th>
<th>Stage</th>
<th>Flap Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>70</td>
<td>Male</td>
<td>II</td>
<td>Sacral II A</td>
</tr>
<tr>
<td>18</td>
<td>50</td>
<td>Female</td>
<td>II A</td>
<td>Sacral II A</td>
</tr>
<tr>
<td>19</td>
<td>35</td>
<td>Female</td>
<td>I</td>
<td>Ankle I</td>
</tr>
<tr>
<td>20</td>
<td>55</td>
<td>Male</td>
<td>II A</td>
<td>Ischial II A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment modalities</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotation</td>
<td>40%</td>
</tr>
<tr>
<td>TFL</td>
<td>24%</td>
</tr>
<tr>
<td>Wound excision+secondary intention</td>
<td>24%</td>
</tr>
<tr>
<td>Skin graft</td>
<td>12%</td>
</tr>
<tr>
<td>Biceps Femoris</td>
<td>8%</td>
</tr>
<tr>
<td>Gluteus Maximus</td>
<td>8%</td>
</tr>
</tbody>
</table>
Table 2 Treatment Modalities

![Chart 1: treatment modalities.](image)

**DISCUSSION**

Juon et al (2007) reported that fasciocutaneous flaps offer an adequate blood supply, durable coverage, and minimal potential for a functional deformity, and they more closely reconstruct the normal anatomic arrangement over bony prominences. The disadvantages include limited bulk for the treatment of large ulcers.\(^9\), we frequently used these flaps in sacral, trochanteric and ischial sores because they are simple to apply and provide accepted level of closure. Kamur et al (2009) reported that the use of the fasciocutaneous flap is expected to provide a better long term result in surgical reconstruction of pressure sores than the myocutaneous or muscle flap.\(^10\), we need larger sample to compare the durability of both types. Mujahid et al (2007) reported that random pattern skin flaps can be used for small sacral ulcers, are easy to elevate, muscle is not sacrificed and they can be re-elevated but lack bulk with limited rotational arc and doubtful tip vascularity.\(^14\)

One of the first fasciocutaneous flaps was a rotational flap described by Conway and Griffith. In their series of 34 patients, only 16% developed a recurrence.\(^11\). We had recurrence rate of sores after using those flaps 1 out of 11(9%). The strict use of alternative pressure air mattress may play a role, still larger sample is needed. Myocutaneous/muscle flaps have good vascularity, withstand infections, obliterate dead space and are the best choice in paraplegics.\(^15\)

TFL flap was very useful way to close most of trochanteric sores. Sensation from the nerve roots of L1, L2, and L3 by the lateral femoral cutaneous nerve makes TFL a
potentially sensate flap in patients with spinal cord injury below L3, representing more
than 60% of meningomyelocele patients.  

Skin graft is not a good option in pressure bearing areas because of doubtful viability
and unpredictable outcome. Skin grafting has only a 30% success rate as grafting tends
to provide unstable coverage. We found that skin graft is only indicated in stage IIA
and some IIB sores, healthy granulation tissue is required for healing.

The ischial sores provided a higher recurrence rate than sacral sores, while our
ischial sores showed no recurrence. A team work planning is recommended to deal with such difficult cases. Nursing homes showed significant improvement in the quality of pressure ulcer preventive care from 1991 to 1995.

The relative mortality of those patients with pressure sores has been reported to be
five times higher than those without sores, most of the causes of death were belong to the primary cause of pressure sore, we had one IDDM patient who died 2 years after successful closure of trochanteric sore.

Conclusions and Recommendations
We conclude that simple rotation fasciocutaneous flap is useful and effective way of
managing sacral sores while Tensor Fascia Lata flap is very beneficial in trochanteric
sores that reach stage III and IV. A team work planning is recommended to deal with such difficult cases. Further studies are required to evaluate the significant difference between different local antimicrobial agents, use of VAC system, and free flap surgery in the management of pressure sores.

Figure 1 (A) Preoperative picture of of stag III C Trochanteric sore.
Figure 1 (B) Postoperative TFL flap

Figure 2 other TFL flap
Figure 3 other TFL flap

Figure 4 Rotation flap for ischial sore
Figure 5 Rotation fasciocutaneous flap for sacral flap

Figure 6 another Rotation flap
Figure 7 Rotation flap with wound dehiscence

REFERENCES

2. European Pressure Ulcer Advisory Panel; Pressure Ulcer Treatment Guidelines. 2003; 5(2)
6. Ali Baba-Akbari Sari1, Kate Flemming2, Nicky A Cullum2, Uwe Wollina3. Therapeutic ultrasound for pressure ulcers (Review); 2009 The Cochrane Collaboration. JohnWiley & Sons, Ltd.