

THE USE OF MUSCLE BASED FLAPS IN THE TREATMENT OF PRESSURE SORES.

A. JAYASWAL¹, S. RASTOGI², P.K. DAVE³,

This study of 62 pressure sores which had developed in 54 patients treated in Orthopaedic Department, of All India Institute of Medical Sciences, New Delhi, between 1985 and 1990 is being presented to highlight the role of local muscle based flaps in the treatment of pressure sores. Majority of these pressure sores were encountered in traumatic quadri and paraplegics. 28% of our 210 spinal injury patients developed bed sores of varying degrees. Out of these 62 sores, 31 were treated by local muscle based flaps. All of these 31 sores were of gr. III or gr. IV. Marginal necrosis occurred in 4 of these cases — 3 of which healed well with debridement and secondary closure. Deep infection was encountered in one case but as the flap was viable, control of infection followed by secondary suturing helped in good uptake. Primary healing and uptake occurred in the remaining cases. Rather than allowing these sores to take a course of debility, the authors feel that, aggressive, timely surgical intervention help in lessening the morbidity and increasing the overall moral of such patients.

The key word in the treatment of pressure sores is without doubt, Prevention. Prevent the sores from occurring. But, inspite of best efforts these sores do occur. Superficial, small sores — grade I and II (Shea '75' Table 1) can be managed by good nursing care, keeping the pressure off the prone areas; repeated dressings and split thickness skin grafting, which may be sometimes necessary. The larger, deeper — the gr. III & IV sores cause greater problems, are not amenable to conventional treatment and require an aggressive surgical approach.

MATERIAL AND METHODS

This is a study of 62 pressure sores in 54 patients treated in the Orthopaedic Department of the All India Institute of Medical Sciences, New Delhi, between 1985 and 1990. Majority of these pressure sores (57) were encountered in traumatic quadri- paraplegics. Infact, 28% of our

spinal injury patients developed bed sores of varying degrees. Two tuberculous paraplegics, two elderly patients with fracture neck of femur and one patient of ankylosing spondylitis who had a dislocated total hip also developed pressure sores and are included in this series. 48 out of 62 sores were sacral or sacro gluteal in distribution 8 were trochanteric, 4 were ischeal and 2 over the heel. 8 patients had more than 2 sores. All the sores were graded according to Shea, 1975 (Table 1). Majority of them were gr. III & II (Table 2). 8 males and 14 females with an average age of 42 years (range 16 years to 75 years) had these sores.

Gr. I superficial sores were all treated with repeated sterile dressings and postural care. The use of a water bed and sealing with dermafilm or biofilm helped. Larger gr. II sores required, besides this, debridement and sometimes split thickness skin grafting. Gr. III & IV sores required, besides aggressive debridement and

1. Associate Professor
2. Additional Professor
3. Professor

Department of Orthopaedics, All India Institute of Medical Sciences, Ansari Nagar, New Delhi — 110 029.

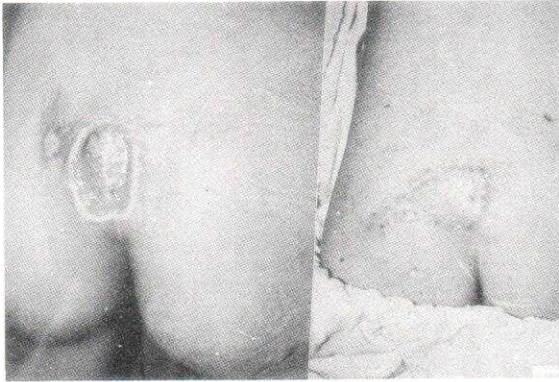


Fig. 1: (a)

Fig. 1: (b)

Fig. 2: (a)

Fig. 2: (b)

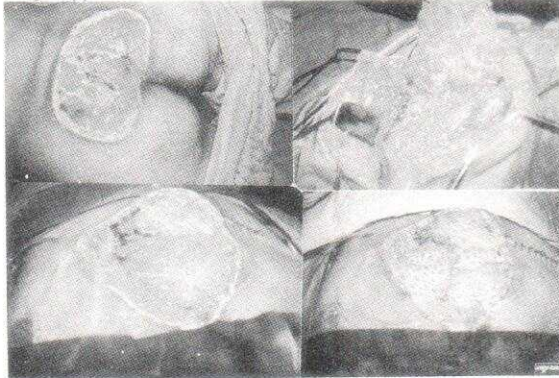


Fig. 3: (a)

Fig. 2: (c)

Fig. 3: (b)

Fig. 2: (d)



Fig. 4: (a)

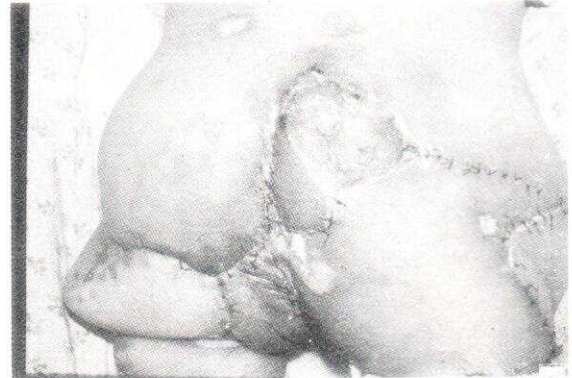


Fig. 4: (b)

LEGENDS

- Fig. 1. : a) Gr. III sacral sore.
 b) The sore covered by a gluteus maximus island myocutaneous flap-2 years post-operative photograph.
- Fig. 2. : a) A large Gr. IV sacral sore.
 b) Peroperative photograph of the whole gluteus maximus being raised like the leaf of a book and
 c) Turned over (turnover plasty) to cover the sore.
 d) Split thickness mesh graft applied over muscle flap.
- Fig. 3. : a) Trochanteric sore.
 b) Raising of TFL myocutaneous flap.
 c) TFL flap rotated to cover the sore.
 d) Suction drain under the flap.
- Fig. 4. : a) Multiple extensive Chronic sores.
 b) Covered by multiple flaps/skin grafts, in different stages of healing.

meticulous repeated dressings, an early muscle based flap to cover the wound.

Surgical Principle :- The flap consists of a part or the whole of a nearby muscle mobilised with its intact main vascular supply. In case of sacral sores the upper two thirds of the gluteus maximus muscle is mobilized by detaching its iliac attachment two inches proximal to the trochanter, and freed distally by splitting in the direction of the muscle fibres at the junction of upper two-thirds and lower thirds (as is done in the posterior approach to the hip). The vascular pedicle of this portion of the gluteus maximus comes from superior gluteal artery which enters the muscle belly immediately after exit from the sciatic notch and hence to prevent its damage, the detachment of the sacral insertion of the gluteal fibres, if required for mobilisation of the muscle has to be done carefully. The mobile muscle flap can then be moved forwards to cover the sacral defect and secured in place with sutures to the surrounding healthy tissue. Skin cover is provided by split thickness graft either primarily or as a secondary procedure over the muscle flap. Alternatively, and better still, the flap with the superior glut. maximus muscle is mobilised with its overlying 'island' of the skin which gets its vascularity from the perforating vessels, which are branches of the main muscular vessels. This 'myocutaneous flap' thus contains vascularised skin, subcutaneous tissue and underlying vascular muscle. It is important to leave two drains, post operatively for 36-48 hrs., one in the dead space left by the mobilised muscle and another under the flap. The skin defect left after mobilisation of the 'island' of skin can be either closed by a "V-Y" technique or, if the defect is large, by split thickness skin graft.

31 local muscle based flaps were done and majority of them for sacral sores (Table 4). The flaps that needs to be chosen depends on the situation of the sore (Table 3). One patient, a young executive, with traumatic quadriplegia came two years after the injury with a big sore involving the sacrum, left gluteal region, the left ischeum with gross undermining and with a

dislocated left hip and a right trochanteric sore. After excising the head of femur, flaps of the gluteus maximus and tensor fascia lata (TFL) were mobilised to cover the entire defect on the left side. Subsequently right gluteus maximus and TFL myocutaneous flaps were used to treat the sores on the right [fig. 4(b)].

Post operative care includes constant surveillance of the flap for necrosis, keeping pressure off the flap and preventing frictional pulls on the suture lines of the flap for 2-3 weeks, appropriate antibiotics for 10 days and patient-family education and counselling to prevent recurrences.

RESULTS & OBSERVATIONS

These flaps are viable flaps and the "muscle base" provide the necessary vascularity for survival, early uptake and form a cushioning over the underlying pressure points — the bony prominences like the sacrum, the ischeum and the greater trochanter. If careful peroperative care is taken in mapping and mobilising the flap according to its vascular supply, and proper post-operative measures are taken to prevent quashing and blanching of the flap then complications are minimized. We had no problem of flap death in our series. However 4 flaps had marginal necrosis, 3 of which healed well with debridement and secondary closure. In one flap a defect of 1 cm after debridement of the necrosed margin, split thickness grafting was done once the defect granulated. Deep infection, underneath the flap, a known complication occurred in one case but the flap was viable and control of infection with debridement, antibiotics followed by secondary suturing helped in good uptake.

One patient who developed hypoproteinaemia, anaemia (Hb 6 grams%) and septicaemia had dehiscence of the flap all around and deep infection. This patient finally succumbed.

Primary healing and uptake occurred in the remaining cases (81%).

DISCUSSION

Prolonged recumbency due to chronic illnesses are known to cause pressure sores, particularly in elderly patients. These pressure sores however, are usually superficial and respond well to postural care, dressings/debridement and split thickness skin grafting. Patients with neurological deficits and particularly those with sensory loss develop the larger, excavating sores with undermined edges and exposed bone. These sores do not heal easily.

These sores when they occur can be

treated by aggressive timely surgical intervention. But it is not enough to just cover the sores with fancy flaps and altering the local cutaneous geography. The early post operative care of keeping pressure off the flap and suture line, the counselling and, patient-family education in care of the "flapped" area as well as other prone areas for prevention of recurrences, the vocational guidance, the need for follow up home visits are some of the aspects that can never be overemphasised. Thus a team approach, a human approach, an involved approach has to be adjuncted with skilled surgical approach to deal with these difficult sores.

Table 1

PRESSURE SORES : CLASSIFICATION (SHEA '75)

GR. I	Superficial ulceration exposing dermis.
GR. II	Full thickness of skin involved — extension into Subcutaneous tissue.
GR. III	Subcut. tissue (whole) upto deep fascia extensive undermining.
GR. IV	Thro' deep fascia involving bones/joints.

Table 2

PRESSURE SORES : GRADES (SHEA '75)

Gr. I	8	12.9%
Gr. II	13	20.9%
Gr. III	37	59.6%
Gr. IV	4	6.6%
62		

Table 3

TYPES OF MUSCLE BASED FLAPS FOR PRESSURE SORES USED

SITE	MUSCLE	VASCULAR PEDICLE	SKIN COVER
* SACRAL	GL. MAXIMUS	SUP. GL. ART.	i) SPLIT THICKNESS ii) ISLAND MYOCUT.
* ISCHIAL	GL. MAXIMUS	INF. GL. ART.	ISLAND MYOCUT.
* TROCHAN- TERIC	TENSOR FASC. LATA	LAT. CIR. ART.	MYO-CUT. FLAP.

Table 4
MUSCLE BASED FLAPS

Gl. maximus advancement and spit. thickness	—	4
Gl. max. Myocut island	—	14
Gl. max. Turnoplasty + grafting	—	3
Bil. Gl. max. Myocut	—	4
Ten. Fascia lata Myocutaneous	—	6
		31

REFERENCES

1. Chacko, V., Joseph, B., Mohanti, S.P., Jacob, T. : Management of spinal cord injury in a general hospital in Surat, India, Paraplegia 24 : 330-335, 1986.
2. Mathes, F., Nahai, S.J. : Clinical application for Muscles and Myocutaneous flaps, C.V. Mosby Co. 1982, 426-509, 1982.
3. Shea, J.D. : Pressure Sores : Classification and management. Cl. Orthop. 112 : 89-100, 1975.
4. Shanmugasundram, T.K. : PI 480 Paraplegia project Madras Project Report, 1984.