

A Hospital-Based Study Evaluating Infragluteal Fasciocutaneous Flap for Management of Recurrent Ischial Pressure Sore

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Abstract:

Aim: The aim of the present study was to determine the feasibility of infragluteal-fasciocutaneous flap in recurrent ischial pressure sore.

Material & Methods: In this study 30 patients suffering from recurrent ischial sore with scars of previous surgery were managed with infragluteal fasciocutaneous flap in between October 2019 to August 2021. Wound bed was prepared by surgical debridement and negative pressure wound therapy in each case. In two cases, gracilis muscle flap was used as adjuvant to fill up the residual cavity. Donor area of flap was primarily closed.

Results: In the present study, there were 12 females and 18 male. RTA, fall from height were the etiologies in the study. The median length of stay durations were 9 and 15 days and no statistically significant difference in median length of stay duration was found between the groups. In this respect, no statistical difference was found between the two groups.

Conclusion: Infragluteal fasciocutaneous flap is reliable option for managing recurrent ischial sore as it transposes well-vascularised thick fasciocutaneous flap from adjacent posterior thigh and its bridge segment can be further used in case of recurrence.

Keywords: Infragluteal-fasciocutaneous flap; ischial pressure sore; perforator plus flap; recurrent pressure ulcer

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Introduction

Pressure sores develop as a result of ischemic damage to the skin and subcutaneous tissues caused by constant exposure to external pressure and friction. [1] It is frequently observed in bedridden patients and can lead to major problems when left untreated. There is a high prevalence in hospitalized patients requiring long-term treatment. [2] The most endangered patient groups consist of the elderly and para- and tetraplegic patients, with a higher incidence in tetraplegic patients. [3,4] There are numerous extrinsic and intrinsic risk factors that promote the development of pressure sores, for example, moisture, comorbidities, malnutrition and hypoperfusion, but of those, lack of sensitivity, immobility together with shearing forces and maximum pressure over bony prominences are the most important ones. [5] Hence, the most endangered regions for the development of pressure

sores are the sacral region and the greater trochanter in bedridden patients and the ischial tuberosity in wheelchair-mobilised paraplegic patients. [6,7]

The ischium is a common site of pressure sores, especially in paraplegic patients who use wheelchairs. The presence of an ischial pressure sore inevitably leads to tissue defects, ischial synovial sac infection, and even osteomyelitis of the ischium. Reconstruction of pressure sore defects is a constant challenge for surgeons. [8] Although early-stage pressure sores can be treated with conservative methods, those in advanced stages such as Grades 3 and 4 are treated with surgery. In these patients, the principles of surgical treatment include complete excision of the ulcer and bursa, removal of infected bones or bones that may cause future pressure, and covering of the region with well-blooded tissue. [9] Long-term follow up studies on patients with

pressure sore document-wide range of recurrence rates varying from 3%–6% to 33%–100%. [10]

There are multiple types of flaps that can be used in flap surgery for pressure sores, each of which has its unique advantages. Examples include the inferior gluteal artery perforator flap, internal pudendal artery perforator flap, gluteus maximus island flap, fasciocutaneous flap, V-Y flap, and free flap. [8] However, due to the high rates of complications and recurrence, the selection of flaps for reconstructive surgery should consider future reconstructive procedures. [11]

Out of various techniques described for ischial pressure sore, we preferred fasciocutaneous flap over musculocutaneous flap. Homma et al. reported using a posteromedial thigh fasciocutaneous flap based on the perforators of either gracilis or the adductor magnus muscle in the treatment of ischial pressure sore. [12] Tissue from the infragluteal region that is posterior thigh was transferred as a free fasciocutaneous flap based on descending branch of inferior gluteal artery. It was first described as an alternative for autologous breast reconstruction in thin patients by Papp et al. in 2007. [13]

The flap can be used repeatedly in the event of recurrence. [14] Even if the vessel is not present due to anatomical variation, the flap survives on superiorly based random fasciocutaneous flap supplied by multiple perforators from the cruciate anastomosis of the fascial plexus. [15] The perforator plus techniques combines the advantage by providing additional blood supply and preventing distal congestion of peninsular flap by safeguarding venous return. [16] The traditionally described gluteal thigh flap can be raised as a musculocutaneous flap based on descending branch of the inferior gluteal artery or as its fasciocutaneous extension if longer length of flap is required.

Hence, the aim of study was to determine the feasibility of infragluteal fasciocutaneous flap in recurrent ischial pressure sore.

Material & Methods

This study was conducted in the Department of Plastic Surgery, Nalanda medical college and hospital, Patna, Bihar in between October 2019 to August 2021. 30 patients suffering from recurrent ischial sore were managed with inferior gluteal artery based fasciocutaneous flap from posterior thigh. 24 of them had paraplegia, and six were ambulatory. Three of the ambulatory patients was a known case of scoliosis and had undergone below knee amputation. 6 patients of paraplegia were known case of meningomyelocele in their childhood. All patients suffering from paraplegia were incontinent. 10 patients had multiple pressure sores. Patients were thoroughly examined, and clinical assessment of stage of ulcer was done. The

general condition of the patients was assessed, and the wound was optimised by surgical debridement. Negative-pressure wound therapy (NPWT) with negative pressure between 70 and 130 mmHg was applied in all patients using polyurethane foam sponge (pore size 400– 600 μ). The quantitative culture was sent for detecting invasive infection in each case. Bone biopsy was done to diagnose osteomyelitis wherever the bone was exposed. Average size of pressure ulcer was 4.5 cm \times 5 cm. The average age of our patients was 36 years with the age range of 20–70 years. The size of ischial sore varied from 4 cm \times 3 cm to 8 cm \times 6 cm. Size of flap varied from 5 cm \times 14 cm to 7 cm \times 21 cm and all the flaps survived without any major complication. Primary closure of donor site was achieved in all cases.

Procedure

Surgical debridement with total excision of well-defined bursa, surrounding scarred tissue, calcification or heterotopic ossification until only healthy pliable tissue is left is the most important step in pressure sore surgery. To achieve this, we placed a methylene blue-moistened sponge in the bursa which helped in thorough excision of all granulation tissue even from the wound base. Removal of infected bone until one reaches hard bleeding bone with proper contour of bony prominence is of paramount importance. Bone should be sent for histopathology and culture and sensitivity. Careful haemostasis should be maintained by cauterisation, packing and suction drain. We should think of potential flap which may obliterate dead space following excision of ulcer, by means of a muscle, myocutaneous or a deepithelialised skin flap. The flap should be planned in such a way that it does not obliterate blood supply for the potential future flaps. Suture lines should not lie on pressure areas and there should be tension-free closure of the donor site. We planned an infragluteal fasciocutaneous flap depending on the site and size of the ulcer. Axis of the flap was kept midway between the ischial tuberosity and the greater trochanter. Doppler was used in the identification of the inferior gluteal artery. The average width of the flap was between 5 and 7 cm and length was 14–21 cm. After proper design and orientation, incision over the posterior thigh was made along the distal margin of flap through the deep fascia. We identified posterior femoral cutaneous nerve to ensure proper level of dissection and just lateral to the nerve descending branch of inferior gluteal vessels was noted.[7] The vessels and nerve were divided and dissected proximally including deep fascia which was divided medially and laterally until inferior border of gluteus maximus was identified along with few femoral perforators, which were sacrificed if they interfered with flap transposition. When the greater length of

the flap was required, the gluteus maximus muscle was split and included at the base of the flap. We divided skin bridge separating the flap from the recipient defect to accommodate the flap. In all our cases, the donor defect was closed primarily. Suction drain was used for the donor as well as recipient areas. Drains were removed 4–6 days

postoperatively. Gradual weight bearing on the flap was started after 3 weeks. Initially, the patients were called for examination each month for 3 months and thereafter every 3 months for 1st year.

Results

Table 1: General Characteristics

	N
Number of Patients	30
Sex (F/M)	12/18
Etiology	
• Traffic accident	9
• Fall from height	9
• Meningomyelocele	6
• Cerebrovascular incident	4
• Occupational accident	0
• Vertebral mass	2

In the present study, there were 12 females and 18 male. RTA, fall from height were the etiologies in the study.

Table 2: Analysis of Quantitative Variables

Age	38 (28.5-53.25)	p=0.31
Length of Stay	9 (6.75-12)*	U=64.5Z=-2.75 p=0.01
Sex	n (%) 21 (70)	x ² =0.07p=0.79a
Male	9 (30)	
Female		
Complications	n (%) 21 (70)	x ² =0.07p=0.79a
No	9 (30)	
Yes		

The median length of stay durations were 9 and 15 days and no statistically significant difference in median length of stay duration was found between the groups. In this respect, no statistical difference was found between the two groups.

Discussion

Although early-stage pressure sores can be treated with conservative methods, those in advanced stages such as Grades 3 and 4 are treated with surgery. In these patients, the principles of surgical treatment include complete excision of the ulcer and bursa, removal of infected bones or bones that may cause future pressure, and covering of the region with well-blooded tissue. [17] Recurrence rates vary widely in long-term follow-up after surgical treatment. [18,19] The development of recurrence, which can be explained by a variety of factors that vary depending on the wound and the patient, has an impact on the life quality of patients and continues to be a significant issue for the health system due to rising costs. In the sitting position, the ischial tuberosity is the area that is exposed to the most pressure, and ischial pressure sores are common in

patients who spend a lot of time in wheelchairs. [20,21]

Pressure sore reconstruction is associated with high rates of complications and recurrence. The reasons for high recurrence are multifactorial. The underlying medical and surgical conditions which had contributed to ulcer formation sometimes persist even after conservative or flap surgery. The labour intensive nursing care, irregular follow-up, lack of financial backup, inadequate family and community support are important associated factors behind recurrence. In the present study, there were 12 females and 18 male. RTA, fall from height were the etiologies in the study. The median length of stay durations were 9 and 15 days and no statistically significant difference in median length of stay duration was found between the groups. In this respect, no statistical difference was found between the two groups.

Commonly used flaps for reconstruction of ischial sore are inferior gluteal myocutaneous flaps, V-Y hamstring advancement flap, medially based thigh flap, gluteus maximus muscle flap, gluteal island

thigh flap, inferior gluteal artery fasciocutaneous flap from posterior thigh, tensor fascia lata flap, gracilis flap and inferior gluteal artery perforator (GAP) flap. [22] Since the introduction of perforator flap by Kroll and Rosanfield, Gluteal perforator flaps have been used as pedicle flap for sacral and ischial pressure sore. [23] GAPs flaps have been used in breast surgery since 1993 with decreased donor site morbidity of the buttock. The superior gluteal artery emerges at the junction of the medial and middle thirds of a line drawn between the posterior superior iliac spine and the apex of greater trochanter of femur. The superior gluteal supplies the suprapiriformis portion of gluteus maximus muscle, only perforators located above the piriformis muscle are used. The superior gluteal artery flap can be raised as an oblique ellipse extending superiorly from medial to lateral with the advantage of concealing the scar in swimwear and undergarments. However, the flap may cause a significant contour deformity at donor site. Superior GAP flap has now become an important option in the treatment of sacral pressure sore.

In recurrent ischial pressure sore before reconstruction we tried to optimise associated factors and assessed wound in terms of stage, size and involvement of bone. Quantitative culture as well as bone biopsy was sent for bacteriological evaluation, and preoperative antibiotics were given accordingly. [24] We used NPWT in all patients. It helped in increasing area and quality of granulation tissue as well as decreased depth and exudation from wound. [25]

Conclusion

The infragluteal fasciocutaneous flap is a reliable option for managing recurrent ischial sore as it transposes well-vascularised thick fasciocutaneous flap from the adjacent posterior thigh region to obliterate the dead space following bursectomy and ischiectomy. It can also be used in cases of recurrence by advancing the same flap taking advantage of loose tissue in bridge segment.

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