



Plastic Surgery

SUPERIOR GLUTEAL ARTERY PERFORATOR FLAP - A BETTER ALTERNATIVE FOR SACRAL SORE RECONSTRUCTION

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ABSTRACT **Objective:** To report the use of the pedicled superior gluteal artery perforator (SGAP) fascio-cutaneous flap as a reliable surgical alternative for sacral pressure sore reconstruction.

Methods: A prospective study was conducted between November 2017 and September 2018 on 20 patients with stage 3 or 4 sacral pressure sores treated with a unilateral pedicled SGAP flap.

Results: The size of the pedicled SGAP flaps ranged from 6×10 cm to 8×14 cm. All flaps survived completely without major complications. The donor site was closed primarily in all cases. No recurrence of a bedsore occurred after an average follow-up of 12 months.

Conclusion: The SGAP flap is an excellent tool for coverage of loco-regional defects. It is particularly suited for reconstruction of midline sacral sores. The SGAP flap is an excellent option due to preservation of an intact gluteus maximus muscle, so can be used as a muscle flap, if recurrence occurs.

KEYWORDS : SGAP flap, gluteal flap, sacral sore reconstruction

INTRODUCTION

As a result of continuous pressure applied to the skin and muscle in bed ridden patients, blood supply to the tissue is decreased. This leads to destruction of skin and underlying soft tissue following tissue necrosis. And also those patients with exposed sacrum, thin skin, and subcutaneous tissue had a higher rate of recurrence. Therefore, reconstructing a sacral sore is still a difficult problem to surgeons. Many traditional methods were applied to repair it, such as primary closure, local random flaps, and muscle flaps. Gluteus maximus myocutaneous flap has been a recent mainstream method to repair sores because of providing excellent blood supply and tissue mass that allow for better distribution of pressure.² Simultaneously, the major drawbacks such as limited shifting of flap, excessive blood loss, and muscle, limit the range of application in some cases.³ After the concept of perforator flaps introduced by Koshima et al,⁴ the perforator flaps were widely used in the treatment of soft tissue defects. With the thorough research on anatomy and clinical application of the SGAP flaps, they became well accepted as useful alternatives for reconstruction of sacral, ischial and trochanteric pressure sores.

Aim and objectives

To report the use of the pedicled superior gluteal artery perforator (SGAP) fascio-cutaneous flap as a reliable surgical alternative for sacral pressure sore reconstruction

Materials and methods

Clinical details

Between november 2017 and September 2018, we treated 20 patients (14 males, 6 females) with sacral pressure sores, with unilateral pedicled SGAP fascio-cutaneous flaps. The average age was 48.85 years (range 38 - 61 years). All patients were non ambulant & paraplegic. The cause of ulcer was spinal cord injury in 16 patients and long-term hospitalisation in ICU in 4 patients. 14 patients had stage 4 sores while 6 had stage 3 sores (staging by NPUAP system).

FIG 1



Figure 1- Three lines are important to localize the SGA and its perforators. Line 1: PSIS to apex of greater trochanter(T); Line 2: PSIS to coccyx(position of the piriformis); Line3: midpoint of line 2 to cranial edge of greater

The patient was placed in a prone position. A line drawn connecting the posterior superior iliac spine (PSIS) to the apex of the greater trochanter of the femur. The site where the SGA enters the buttock is identified by the medial 1/3rd and lateral 2/3rd junction of this line. Another line is then drawn between the PSIS and the coccyx. The position of the piriformis is located by joining the middle of the PSIS-coccyx line to the superior edge of the greater trochanter. The SGA supplies the gluteus maximus at its suprapiriform portion. Perforators located superior to the piriformis and lateral to the SGA exit point, will be considered. The position of the relevant perforators is identified and marked on the skin, using a hand-held Doppler. The most lateral perforator giving the highest Doppler signal is most important. The sacral sore was then thoroughly debrided with complete removal of bursa. According to the resultant sacral defect, the SGAP flap was designed in an elliptical fashion of corresponding size over perforator. The skin, subcutaneous tissue and deep fascia were incised over the superior border of the flap. Flap elevated in the subfascial plane from lateral to medial. Perforator was carefully dissected through the gluteus maximus muscle. Any other suitable perforators encountered may be dissected and included in the flap. Flap incision was completed along medial and inferior borders. Pedicle was traced proximally until the required length of pedicle was achieved. Adequate haemostasis was achieved. The SGAP flap was either advanced or transposed into the defect, without causing any twisting, kinking, compression or undue tension on the pedicle. The donor site was closed primarily. Drains were kept,

Case 1



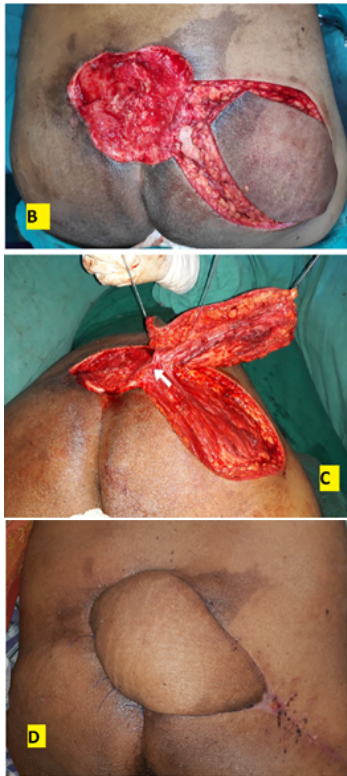


Figure 2. A 45-year-old man became paraplegic because of spinal cord injury and developed a sacral sore, which failed to heal with traditional methods at the other hospital A) The defect of sacral region measured 8×9 cm2. B) defect size 9×10 cm2 after debridement, along with incised flap from right gluteal region C) A flap elevated on the superior gluteal artery perforator D) The flap settled well, 1 month postoperative photo.

one under the flap and one in the donor area. The patient was maintained in prone position for initial 2 weeks, after which suture removal was done and gradual mobilisation was allowed.

Results

The size of the pedicled SGAP flaps ranged from 6×10 cm to 8×14 cm. All flaps survived without major complications. The donor site was closed primarily in all cases. Two cases developed postoperative hematoma, underneath flap. drainage of the hematoma was done, followed by an uneventful recovery. No recurrence of a bedsore occurred for an average follow up period of 12 months (range 4 - 20 months).

Conclusion.

The SGAP flap is an excellent tool for coverage of loco-regional defects. It is particularly suited for reconstruction of midline sacral sores. The SGAP flap is an excellent option due to preservation of an intact gluteus maximus muscle, so can be used as a muscle flap, if recurrence occurs.

CASE 2

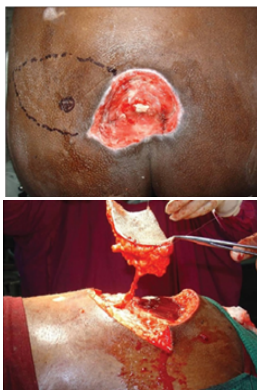


Figure 3 A 47-year-old male was involved in a traffic accident with left femoral shaft fracture, after an open reduction and internal fixation, he was bedridden...A) The defect of sacral region measured 8×9 cm2 after debridement. B) A flap based on superior gluteal artery perforator was elevated to reconstruct the defect. C) The flap survived and healed primary after 10 days postoperative.

Discussion.

Bedridden patients are prone for pressure sores due to long term constant compression. Sacral region is especially prone, due to its relatively thin layer of soft tissues overlying the sacrum and poor blood supply, which make the sores difficult to heal, prone to recurrence. Traditional methods such as the gluteus maximus myocutaneous flaps has the major drawbacks, such as limited shifting capacity, excessive blood loss, it sacrifices the function of normal muscle, and not reusable if sore recurrence occurs at the same region, which may limit the range of application in some cases.

In 1993, Koshima et al¹ introduced the concept of a perforator flap for treating pressure sores in the sacro-coccygeal region. According to an anatomical study by Ahmadzadeh et al,⁵ a mean of 5 + 2 cutaneous perforators can be found in the gluteal region arising from the superior gluteal artery, of which all were musculocutaneous perforators passing through the gluteal muscle. The average diameter of the perforators ranged from 0.6 to 1.0 mm. Each perforator supplies a mean area of 21± 8 cm². With the in depth research on anatomy and clinical application of SGAP flap, it was well accepted as a reliable and alternative method for reconstructing soft tissue defects in sacro-coccygeal, greater trochanter, and ischial tuberosity regions. For better flap outcome, we have the following suggestions: 1) Good general condition of the patient is the foremost of a successful reconstruction, improve nutrition, and local infection control. 2) Completely debride the ulcerated area and scar tissues with adequate bursectomy. Thus, these nonviable tissues must be excised down to healthy tissue. 3) Guided by a hand-held Doppler, we chose the most lateral perforator which creates the longest pedicle possible to give a greater arc of movement. 4) It is necessary to educate patients and caregivers on pressure relief and skin care for good long-term results. Recurrence is usually not secondary to the operation, but to the poor compliance of patients at home or the lack of appropriate wound care assistance.⁷

Comparing to traditional methods, the SGAP flap has many advantages. The perforator flap has a reliable blood supply that makes its high survival rate. Perforator flaps only contains skin and subcutaneous fat, therefore the sacro-coccygeal region has fine appearance and good texture. Furthermore, the SGAP flap preserves the entire contra lateral side as a future donor site. On the ipsilateral side, the gluteal muscle itself is preserved and all flaps based on the inferior gluteal artery are still available.⁶

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