

# Outcome of Perforator Based VY Advancement Fasciocutaneous Flap for Sacral Pressure Sore Reconstruction

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## Abstract

### Background:

Pressure sores are an ancient medical problem; were even found in autopsies of Egyptian mummies. Sacral pressure sore is more common among paraplegic and bedridden patients. The principle of treatment is excision of all dead & devitalized tissue including scars, underlying bursa, and the involved bone, followed by durable coverage with Flap. Various flaps have been used to reconstruct the pressure sore, including Fasciocutaneous flaps, muscle flaps and free flaps. Among various local flaps, perforators based V-Y advancement fasciocutaneous flap is a reasonable and flexible option with good outcomes for sacral pressure sores reconstruction.

### Objectives:

The purpose of this study was to evaluate the outcome of perforator based V-Y advancement fasciocutaneous flap for sacral pressure sores reconstruction concerning the sociodemographic characteristics of the patients, defect size, and outcome of surgery.

### Methods:

This was a prospective observational study, conducted in the Burn & Plastic Surgery department of Rangpur Medical College Hospital, Rangpur over a period of three years from August 2018 to September 2021 through purposive sampling. Patients of all ages and sexes having grade IV sacral pressure sores were included in this study. In all cases, perforator-based V-Y advancement fasciocutaneous flaps were used. Surgical technique, patient demographics, and outcome were evaluated.

### Results:

A total of 30 patients were operated on. The age range was 18 – 65 years, among them 43.33% of patients were in the age range of 31 – 40 years. 80% of patients in this series were male. Traumatic paraplegia was the main cause of sacral pressure sore, and it was 70%. This study showed that in context to the length and breadth of the wound, a majority (30%) of the patients had a wound dimension of 71–90cm<sup>2</sup>. The smallest wound dimension was (5x6) = 30cm<sup>2</sup> and largest wound dimension was (10x16) = 160cm<sup>2</sup>. Twenty-one sores that ranged from 6cm to 10cm were reconstructed with unilateral flaps and 09 sores that ranged from 11cm to 16cm were reconstructed with bilateral flaps. In this study, 06 (20%) patients had complications and all were managed conservatively. Three patients had infections and were treated according to the culture sensitivity report. Two patients had marginal flap necrosis at the vertical limb of Y which healed conservatively. One patient developed a seroma due to a blockage of the drain tube, which was resolved spontaneously. There was no flap loss in our study. The average follow-up period was one year. No recurrence of pressure sore during this period.

### Conclusion:

The simplicity of the surgical procedure, minimum or no morbidity in the donor area, and satisfactory outcome in terms of recurrence make this a reasonable option for the reconstruction of the sacral pressure sore.

**Keywords:** Pressure sore, Fasciocutaneous, VY advancement flap

## Introduction:

Pressure sore is an ancient problem and difficult to manage because it usually occurs in fragile and nutritionally compromised patients<sup>1-3</sup>. Early-stage

pressure sore can be managed conservatively, but the patient very often presents with advanced stage. Surgical reconstruction is challenging due to slow healing and frequent recurrence<sup>4</sup>. Durable

coverage with well-vascularized tissue is one of the key points in pressure sore reconstruction. Various flaps have been described for pressure sore reconstruction, including local musculocutaneous, fasciocutaneous, and free flap. Among this perforator-based VY advancement, fasciocutaneous flap is a reasonable option due to its relatively easy surgical technique and greater mobility. Moreover, it has several advantages like no functional deformity in the donor site, better reconstruction with the normal anatomic arrangement, it does not preclude the use of other flaps in recurrent cases, versatility of design, provides a larger flap, and re-advancement is often feasible<sup>5</sup>.

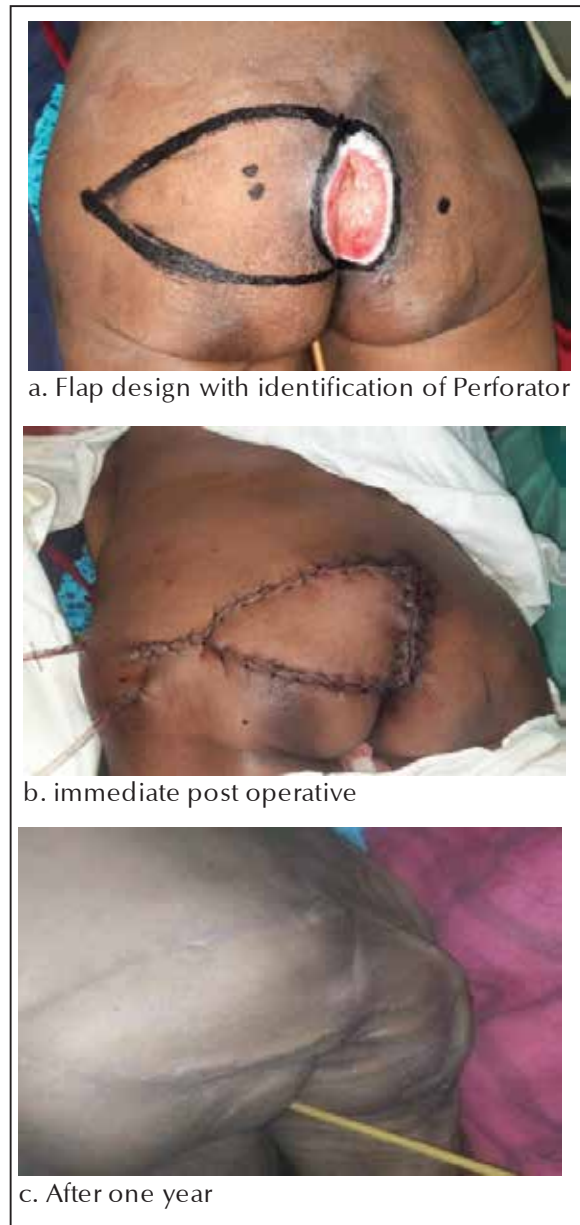
The aim of this study was to evaluate the outcome of perforator based V-Y advancement fasciocutaneous flaps for sacral pressure sore reconstruction concerning the sociodemographic characteristics of the patients, defect size, and outcome of surgery.

**Methods:**

This was a prospective observational study, conducted in the Burn & Plastic Surgery department of Rangpur Medical College Hospital, Rangpur over a period of three years from August 2018 to September 2021 through purposive sampling. Systemically optimized patients of all ages and sexes having grade sacral pressure sores were included in this study. Here, 30 patients with grade IV sacral pressure sores of different sizes were reconstructed with perforator based V-Y advancement fasciocutaneous flap. We reviewed the prospectively collected data. By analyzing the patient demographics, wound dimension, flap survivability, and associated complications, we put forward a few significant findings from our experience.

**Surgical Technique:**

**Design and marking:** Each and every patient was carefully assessed by through clinical examination and relevant investigations to assess the underlying pathology and fitness for surgery. After giving spinal anesthesia all patients were placed in a prone position. After wound excision, the defect was measured. Perforators were identified with a handheld Doppler (black dot in Fig a). The desired flap was designed based on the identified perforators (Fig a).



**Figure-1: Sacral pressure sore reconstruction**

**Dissection:**

All the borders of the flap were incised down to the muscle. Then dissection proceeds distal to proximal fashion keeping in mind not to injure the previously identified perforator. After complete elevation the forward mobility of the flap was assessed. Meticulous hemostasis was achieved. Tensionless flap inset was done keeping a negative suction drain insitu.

**Post operative care:**

All patients were given standard post operative care. Flap was monitored daily and negative suction drain was checked. Dressing was changed on 5th post operative day and Drain was removed on 7th – 9th post operative day. Stitches were removed on 15th post operative day. After 6 weeks all operative area were observed for assessment of outcome of procedure.

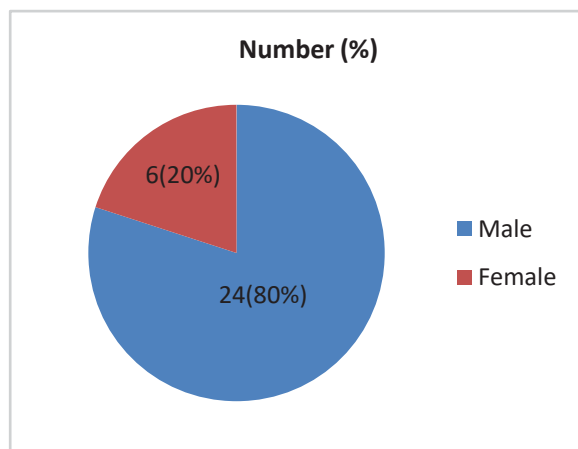
**Results:**

Thirty patients with grade IV sacral pressure sore were undergone reconstruction by perforator based V Y advancement fasciocutaneous flap during August 2018 to September 2021. Results of the study are summarized in the texts, tables and figures in the following pages.

**Table-I: Distribution of the patient by age (n=30)**

Age group	no. (%)
< 20 yrs	02(6.66)
21 - 30 yrs	06(20.0)
31-40 yrs	13(43.33)
41 - 50 yrs	04(13.33)
>50 yrs	05(16.66)
Total	30(100)

In this study age range was 18- 65 years. Majority (43.33%) of the patients belong to the age group 31-40 years (Table-I) and males were predominant 4:1 (Figure-2).

**Figure-2: Distribution of patient by sex (n=30)****Table-II: Distribution of the patients by etiology of primary diseases (n=30)**

Etiology	no. (%)
Traumatic Paraplegia	21(70)
Post operative paraplegia	03 (10)
Cerebro vascular accident	05 (16.66)
Fracture pelvis	01(3.33)
Total	30(100)

Traumatic paraplegia is the major (70%) cause of primary diseases (Table-II). Half of the wounds was 71-110 cm<sup>2</sup> (Table-III). 70 % of them needed single flap (Table-IV). Post operative infection, marginal necrosis and seroma were observed complications (Table-V).

**Table-III: Wound dimension (Length X Width) cm<sup>2</sup> (after excision)**

Dimension of the defects (Width X Length) cm <sup>2</sup>	no. (%)
30 – 50	02(6.66)
51 – 70	04(13.33)
71 – 90	09(30.00)
91-110	06(20.00)
111- 130	04(13.33)
131- 150	02(6.66)
>151	03(10)
Total	30(100)

**Table-IV: Distribution of the patients by number of flap (n=30)**

Number of flap	no. (%)
Single flap	21(70)
Double flap	09(30)
Total	30(100)

**Table-V: Post operative complications (n=30)**

Complications	no. (%)
Infection	03(10.00)
Marginal necrosis	02(6.66)
Seroma	01(3.33)

**Discussion:**

Despite great advances in reconstructive surgery, pressure sore reconstruction is still challenging. Performing a standard surgical procedure does not assure that the patient is not going through recurrences or complications.<sup>6</sup> So during designing a flap that will provide the best result, the availability of a second flap in case of recurrence should be kept in mind. Till now, there has been no evidence in the literature showing the superiority of one technique of flap coverage compared with another<sup>7</sup>. Systemically optimized 30 patients with grade IV sacral pressure sores were included in this study. Age incidence ranged from 18 to 65 years. Among them, a maximum number of patients 13(43.33%) were between 31–40 years. This is not surprising as people in this age bracket are quite active and mobile, predisposing them to various types of accidents; road traffic, industrial and/or domestic. In this study, 24 (80%) cases were male, and 06 (20%) cases were female. The male and female ratio was 4:1. Males are more vulnerable than females, as in our country they work outside and travel frequently, while females mostly remain at home and are involved in household work.

In the literature, pressure sores are commonly seen among prolonged hospitalized patients, the geriatric population, and those with spinal cord injuries. Traumatic spinal cord injury is the most prevalent in our series (70%). This picture is similar (73.33%) to the study of W H Mahmoud<sup>4</sup>. This may be due to the rapid increase in the incidence of road traffic accidents. Byrne and Salzberg<sup>8</sup> observed that 70% of patients with spinal cord injury suffer from multiple pressure sores, and 85% of the patients have at least one pressure sore during their lifetime.

Random pattern flap has an indistinct perfusion pattern and is limited in size and mobility<sup>9</sup>. Whereas the perforator flap has a reliable blood supply with greater arc of mobility.

In sacral pressure reconstruction, the perforator based V-Y advancement flap has greater forward movement than the random one. It allows adequate coverage with minimal donor site morbidity. No undermining is needed to close the vertical limb of the V-Y flap. The use of muscle flaps is controversial as sparing the muscles is of functional value in ambulant patients, the muscle undergoes atrophic changes shortly after surgery,

and muscle tissue is less resistant to ischemia. Moreover, the pressure points in the body are covered by skin and subcutaneous tissue, and muscle coverage provides no additional benefit<sup>4</sup>.

Recent studies found<sup>10-11</sup> that fasciocutaneous flaps provide comparable, if not superior, long-term results in surgical reconstruction of pressure sores than myocutaneous flaps.

We used perforator based V–Y advancement fasciocutaneous flaps to cover all sacral pressure sore. This flap is easy to harvest, shows good resistance to pressure, and ensures a long pressure sore-free survival rate. In 70% of the cases, we used unilateral flaps to cover defects as large as 10 cm in diameter, whereas bilateral flaps were used in 30% of cases to cover defects as large as 16cm in diameter. In the study of Ohjimi et al.<sup>12</sup> the largest sores that were reconstructed with bilateral and unilateral gluteal fasciocutaneous V–Y advancement flaps were 15–21 and 10–11cm, respectively. This is similar to our study. In another study, Wong et al.<sup>13</sup> recommended the perforator-sparing buttock rotation flap for gluteal pressure sores as it affords the flexibility of re-rotation in the event of ulcer recurrence. In this series, complication rate was 20%; three wound infections, two marginal necrosis, and one seroma, all treated conservatively without necessitating a second operation. During the follow-up period of 12 months, there was no recurrence sore in our study. In the study of Figueiras<sup>14</sup> thirty three pressure ulcers were surgically treated, complications related to 13(39%) ulcers, and ulcer recurrence occurred in three (18%) patients after an average of 6 months of follow-up. Our study was similar to the study of El Hawary<sup>15</sup> who treated 13 sacral pressure sores by using V–Y advancement gluteal fasciocutaneous flap and noticed that only two (15.4%) patients had superficial necrosis in the distal end of the flap that was treated conservatively, all flaps survived without major problems and after a mean follow-up of 10 months, there was no ulcer recurrence.

In another study, Hurbungs and Ramkalawan<sup>16</sup> used the pedicled superior gluteal artery perforator flap to cover 10 sacral pressure sores and found that only one (10%) patient had postoperative hematoma, all flaps survived and after a mean follow-up of 14 months, there was no ulcer recurrence.

**Conclusion:**

Perforator based V-Y advancement fasciocutaneous flap can provide a relatively reliable and durable reconstruction of sacral pressure sore of variable sizes. Muscle sparing, less donor site morbidity, and versatility in design with greater forward mobility make this flap preferable in sacral pressure sore reconstruction.

**Limitations:**

1. Comparison with different flaps would yield a better understanding of the reconstruction of sacral pressure sore.
2. The sample size was small and for representative data a large sample is required.
3. The study was done in only one area that did not represent the whole of Bangladesh.
4. Time elapsed between the creation of the wound and the operation was not included in this study, which can affect the outcome of the flap.

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