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Role of keystone designed flap in management of pressure ulcer

Chirra Likhitha Reddy[1], Ravi Kumar Chittoria[2*], Saurabh Gupta[1], Padma Lakshmi Bharathi Mohan[1] Shijina K[1], Imran Pathan[1], Neljo Thomas[1], Nishad K[1]

[1]Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry, India

[2]Department of Plastic Surgery & Telemedicine, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry, India

Case Report

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Corresponding Author:

Ravi Kumar Chittoria

Department of Plastic Surgery & Telemedicine,

Jawaharlal Institute of Postgraduate Medical Education and Research(JIPMER),

Pondicherry, India

Email id: drchittoria@yahoo.com

Abstract

Pressure sores are common problem that are extremely difficult to treat and they have a high chance of recurrence. There have been various flaps described for treating the ischial pressure ulcers. We would like to share our experience of using keystone flap for ischial pressure ulcer

Key Words: Pressure sore, Key stone flap, bedsore treatment.

Introduction

Pressure ulcers are the most common complication in patients receiving chronic hospital care. The prevalence in patients admitted in nursing care ranges from 2% to 28% [1]. In such cases there have been various methods of treatment of pressure sores based on the grade of the ulcer, including medical and surgical management.

It is common knowledge that there is various treatment options for cover of ischial pressure ulcers including primary closure, flaps including like fasciocutaneous flaps and various muscle flaps posterior thigh flap with biceps femoris myoplasty, inferior gluteus maximus muscle flap, gracilis musculocutanoeous flap, free flaps etc. The primary aim of flap cover in pressure ulcer is to give adequate well vascularised cushion over the bony prominences.

There are various newer flaps that have been described, one such flap is keystone flap.

We would like to share our experience of use of type 1 keystone flap for the cover of ischial pressure ulcer.

Case report

The patient was a 30 year male admitted in department of Plastic Surgery, with h/o traumatic paraplegia with bowel and bladder incontinence of 7 years duration which has partially recovered. Patient has h/o recurrent pressure ulcer in the bilateral ischial region (Figure 1), of which right side was operated with inferior gluteal rotation flap previously. Patient is now admitted with grade 4 ischial pressure ulcer of 2 months duration. Thorough evaluation revealed osteomyelitis on right side. Wound bed preparation was done with negative pressure wound therapy (NPWT) and adjuvant therapy with Low level LASER therapy (LLLT) and autologous platelet rich plasma (APRP). Once patient general condition was optimised we planned for debridement with flap cover. After debridement a 3cms defect was present (Figure 2). A type 1 keystone flap was done (Figure 3). The procedure was done with tumescent anaesthesia. The debridement was done is such a way as to produce an elliptical defect of 3 cms width at the broadest part of the defect. Same size flap was planned lateral to the defect. Fasciocutaneous flap was raised, and used to cover the defect. The donor site was closed primarily.

Results

The keystone flap covered the defect completely without tension.

Discussion

Keystone is a peg shaped, main stone which supports the arch in greek architecture [2]. Because of the shape the flap designed, it is called a keystone flap (2). There are various types that have been described.

Type I

The standard flap design and closure is suitable for defects over most areas of the body up to 2 cm in width

Type IIA: Division of deep fascia

For larger areas of reconstruction, located over the muscular compartments, the deep fascia over the muscular compartment is divided along the outer curvature of the flap to permit further
mobilization of the keystone flap

Type IIB: With split skin graft to secondary defect

Where excess tension exists, the secondary defect may be skin grafted

Type III: Double keystone flaps

For considerably larger defects (5–10 cm) a double keystone design can be done to exploit maximum laxity of the surrounding tissues.

Type IV: Rotational keystone flap

Occasionally to facilitate rotation across a joint contractures or compound fractures with exposed bone, the keystone flap is raised with undermining up to 50% of the flap subfascially. The perforator support is derived from the attached part of the flap [3].

Keystone flap was initially described for lower extremity defects. There have been reports of the used of this design for trochanteric pressure ulcers.

Since our patient had partial recovery of paraplegia, he walks with support and can be in sitting position for long time. This has lead to ischial pressure ulcer. A versatile flap was required, which covered the bony prominence. As he had recurrent pressure sore, it was thought to be prudent to preserve the muscular flaps for future. We have used the type 1 keystone flap for the pressure ulcer since we felt the fasciocutaneous flap would give an adequate cover and also leave the other time tested options as our life boat flap.

We have found this flap is easy to design and owing to the surrounding skin laxity in the gluteal region the donor site was closed primarily.

Conclusion

Even though there are various flaps described in literature for ischial pressure ulcer, keystone flap, is a versatile flap which may be added to the armamentarium of treatment of pressure ulcers. However larger sample size is required for identifying the absolute indications for the use of keystone flap and the possible complications.

Figures

Figure 1: Grade 4 pressure sore

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DECLARATIONS

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All authors made contributions to the article

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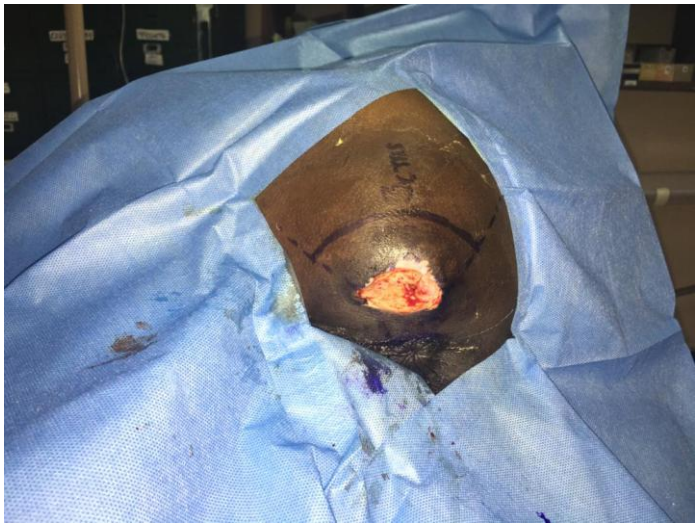

Figure 2: After debridement + Flap marking.

Figure 3: Type 1 keystone flap

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