

THE PHARMA INNOVATION

Outcome of skin grafting in post burn contractures of groin and perineum patients at a tertiary care teaching hospital

Dr. Ravi Hullamballi Shivaiah

Assistant Professor, Department of Plastic and Reconstructive Surgery, JSS Hospital and Medical College, Mysore, Karnataka, India

Background: Perineum and groin constitute only 4–6% of total body surface area and are very important sites in the body anatomically and functionally. Isolated burns to the genitalia and perineum are not common. These burns are of major concern to the patient as well as clinician. Flame burns and scalds are common causes of perineal and genital burns. Alcoholism is considered to be one of the leading predisposing factors in perineal and genital burns.

Materials and Methods: This is prospective and descriptive study conducted in the Department of Plastic Surgery at JSS Medical College, Mysuru over a period of 1 Year. First dressing was seen on third or fourth postoperative day and percentage of graft take/loss was noted. Complications, if any, were recorded. Indwelling urinary catheter drainage was instituted for 3 to 4 days postoperatively. Once the graft stabilized, patients were discharged and advised to wear compression garments.

Results: In our 68.5% of the patients, post burn contractures of the groin and perineum were because of Open chulla. Other less common causes were hot water (17.1%) and flame burn (14.2%). Majority of the patients were brought with complaints of difficulty in squatting (65.7%) followed by limitation of movements of hip joints (54.2%) and (48.5%) impairment of walking. In our study of 35 patients two types of operative procedures were performed: (1) release of contracture with split thickness skin grafting; (2) release of contracture and closure by multiple Z-plasties. Moreover, 17 (48.5%) patients having bilateral groin contractures underwent release of contracture with split thickness skin grafting. 13 (37.1%) patients underwent release of unilateral groin contracture with split thickness skin grafting and 3 (8.5%) patients underwent release of unilateral groin contracture and closure by multiple Z-plasties. 2 (5.7%) patients with perineal contracture only underwent release of contracture with split thickness skin grafting.

Conclusion: In our study, satisfactory functional and cosmetic results were seen with split thickness skin grafts in patients having postburn contractures of groin and perineum.

Keyword: Skin grafting, perineum, post burn contractures, groin

INTRODUCTION: Perineum and groin and are very important sites in the body constitute only 4–6% of total body surface area anatomically and functionally. Isolated burns to

the genitalia and perineum are not common [1]. These burns are of major concern to the patient as well as clinician. Flame burns and scalds are common causes of perineal and genital burns. Alcoholism is considered to be one of the leading predisposing factors in perineal and genital burns [2].

**Corresponding Author's Contact information:
Dr. Ravi Hullamballi Shivaiah**

Assistant Professor, Department of Plastic and Reconstructive Surgery, JSS Hospital and Medical College, Mysore, Karnataka, India

The incidence of perineal burns is uncommon. The incidence of perineal burns to be about 12/1000 admissions way back in the early 90s. In recent times, Haung mentioned a fairly consistent incidence of 1–1.5% perineal burn injuries admitted in Shriners Burns Hospital [3]. The perineum often escapes burn injury due to its deep location between the thighs. Generally, it is an extrinsic contracture of the surrounding area, that is, the lower part of the abdomen, the inguinal area, and the adjacent thighs that secondarily distort the perineum. It is reported that in the pediatric age group, 56% of patients suffering perineal burns develop contractures needing some form of surgical release, with either local flaps or skin grafts [3].

Burn injuries to the genitalia and perineum are usually the result of a child spilling hot liquid on themselves. These burns are usually partial-thickness injuries. Deep perineal burns are usually associated with either large TBSA flame burns or immersion injury [4]. Over a decade of experience in a major burn center in United States, found that genital and perineal burns occurred in the context of major burns and were rarely isolated. A total of 64.1% of the burns were caused by hot liquids (scalds), 29.5% were flame burns, 3.8% contact burns, and 2.6% electrical burns [5].

The mode of injury in developing countries may be different. Children with perineal burns that had been sustained by the spilling of kerosene on the clothes from a burning stove or due to the explosion of such stoves [6]. Perineal burns due to hot water, chemicals, and grease in males

secondary to spouse abuse [7]. The management of perineal burn injuries that were caused by the burning firewood, while cooking in a “chullah” (an earthen floor-level cookstove) [8]. Perineal burns caused by “kaangri,” or, an indigenous earthen pot containing glowing charcoal, which is used in Kashmir during the winter months for warmth, for which it is kept between the legs under a large flowing robe. Accidental chemical (sulfuric acid) burns to the genitalia in 12 patients [9].

Contractures in the groin and perineum lead to problems in squatting, walking, sitting, urination, defecation, and sexual function. Squatting, a common posture adopted in India and Southeast Asia for urination and defecation, becomes extremely difficult and frequently is the chief presenting complaint [10]. Around 25% of all adult patients with burns experience a loss of libido or orgasmic dysfunction [11]. Direct injury to the genitalia increases the number of patients who have sexual dysfunction to a significant higher level [12].

Materials and Methods

This is prospective and descriptive study conducted in the Department of Plastic Surgery at JSS Medical College, Mysuru over a period of 1 Year.

All the burn patients presenting to our facility who fulfill the standard criteria of admission were admitted to our Burn Unit. Burns involving the pubic area, genitalia, perianal area, upper posterior thigh, and buttocks were classified as perineal burns. All the burn patients admitted to our unit were managed as per the standard burn management protocol like resuscitation, wound management, and rehabilitation. Epidemiological data, type, extent and severity of the burns, associated/predisposing factors, management, complications and outcome was analyzed. The specific outcomes were death or discharge from the hospital.

All patients were subjected to surgery under general anaesthesia and the following operative procedures were performed: (1) release of contracture with split thickness skin grafting (2)

release of contracture and closure by multiple Z-plasties.

First dressing was seen on third or fourth postoperative day and percentage of graft take/loss was noted. Complications, if any, were recorded. Indwelling urinary catheter drainage was instituted for 3 to 4 days postoperatively. Once the graft stabilized, patients were discharged and advised to wear compression garments. Regular physiotherapy and massaging with emollient creams were advised in all cases to avoid any recurrence of the contracture. Operated patients were followed and the results were analyzed according to the functional and cosmetic outcome; patient's satisfaction regarding the operative procedure and need for any secondary surgeries were recorded.

Results

In table 1, maximum number of patients were female 28 (80%) and male 7 (20%) in present study.

Table 1: Distribution of gender

Gender	Number of patients (Percentage)
Male	7 (20%)
Female	28 (80%)
Total	35 (100%)

Table 2: Distribution of different age groups

Age in years	Number of patients (Percentage)
11-15	11 (31.4%)
16-20	13 (37.1%)
21-25	11 (31.4%)
Total	35 (100%)

In our study, majority of the patients were in the age group of 16–20 years 13 (37.1%) and least were 11-15 years 1 (31.4%).

Table 3: Distribution of causes of patients

Parameters	Number of patients (Percentage)
Open chulla	24 (68.5%)
Hot water	06 (17.1%)
Flame burn	05 (14.2%)
Total	35 (100%)

In table 3, in 68.5% of the patients, post burn contractures of the groin and perineum were because of Open chulla. Other less common causes were hot water (17.1%) and flame burn (14.2%).

Table 4: Distribution of complaints of patients

Complaints	Number of patients (Percentage)
Squatting	21 (65.7%)
Limitation of movements of hip joints	19 (54.2%)
Impairment of walking	21 (48.5%)

In table 4, majority of the patients were brought with complaints of difficulty in squatting (65.7%) followed by limitation of movements of hip joints (54.2%) and (48.5%) impairment of walking.

Table 5: Operative procedure of patients

Operative procedure	Number of patients (Percentage)
Release of bilateral groin contracture with split thickness skin grafting	17 (48.5%)
Release of unilateral groin contracture with split thickness skin grafting	13 (37.1%)
Release of unilateral groin contracture and closure by multiple Z-plasties	3 (8.5%)
Release of perineal contracture with split thickness skin grafting	2 (5.7%)
Total	35 (100%)

In our series of 35 patients two types of operative procedures were performed: (1) release of contracture with split thickness skin grafting; (2) release of contracture and closure by multiple Z-plasties. Moreover, 17 (48.5%) patients having bilateral groin contractures underwent release of contracture with split thickness skin grafting. 13 (37.1%) patients underwent release of unilateral groin contracture with split thickness skin grafting and 3 (8.5%) patients underwent release of unilateral groin contracture and closure by multiple Z-plasties. 2 (5.7%) patients with perineal contracture only underwent release of contracture with split thickness skin grafting.

Table 6: Complication had patients

Complications	Number of patients (Percentage)
Postoperative hematoma	1 (2.8%)
Minimal patchy graft loss	2 (5.7%)
Secondary contractures of the graft	1 (2.8%)
Partial recurrence of the contracture	1 (2.8%)
Total	5 (14.2%)

On table 6, postoperative hematoma formation under the graft was seen in 1 (2.8%) patients. Minimal patchy graft loss was seen in 2 (5.7%) patients, which was managed conservatively. Minor secondary contractures of the graft were seen in 1 (2.8%) patient. Partial recurrence of the contracture was seen in 1 (2.8%) patients who required secondary surgeries.

Discussion

Postburn contractures of groin and perineum are a rare burn sequel and such contractures are usually diagnosed late owing to the patient's negligence, ignorance, and shyness and delay can be extended until puberty and sometimes even later in females. The contracture band in the groin and across the symphysis pubis binds the thighs together, leading to functional problems like difficulty in squatting, walking, sitting, urination, defecation, and sexual function. Squatting, a common posture adopted in India for urination and defecation, was the main complaint in all our patients.

The mode of burn injury in our series was different from that reported by other authors. Sawhney^[13] reported perineal burns sustained by spilling of kerosene on the clothes from a burning stove or due to explosion of such stoves. Bangma *et al.*^[14] reported burns to the perineum and genitals due to scalds, explosion, open fire, or electricity. Balakrishnan *et al.*^[15] reported perineal burns due to hot water, chemicals, and grease in males secondary to spouse abuse. Kumar *et al.*^[16] reported scalds, flames, and electric burns as the most common contributors to burn injury.

Michielsen *et al.*^[17] reported burn injury to the genitalia and perineum mostly due to scalds,

flames, and chemicals. Abdel-Razek^[18] reported accidental chemical (sulphuric acid) burns to the genitalia. Thakur *et al.*^[19] reported perineal burns caused by fire wood used in open "chullah."

In majority of our patients (68.5%), open chulla burn injury to groin and perineum was the mode of injury. Because these burns were not managed properly in acute phase, they had healed with the development of contractures of groin and perineum.

Limitation of the movements of hip joints was seen in 19 (54.2%) patients. This limitation of movements of the hip joints had led to impairment of gait in 21 (48.5%) patients. Most of these patients had long standing contractures of groin. The findings are in agreement with the observations made by other investigators^[20].

As perineal burn contractures are not in a stabilized position, recurrent ulcerations may occur and, in exceptional cases, Marjolin's ulcer (squamous cell carcinoma) may develop^[21]. Darzi and Chowdri^[22] reported recurrent ulceration in 30 (41.66%) patients with postburn scar carcinoma. In our series we have seen recurrent ulcerations in 3 (6.12%) patients.

As reported by Sawhney^[23], long term measures have to be instituted postoperatively to prevent skin graft contraction such as wearing tightly fitting undergarments. In our study also patients were advised to wear compression garments postoperatively. Regular physiotherapy and massaging with emollient creams were also advised in all cases to prevent any recurrence of the contracture. Postoperative follow-up ran smoothly with adequate healing. Squatting ability improved in majority patients and they were able to perform essential chores that require squatting position. There were no donor site complications. Thus, split thickness skin grafting was safe, less time consuming, and technically easy with good functional and cosmetic results. It can be done safely in patients having unilateral or bilateral postburn groin contractures and postburn perineal contractures of any severity.

Release of contracture and closure by multiple Z-plasties was done in 3 (8.5%) patients having minor unilateral postburn groin contractures in the form of linear bands. The functional and

cosmetic results were satisfactory. Ye ^[24] found satisfactory results with local Z-plasty in 32 (82.05%) patients with postburn perianal scar contracture. Thus, patients having minor postburn groin contractures, release of contracture and closure of wound by multiple Z-plasties can be done safely with shorter operative and recovery time and satisfactory functional results.

Conclusion

In our study, satisfactory functional and cosmetic results were seen with split thickness skin grafts in patients having postburn contractures of groin and perineum.

References

- Suliman MT. Experience with the seven flap-plasty for the release of burns contractures. *Burns*. 2004;30:374-9.
- Ahuja RB, Bhattacharyas. ABC of burns: Burns in the developing world and burn disasters. *BMJ*. 2004;329:447-9.
- Pisarski GP, Greenhalgh DG, Warden GD. The management of perineal contractures in children with burns. *J Burn Care Rehabil*. 1994;15:256-9.
- Andreason NJ, Norris AS. Long term adjustment and adaptation mechanism in severely burned adults. *J Nerv Ment Dis*. 1972;154:352-62.
- Borman H, Maral T, Demirhan B, Haberal M. Reliability of island flaps raised after superficial and deep burn injury. *Ann Plast Surg*. 2000;45:395-8.
- El-Otiefy MA, Darwish AM. Post-burn breast deformity: various corrective techniques. *Ann Burns Fire Disasters*. 2011;24:42-45.
- Yongwei P, Jianing W, Junhui Z, Guanglei T, Wen T, Chun L. The abdominal flap using scarred skin in the treatment of postburn hand deformities of severe burn patients. *J Hand Surg [Am]*. 2004;29:209-15.
- Yang JY, Tsai FC, Chana JS. Use of free thin anterolateral thigh flaps combined with cervicoplasty for reconstruction of post burn anterior cervical contractures. *Plast Reconstr Surg*. 2002;110:39-46.
- Tsai FC, Mardini S, Chen DJ, Yang JY, Hsieh MS. The classification and treatment algorithm for post-burn cervical contractures reconstructed with free flaps. *Burns*. 2006;32:626-633.
- Woo SH, Seul JG. Optimizing the correction of severe post burn hand deformities by using aggressive contracture releases and fasciocutaneous free-tissue transfers. *Plast Reconstr Surg*. 2001;107:1-8.6.
- Erguns, Cek DI, Ulay M. Reconstruction of vulva in a female patient having long-standing genital burn contracture with severe web and Marjolin's ulcer: a case report. *Annals of Burns and Fire Disasters*. 1999;12:36-9.
- Grishkevich VM. Post-burn perineal obliteration: Elimination of perineal, inguinal, and perianal contractures with the groin flap. *J Burn Care Res*. 2010;31:786-90.
- Sawhney CP. Management of burn contractures of the perineum. *Plastic and Reconstructive Surgery*. 1983;72(6):837-842.
- Bangma CH, van der Molen ABM, Boxma H. Burns to the perineum and genitals-management, results and function of the thermally injured perineum in a 5-year-review. *European Journal of Plastic Surgery*. 1995;18(2-3):111-114.
- Balakrishnan C, Imel LL, Bandy AT, Prasad JK. Perineal burns in males secondary to spouse abuse. *Burns*. 1995;21(1):34-35.
- Kumar P, Chirayil PT, Chittoria R. Ten Years epidemiological study of paediatric burns in Manipal, India. *Burns*. 2000;26(3):261-4.
- Michielsen D, van Hee R, Neetens C, Lafaire C, Peeters R. Burns to the genitalia and the perineum. *Journal of Urology*. 1998;159(2):418-419.
- Abdel-Razek SM. Isolated chemical burns to the genitalia. Analysis of 12 patients. *Annals of Burns and Fire Disasters*. 2006;19(3):148-154.
- Thakur JS, Chauhan C, Diwana VK, Chauhan DC, Thakur A. Perineal burn contractures: an experience in tertiary hospital of a Himalayan state. *Indian J Plast Surg*. 2008;41:190-4.

20. Weiler-Mithoff EM, Hassall ME, Burd DA. Burns of the female genitalia and perineum. *Burns*. 1996;22(5):390-395.
21. Gottlieb LJ, Grevious MA. Reconstruction of the burned perineum and genitalia. In: Sood R, editor. *Burn Surgery: Reconstruction and Rehabilitation*. Philadelphia, PA: WB Saunders; c2006. p. 271-91.
22. Angel C, Shu T, French D, Orihuela E, Lukefahr J, Herndon DN. Genital and perineal burns in children: 10 years of experience at a major burn center. *J Pediatr Surg*. 2002;37(1):99-103.
23. Hayashi A, Maruyama Y. The use of the anteromedial thigh fasciocutaneous flap in the reconstruction of the lower abdomen and inguinal region: a report of two cases. *Br J Plast Surg*. 1988;41:633-8.
24. Sagi A, Freud E, Mares AJ, Ben-Meir P, Ben-Yakar Y, Mahler D. Anal stenosis with megarectum: an unusual complication of a perineal burn. *Journal of Burn Care and Rehabilitation*. 1993;14(3):350-352.