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PREPUCEAL SKIN GRAFTING – A MORE PRACTICAL AND EASILY AVAILABLE NEW RECONSRUCTIVE OPTION

Medical Science

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ABSTRACT

AIM AND OBJECTIVES

To evaluate the usefulness of prepuceal skin grafting for various raw areas due to Diabetic ulcers, Venous ulcer, Scrotal raw area after Fournier's gangrene debridement, raw areas due to cellulitis debridement.

MATERIALS AND METHODS

This study was conducted at Government Theni medical college hospital, Theni, over a period one year i.e., from May 2010 to April 2011. About 20 uncircumcised male patients with raw areas due to various cause like Diabetic ulcers, Venous ulcers, raw areas after cellulitis debridement and Scrotal raw area after Fournier's gangrene debridement were included in the study.These patients were evaluated and circumcision and grafting were done in the same sitting.

DATA COLLECTED

Data were collected regarding the age of the patient , average size of the defect , mean size of the prepuceal skin for grafting , graft survival on 5th and 7thpost operative days, donor site morbidity, complications at the donor and recipient site .

RESULTS

The average ulcer area treated was between 32 + 7 cm2 . The size of the donor graft harvested varied from 30-40cm2. The graft take was 100% in all 20cases on 7th postoperative day . All the recipient areas healed completely in 2 -3 weeks . There was no contracture at the grafted site. Except for hyperpigmentation no other complications were observed at the recipient site.

CONCLUSION

Prepuceal skin is natural human moiety that needs to be preserved and used fruitfully. This prepuceal skin grafting is more practical and effective alternative to conventional skin grafting.

KEYWORDS:

INTRODUCTION

Although skin grafting originated 2500 -3000 years ago, it was only in the 19th century that this technique was introduced as a reconstr uctive option[13]. Skin grafting can be broadly classified in to split thickness grafts, full thickness grafts, composite grafts and cartilage grafts13.In the last decade, an extraordinary type of full thickness graft, prepuceal skin graft has been used as an alternative graft source and has promising results.

Prepuceal skin is a full thickness, double layered skin with the inner skin layer lied close to the glans penis. The main advantage of this is that more than 20% of the actual measured foreskin can be used for grafting because of its high elasticity[7]. We made use of this foreskin for grafting the commonly encountered raw areas in surgical practice like Diabetic ulcers, Venous ulcers , for Scrotal raw areas after Fournier's gangrene debridement and raw areas after debridement of Cellulitis due to various causes.

The prepuce, or foreskin, has been used as a skin graft for a number of indications, including hypospadias repair, eyelid reconstruction, creation of an anal canal, replacement of conjunctiva, correction of ectropion, reconstruction of burned eyelids, reconstruction of extravasation injury to the foot.

MATERIALS AND METHODS

This study was conducted at Government Theni medical college Hospital,Theni, over a period two years i.e., from May 2012 to April 2014. About 50 uncircumcised male patients with raw areas due various cause like Diabetic ulcers, Venous ulcers, raw areas after cellulitis debridement and Scrotal raw area after Fournier's gangrene debridement were included in the study .

All the patients were admitted in the surgical wards. The recipient area was prepared with routine wound care and was posted for grafting after the wound swab cultures turned out to be negative for any growth. A thorough preoperative evaluation was done and anaesthetic fitness was obtained prior to the procedure.

The size of the raw area and the average size of the skin required was evaluated preoperatively itself. Patients with raw areas less than 50cm2 were included in the study which shows the maximum area of prepuceal skin that can be harvested.

Patients were fully explained about the procedure regarding its advantages , disadvantages and other available alternative donor sites and an informed consent was obtained from them.

Prepuceal skin was prepared preoperatively by cleaning with normal soap and water. Circumcision and grafting were performed in the same sitting. Circumcision was done by freehand technique. After completing the circumcision, the resected foreskin was unfolded to become a larger piece. The prepared recipient site was then covered with full thickness prepuceal graft. Meshing of the graft is done in few cases to cover larger areas. The graft was secured with silk sutures and the recipient area was splinted to prevent slippage of the graft. Prophylactic antibiotics was used for 5 days post operatively, diabetic patients were managed with insulin and the graft was examined for survival on the 5th and 7th post operative days

Datas were collected regarding the age of the patient , average size of the defect , mean size of the prepuceal skin for grafting , graft survival on 5th and 7th post operative days, donor site morbidity, complications at the donor and recipient site .

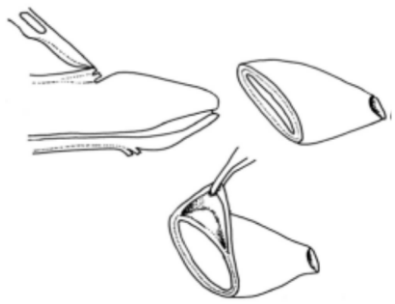


Fig. 1 Diagram showing the circumcised foreskin and the unfolding of the two layers of foreskin provided doubled size of foreskin for grafting.

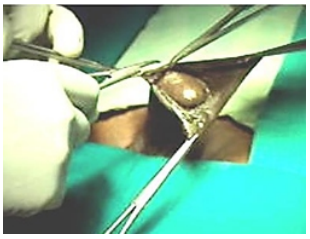


Fig 2 circumcision being performed



Fig 3 circumcised skin



Fig 4 post circumcision

RESULTS AND ANALYSIS

The average ulcer area treated in our study was between 32 + 7 cm^2 . The size of the donor graft harvested varied from 30-40cm^2. The graft take was 100% in all 20cases on 7th postoperative day. All the recipient areas healed completely in 2 -3 weeks . There was no contracture at the grafted site Except for hyperpigmentation no other complications were observed at the recipient site . Almost all the circumcised wounds healed completely except for one patient who had edema around the circumcised area which subsided with anti-inflammatory drugs.The skin grafting using prepuce skin was without any scarring or hypopigmentation at the donor site, like other methods of harvesting the graft except the normal looking circumcised penis.



Fig 5 scrotal raw area



fig 6 grafted scrotal raw area



Fig 7 grafted venous ulcer



fig 8 grafted venous ulcer



Fig 9 grated diabetic ulcer

DISCUSSION

The approach to particular wound care depends on the severity, extension and site of the wound. Deeper wounds and nonhealing wounds with wider raw areas needs a skin cover to promote faster wound healing and prevent contracture at the wound site.

Available skin autografts donor tissues can be harvested from many sites . For full thickness grafts groin is the most common site followed by cubital and post auricular areas. However the size of the graft is limited and there is potential wound infection at the donor site[4].

Circumcision is being performed as a part of various religious,social and cultural practices and claimed to have some potential benefits like protection against sexually transmitted diseases and penile cancer3 . Indications for circumcision are phimosis secondary to Balanophosthitis xerotica obliterans, recurrent balanoposthitis, paraphimosis, phimosis, prepuceal pearls and redundant fore skin . we go still further and add autograft harvesting as yet another indication for circumcision.

In adult population we come across a lot situations wherein we need skin grafting . The most common situation being a healing diabetic foot ulcer, followed by raw area due to debridement of cellulitis due to various causes etc. One such situation wherein we need a flap cover for healing is a scrotal raw area. The use of prepuceal skin for this situation is valuable alternative in which the donor site is nearby and it aptly matches for this area.

In the clinical report published by Sootiporn Chittmittrapap, from Bangkok ,Thailand, 42 thai boys who underwent burn contracture release[8], syndactyly reconstruction, injured extremities , fasciotomy defects ,were grafted with prepuceal skin and the graft take was 100% and was without any complications both at the donor and recipient site[5]. In study by Dogrul et al , in 12 patients prepuceal skin grafting was done after burn contracture release and graft survival was 100% with out any donor site morbidity[18].

Recently in a study performed by Mcheik and et al, they concluded that keratinocyte resulting from foreskin have a high capacity of division. These cells can divide a long time before differentiation and enabled them to propose with their paitents the keratinocytes from foreskin for wound healing especially for burns in children .Only limitation of Prepuce Skin Grafting is its healing with hyperpi gmentation which limits its usage in face and neck region which are the most common recipient side of Full Thickness Skin Grafts. But it can be used in extremity and scalp defects

In an analysis by yldrim et al 11 patients who underwent circumc ision grafting for scalp defects and defects due to trauma also did well with out any morbidity6.

Our study still extends the application of this useful procedure to more surgical scenarios like scrotal raw area and diabetic and venous ulcers where in we got 100% results with out any donor or recipient site morbidity.

The use of prepuceal skin is not a new idea because it has been used in correction of hypospadiasis, syndactyly repair[9], eyelid and anal canal reconstruction10, intra oral burn reconstruction10 and penile skin defect repairs[15-17].

The advantage of prepuce as a graft donor site are 1.Normal looking circumcised penis and also hidden donor site [2].The circumcision scar has less tendency of hypertrophic scarring or keloid formation [3].Good results as a full thickness graft with less secondary graft contracture, more flexible graft especially over area requiring movement i.e., across joints [4]. Absence of hair follicles [5]. No special equipments are needed for harvesting.

The disadvantages are

1. Limited to the male uncircumcised population,
2. Hyperpigmentation at the reconstructed area and in the exposed area where cosmesis is needed.

However the skin on the inner side of the prepuce tends to have good adaptation and matching. Prepuceal skin of the penis is considered one of the best donor sites for full thickness autografts. Circumcision at the donor site is considered as a normal variant rather than abnormality.

CONCLUSION

Prepuceal skin is definitely a valuable resource for full thickness skin grafting. Its application can still be extended to various surgical situations where skin grafting is needed. Simpler methods for harvesting, flexibility and better graft survival must indulge more number of surgeons to use this valuable skin as a full thickness graft when indicated. Prepuceal skin is natural human moiety that needs to be preserved and used fruitfully.

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