

BURNS IN CHILDREN; EARLY VERSUS LATE EXCISION AND GRAFTING

ORIGINAL
PROF-2054

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ABSTRACT... Burns are among the most devastating of all home injuries with formidable sequelae ranging from considerable physical disability to emotional and mental trauma. Patients of burn require prolonged hospitalization resulting into considerable financial burden on patient as well as the state. Treatment of burns can be made cost effective by early excision and grafting of the burned areas. A randomized controlled study was conducted to evaluate the efficacy of early versus delayed excision and skin grafting in pediatric burns. Out of 80 burned children, 30 underwent early excision and grafting whereas 50 were treated with delayed excision and grafting. Mean percent graft take was 96.67 in early and 88.40 in delayed group. Over all post operative complications like minor graft rejection was found in 26% cases of early and 48% of delayed group whereas major graft rejection was found in 14% of delayed group only. Post operative contractures developed in 8% of delayed group. Mean hospital stay was 13.66 and 37.46 days for early and delayed excision and grafting respectively. Early excision and grafting in pediatric burns is a superior and cost effective to delayed excision and grafting in terms of post operative complications, cosmesis and hospital stay.

Key words: Burns, Skin grafting, Early grafting.

INTRODUCTION

Burns in children remain a major public health issue in terms of morbidity and long term disability especially in the developing countries. It is also one of the leading causes of accidental death in children. Burn is a type of injury caused by heat, electricity, chemicals, light, radiation or friction. Most burns affect only the skin. Rarely, deeper tissues, such as muscle, bone, and blood vessels can also be injured¹. Extensive burns require specialized treatment which include immediate fluid resuscitation, removal of dead tissue, administering antibiotics, and skin grafting². Main aim of treating burns after saving the life is to minimize scarring by appropriate surgical intervention and long-term scar management. Optimal time for excision and grafting is not a consensus³. Conventionally, they are treated by delayed excision and grafting usually after 15 post burn days. However early excision and grafting within 3-5 days of burn is another alternative of treating burns. Early excision and grafting reduces the septic complications in burn injuries⁴. However, due to lack of education in general, and health-education in particular amongst the common people in the "developing" countries this procedure could not be accepted. The aim of the study is to evaluate the efficacy of early excision and skin grafting in pediatric burns in reducing hospital stay and burn related complications which affect the ultimate cosmesis in burn cases.

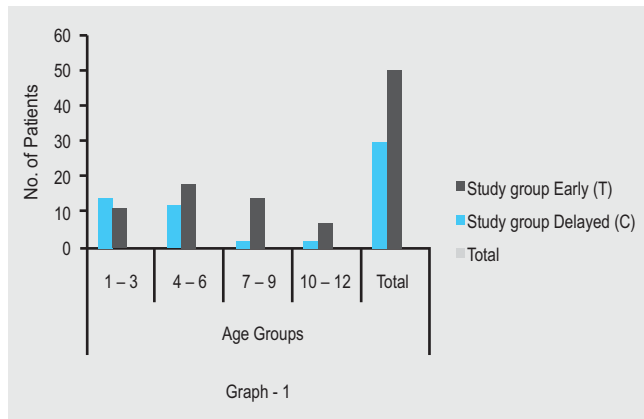
PATIENTS AND METHODS

A randomized controlled trial was conducted in the department of Pediatric Surgery, King Edward Medical University/ Mayo Hospital, Lahore, over a period of 6 months. Non-probability, purposive sampling technique was adopted. Eighty children of burns were studied out of which 30 underwent early excision and grafting. They were taken as Test (T) whereas 50 cases taken as Control (C) were treated with delayed excision and grafting. All the patients were resuscitated with appropriate fluids at the time of admission. Detailed history of all the patients was taken. Type and actual mechanism of burn injury was determined. Detailed physical examination was done to know the total burn area. Children 1-12 years old, having deep burns of 10-20% of body surface area and of less than 48 hours duration with no co-morbid factor were included in the study. Cultures of the recipient area of all the children undergoing delayed grafting was obtained. All the grafted areas were examined on 3rd post operative day to know the graft take percentage and majority of them were discharged on 7th post operative day of successful graft take. Patients were followed weekly for the first month and monthly thereafter for six months for the development of any complication. Data was analyzed by using statistical package for social sciences SPSS version 11.0. 't' test was used to test the difference between the centre values of the continuous variable; i.e.

number of days of hospital stay while chi-square test was used to know the difference in graft take percent and thus the cosmetic results between the two groups.

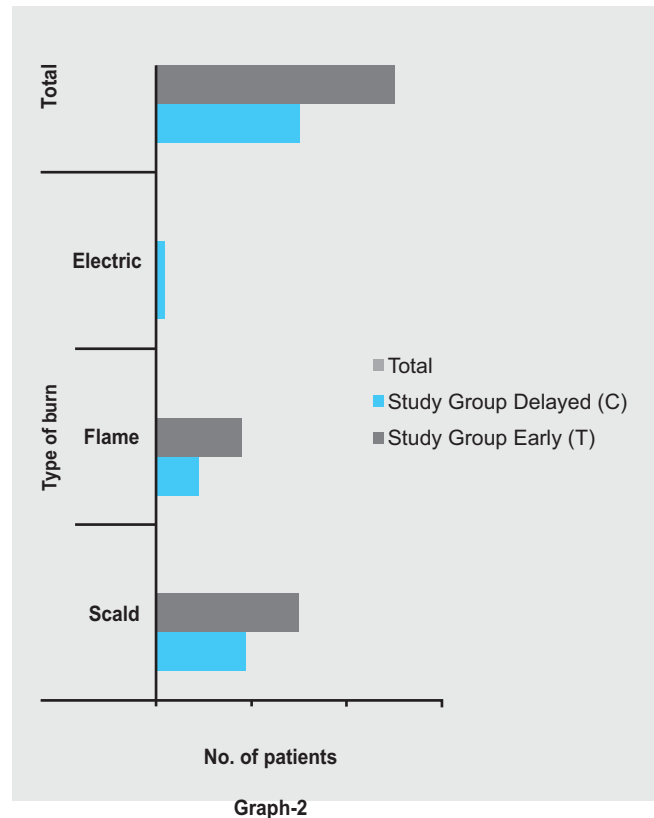
RESULTS

The mean age of all the patients was 5.29±2.78 years with minimum and maximum age of 1 and 12 years respectively. The mean age of children in early treatment group was 4.18±2.54 years and 5.96±2.73 years in delayed treatment group. There were 25 (31.25%) children of 1-3 years 30 (37.5%) of 4-6 years, 16 (20%) of 7-9 years and 9 (11.25%) were 10-12 years of age. Distribution of different age groups in both study groups is given in Graph-1.



There were 51 (63.75%) male and 29 (36.75%) female children. Forty nine (61.2%) children presented with scalds, 27 (33.8%) with flame burn and 4 (5%) presented with electrical burn (Graph-2). Chest was involved in 28 (35%) cases, thighs in 23 (28.8%), arms in 21 (26.3%), abdomen in 15 (18.8%) and face was involved in 11 (13.8%) cases. Most of them had involvement of more than one anatomical regions. The mean total body surface area (TBSA) of all the patients was 14.66%±4.15% with minimum and maximum TBSA% of 10% and 25% respectively. The mean TBSA% of children in early and delayed treatment group was 11.43%±2.16% and 16.60%±3.84% respectively. There was significant difference between both groups for mean TBSA% (P-value = 0.000). The mean graft take percent of all the patients was 91.50% with minimum and maximum percentage 50% and 100% respectively. The mean percentage of graft take of children in early treatment group was 96.67% whereas it was 88.40% in

delayed treatment group. There was significant difference between both groups for mean graft take percentage(P-value = 0.001).

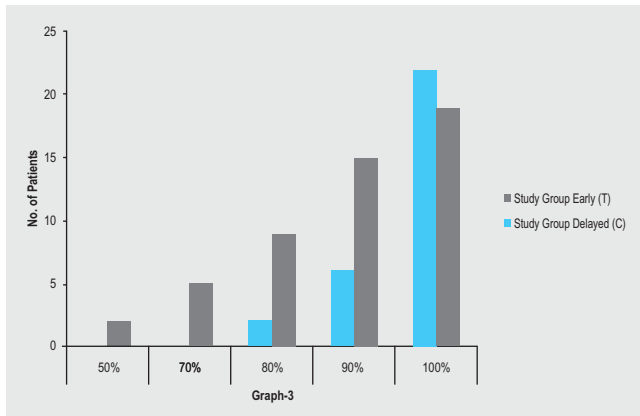


There was significant difference between both groups for percentage of taken graft (P-value = 0.024). In early treatment group, 8 (26.6%) had minor (upto 20%) rejection of skin graft and none showed major (>20%) graft rejection whereas 24(48%) of delayed group had minor and 7 (14%) had major skin graft rejection (Graph-3). Four (8%) of delayed and none of early group developed contractures.

Mean post-operative hospital stay of patients in early treatment group was 13.67 days whereas it was 37.46 days in delayed treatment group.

DISCUSSION

Skin burns are a leading cause of injury in the home environment. Children are particularly vulnerable to this type of injury. At the age of 1-3 years children start to walk and move in different rooms in the house and thus become victims of burn injuries. Burns are usually caused by heat. However, chemicals, electricity and



radiation can also cause severe burns¹. Among children scalds are more common than flame injuries⁵. Thermal injury is usually characterized by serious sequelae ranging in magnitude from disfigurement, deformity and amputation to death depending on the severity of the burn and the treatment offered⁶. It affects the daily routine of the victim as either he remains away from work place or school, etc or is unable to perform the daily activities because of these complications⁷.

Most skin burns are minor and can be managed at home. However, it is important to identify the signs of a more serious deep skin burn, which should be evaluated and treated accordingly. The surgeon's goal for any burn is well healed durable skin of normal functions and near normal appearance⁸. In order to minimize the complications of deep burns they are treated by skin grafting. Early skin grafting reduces duration of illness, septic complications, and major reconstructive procedures resulting in low treatment cost⁹. Immediate grafting for deep dermal burns was first used by Janzenkovics expecting less scarring and better function¹⁰. Jackson and Stone suggested the second to fifth post-burn days as the optimum time for the procedure¹¹. Early excision of burned tissue and skin grafting were actually introduced to minimize hospital stay, hospital cost, and septic complications through elimination of burn toxins¹². Early tangential excision and grafting has now become the standard treatment for most deep dermal burns. The procedure requires experience and training, both in the selection of wound and performance of the procedure¹³. Identification of full-thickness lesions is normally easy, the judgment between superficial and deep dermal burns on the first

day after injury demands more experience. Indeed, the burn severity not only depends on the intensity and duration of the thermal agent but also on the thickness of dermis and infective events. An erroneous under evaluation with a delayed spontaneous healing leads to more scarring and need for secondary surgical corrections. Late surgical treatment of unhealed areas is again the cause of possible functional and cosmetic impairment. However, over evaluation exposes the risk of excessive removal of healthy tissues with iatrogenic damage^{14,15}.

Mean graft take percent in the present study was better in early excision group (96.67%) as compared to delayed group (88.40%). Post operative complications like rejection of graft and development of contracture was more in delayed group than early group. Minor skin graft rejection (upto 20%) was found in 8 (26.6%) cases of early group and 48% of delayed group whereas major graft rejection (>20%) was not found in early group but 14% of delayed group. Four (8%) cases of delayed group were found to have contractures on follow up. This was mainly due to infection of recipient areas. Malfeyt compared the results of early excision and grafting with delayed grafting on granulating wounds in deep burns of hands. Patients undergoing early excision and grafting had better graft take, with faster healing and better function than others¹⁶. Pietsch et al also showed that early excision of major burns in children resulted in considerable reduction in morbidity and mortality¹⁷. In different studies presented by Edstrom et al., Goodwin et al., and Frist et al., there was no significant difference in the functionality of the body part in the conservative method versus early excision and grafting^{18,19,20}. The only reason for early excision and grafting seemed to be the short hospital stay for patients with small total body surface burns. Although it is universally agreed that early excision and grafting shortens the length of hospital stay, the debate regarding the other proposed benefits continues. Differences in outcome also seems to be dependent on anatomical sites^{3,18}.

In the present study mean hospital stay of children in early treatment group was significantly shorter (13.66 ± 4.94 days) as compared to delayed group (37.46 ± 14.68 days). Omar et al., also showed that the

mean hospital stay was significantly lower in early excision and grafting group (16 ± 2.5 days) as compared to (24 ± 3.4 days) in the delayed group¹². Among patients who underwent early excision, blood transfusion requirements were also increased due to more blood loss. However, this was not significant, as most of the patients of delayed grafting needed multiple transfusions. Xiao-Wu et al also showed that delayed excision and grafting were associated with longer hospitalization and increased rates of invasive wound infection and sepsis²¹. Reduced treatment cost by short hospital stay with early surgery makes it a better option for the management of burn cases²².

CONCLUSIONS

Early excision and skin grafting reduces septicemia and other complications of burns. Cosmetic results are better than late excision and grafting. It minimizes the secondary reconstructive surgery and affects the treatment cost by reducing the hospital stay.

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Article received on: 01/08/2012

Accepted for Publication: 25/08/2012

Received after proof reading: 08/10/2012

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Article Citation:

Mansoor SH, El-Harrazin MM. Burns in children; early versus late excision and grafting. Professional Med J Oct 2012;19(5):625-629.