ELECTRIC BURN OF THE PRECORDIAL REGION

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SUMMARY

A case of high tension electrical burn in a young adult male who besides other injuries had full thickness loss of the chest wall in the region of the precordium (2" × 2") through which the pulsating heart could be seen was brought for treatment to the Postgraduate Department of Plastic Surgery at the King George's Medical College, Lucknow. He attracted the attention of all the patients admitted in the department because every body wanted to have a look at the pulsating heart. Attempts to improve his general condition and state of nutrition were made so that a definitive procedure of a flap cover for the precordial region could be provided. But before this could be done the defect got covered by granulation tissue and a simple skin graft was put in over that area. Now a protective jacket has been provided to him and he is carrying on well with his activities for the last 2 years.

Reconstruction of chest wall defects is a challenging problem. The majority of the chest wall defects are produced as a result of surgical removal of chest wall malignancies, accidents or following radiotherapy. The site, extent, depth of the wound and the condition of surrounding tissues are important factors in planning a reconstructive procedure. Effective closure of the pleural space and chest wall stability must be finally achieved (Converse, 1977).

Case Report

A 20 year old male with extensive electric burn wounds sustained about a month ago over his scalp, chest, right hand, left thigh and left buttock was referred to our department from a district hospital. The accident occurred when the patient was repairing high tension live electric wires. An above elbow amputation of the left upper extremity had already been done prior to his admission in our department because of the impending gangrene in the extremity. At the time of admission, the patient had severe anaemia, dyspnoea and tachycardia. There was a 4" × 4" size rounded full thickness loss of scalp over the right parietal and temporal area with exposed skull bone (Fig. 1). There were infected wounds over the front and back of the chest. The wound on the front of chest was situated mainly on the left side extending from the clavicle above to the xiphisternum below and from the left anterior axillary line to almost the mid clavicular line on the right side (Fig. 2). In the precordial region, there was a full thickness defect (2" × 2") through which the pulsation of the heart could be seen (Fig. 2). Peripheral healing was seen all around the wound. Nearly the entire left half of the back had a deep burn due to earthing. The amputation stump of the left hand had a small infected ulcer but the humerous was well covered. The examination of the right upper extremity revealed a deep burn over the dorsum of the thumb, 1st web space and dorsum of the index finger besides a partially healed wound on the medial aspect of the right upper arm. There was also an infected deep burn wound over the left buttock (3" × 3") and over the anteromedial region of the left thigh (4" × 2").

On investigation he was found to have a haemoglobin of 7.5 gm%. Other haematological and biochemical tests were within normal limits. X-ray chest revealed loss of the anterior portions of the 4th and 5th ribs. X-ray skull revealed no abnormality.
Fig. 1. Photograph showing result of split skin grafting over the scalp defect (after 2 years).

Fig. 2. Photograph showing defect over the anterior chest wall. Arrow indicates the exposed pericardium.

Fig. 3. Photograph showing result of split skin grafting (after 2 years) over ant. chest wall defect. Arrow indicates the site where pericardium is directly covered by split skin graft.

Fig. 4. Photograph of the patient wearing a protective chest shield.
Management

The patient was given high caloric diet, antibiotics, vitamins and haematinics. Multiple blood transfusions were required. The wound was dressed daily. After about one month of conservative treatment, the general condition of the patient improved and the defect in the precordial region got a covering of healthy granulation tissue spontaneously which surprised all of us. A meshed split skin graft taken from the right thigh was used to cover the entire raw area (Fig. 3). The outer cortex of the skull was chiselled prior to skin grafting. Except over the back all other areas showed 70-80% take up of the graft. On the back it was about 30-40% take and required another session of skin grafting. After about two weeks the patient was discharged with advice for follow-up after two months. This time his adduction contracture of the thumb was released and the defect in the web space was resurfaced by an ipsilateral groin flap.

Discussion

A large full thickness defect of the anterior chest wall can be reconstructed by pedicled skin flap (Thomas, 1961; Converse et al, 1951), latissimus dorsi muscle flap (Davis et al., 1949; Campbell, 1950), pectoralis major muscle flap (Arnold and Pairolero, 1978, 1979), pectoralis major myocutaneous flap (Hueston & Conchie, 1968) and greater omentum (Dupont and Menard, 1972; Jurkiewicz and Arnold, 1977). In special situations smaller defects of the anterior chest wall can be reconstructed by external oblique myocutaneous flap (Hodkinson and Arnold, 1980) or by rectus abdominis muscle/myocutaneous flap (Mathes and Nahai, 1982). Waston and James (1947) have used fascial grafts for the chest wall defect. Pickrell et al., (1947) have sutured the pericardium to the chest wall defect and used split thickness skin graft to resurface it. Tantalum mesh and plates have been used for chest wall reconstruction but they have been found to be unsatisfactory (Effler and Blades, 1946; Marrow, 1950). Tantalum plates become loose and slough out due to constant movements of the chest wall. Dunavant (1955) has used free full thickness graft to close the defect of the chest wall without jeopardizing its stability.

In the present case the left pectoralis major, the left latissimus dorsi muscle and portion of the right pectoralis major muscle was involved by the electric burn. There was also a possibility of damage to the superior epigastric artery on the left side. So the use of these muscle flaps for chest wall reconstruction was out of question. As the defect was large and the exposed pericardium was surrounded by friable granulation tissue, it was not feasible to use any of the pedicled skin flaps. The risk of infection spreading in the peritoneal cavity forced us not to use the greater omentum for coverage. Hence finally it was decided to use the split thickness skin graft directly over the pericardium. The post-operative period had been uneventful and the patient is doing well at the end of 2 years of reconstruction without any paradoxical respiration. The skin graft placed over the pericardium can be seen moving with each heart beat. To protect the heart from trauma a protective chest shield (Fig. 4) has been provided to the patient.

REFERENCES


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