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THE LATISSIMUS DORSI MYOCUTANEOUS FLAP FOR THE EXPOSED CARDIAC PACEMAKER IN CHILDREN

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SUMMARY : Exposure of a cardiac pacemaker implanted subcutaneously in the infraclavicular region is a difficult problem facing the plastic surgeon. The principles of treatment for salvage are control of sepsis, extensive debridement and tension free closure with locoregional flaps. Management in children is complicated by the fact that the pacing unit is of the same size as in the adult and there is little laxity of tissue in this age group. We have treated 7 children and have utilised the latissimus dorsi myocutaneous flap for salvage in 4 patients. Local skin flaps were employed in 2 children while a primary closure was possible in 1 child. Six patients have remained healed over a follow up period ranging from 6 months to 60 months. In one case we have had to explant the unit at 3 months due to persisting sepsis. Salvage of pacemakers should be attempted in all patients with pacemaker exposure. The latissimus dorsi myocutaneous flap that we have employed is a useful option when faced with this problem in children.

INTRODUCTION

The first cardiac pacemaker was implanted by Chardack et al in 1960[1]. Assistance of the Plastic Surgeon is sought, when the skin over the pacemaker gets necrosed resulting in its exposure. In a series reported in 1974 of the 372 patients followed up over ten years the incidence of exposure resulting in explantation was 10 percent[2]. With the improvement in pacemaker technology and decrease in its size this incidence may be decreased. However, over the past decade there has been an increase in the total number of patients presenting with exposure due to expansion in the indications, expertise and availability of pacemakers.

Exposure may be due infection or pressure necrosis or a combination of both. The patient's life is threatened due to the risk of pacemaker malfunction. Infection may ascend along the pacing leads and result in endocarditis. Exposure is therefore an emergency, requiring urgent and effective measures. In view of the cost of the pacemaking equipment and paucity of alternate sites for implantation, it is worthwhile to attempt the salvage of the exposed unit.

PATIENTS AND METHODS

We have treated 7 children who were referred to us by our cardiologists. The age ranged from 1 to 10 years. The duration between implantation and exposure was 1 to 20 months with an average of 4 months. All patients were hospitalised and the pus was cultured. Empirical antibiotics were started and changed to specific antibiotic once the sensitivity report was obtained. Antibiotics were continued for a period of 10 to 14 days after the operation. The patients were followed up regularly at 3 month intervals.

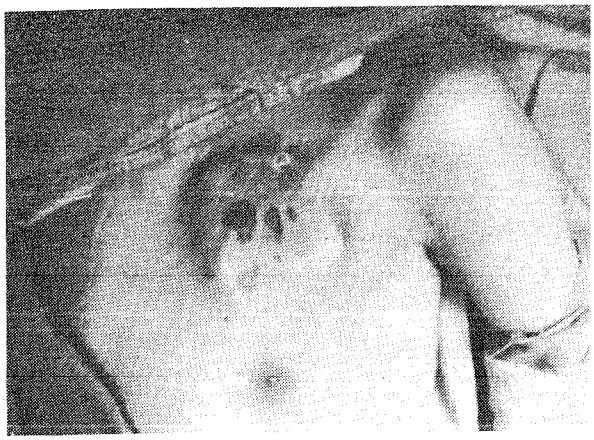
SURGICAL TECHNIQUE

Under general anaesthesia, the indurated skin around the exposed unit is extensively debrided. The infected pocket is widely opened and the unit is freed from all attachments. The unheaithy granulations are curretted out and a thorough lavage is given with saline and povidone-iodine. If, on attempted closure, there is no tension a primary closure is done in two layers with catgut and nylon. When the defect is larger, and adequate lax tissue is available adjacent to the defect a local flap is designed. For a still larger defect a latissimus dorsi myocutaneous flap is employed. The LD myocutaneous flap is tunnelled subcutaneously and inset into the defect. The donor defect is closed primarily.

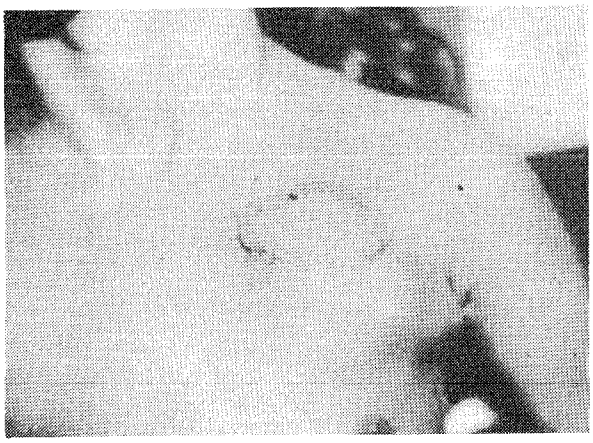
RESULTS

Primary closure was done in one patient. A local flap was done in 2 patients (transposition flap in one and Limberg flap in one). In 4 patients

latissimus dorsi myocutaneous flap was done (Figs. 1 and 2). Our follow up has ranged from 6 months to 60 months with an average of 22 months. Six patiens are well healed and doing well. In one patient we had to explant the pacing unit in view of persisting sepsis at 3 months.



(Fig-1) Pre-op photograph of an exposed pacemaker.



(Fig-2) Photograph 2 weeks following a latissimus dorsi myocutaneous flap cover.

DISCUSSION

The placement of any implant in the subcutaneous pocket poses the risk of infection and exposure. Number of causes may be attributed. The patient may be debilitated with thin skin and atrophic subcutaneous tissue that provides poor cover. Contamination at the time of surgery manifesting itself as gross infection within three to four weeks often requires explantation. A low grade infection usually manifests later and may be impossible to distinguish from a sterile reaction to the foreign body, because actual breakdown is accompanied by obvious infection[2].

According to Phibbs and Marriott, the mortality associated with infection, if the pacemaker is not removed is in the range of 66 per cent.[3] Removal and reintroduction through a different site carries the risk of exhaustion of limited number of alternate sites. Therefore it is important to consider salvage of an exposed but well functioning unit. Bacterial infection of a foreign body is considered a difficult problem. Infections associated with prosthetic implants are due to weak opportunist pathogens such as Staphylococcus epidermidis which cannot attack the generator metal or the synthetic resin enveloping it.[4] Since the material enveloping the cardiac pacemaker and the electrode is inert, surgical debridement and antibiotic lavage of the infected pocket and the foreign body may eradicate the infection. Based on this premise various techniques have been reported in literature. These have involved administration of systemic antibiotics, in conjunction with local surgical procedures. The pacing unit has been relocated to a subfascial or a sub-pectoral location.[4,5] Local skin flaps have been utilised for providing cover.[6-9] These series have been small and the success rates have been variable. The failure has been postulated to be due to scratch marks on the surface that are not sealed by the protective layer.[6] These foci may harbour resistant bacteria or set up points of corrosion.

A small defect and the presence of lax skin allows primary closure. When the defect is bigger a local skin flap from the adjacent skin can be utilised. In case the local tissues are inadequate a latissimus dorsi myocutaneous flap helps in achieving a tension free closure. This is especially true in children because the pacing unit is of the same size as in adults and there is little laxity of skin in that age group. In our experience, 4 out of the 7 children treated underwent an LD myocutaneous flap. Of the seven children treated six have healed well. This successful outcome was definitely simpler and less expensive than implanting a new pacing unit at an alternate site. The recovery was uncomplicated and the hospital stay was short. In addition to providing a tension free closure, the latissimus dorsi myocutaneous flap that we have employed, helps in dealing with infection. Our treatment failed in 1 case. Although the wounds healed well, the pacing unit had to be explanted because of suppuration. In this child, inspite of appropriate antibiotics, a pus discharging sinus persisted necessitating explantation of the pacing unit 3 months after the operation. Sepsis is also known to manifest after an uneventful period of months and may be related to a low grade infection. This fact highlights the need for a meticulous follow up.

Extensive debridement of unhealthy skin, thorough irrigation, tension free closure and prevention of

hematoma are essential for a successful outcome. However, the proposed technique is contraindicated in the presence of generalised sepsis, endocarditis or an immunosuppressed state. We suggest that salvage of an exposed pacemaker must be attempted utilising the principles that have been stated.

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