Delayed management of exposed pacemaker with partial latissimus dorsi myocutaneous flaps

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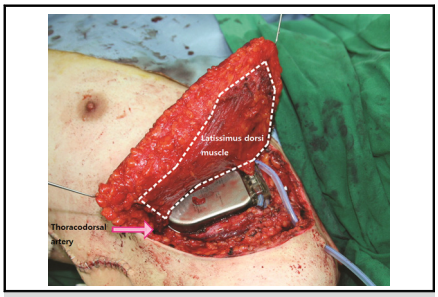
Video clip is available online.



Management of exposed pacemaker using LD flap.

Central Message

The partial LD myocutaneous flap helps cover the exposed pacemaker without the need for replacement or repositioning.

See Editorial Commentary page 1452.

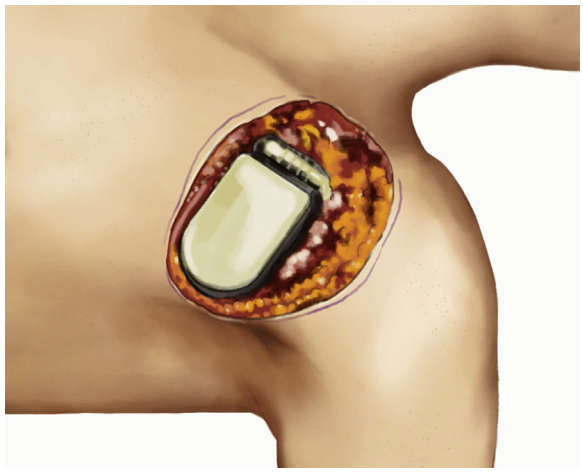
The infection rate of a cardiac pacemaker varies from 0.1% to 20%, and the frequency of device exposure is 0% to 12.6%.[1,2] When clinical infection is present, conventional treatments involve removal of the device and placement of a new device at a separate site.[1-3] We introduce our technique for delayed management of an exposed pacemaker using a partial latissimus dorsi (LD) myocutaneous flap.

SURGICAL TECHNIQUE

Between 2008 and 2014, 5 consecutive patients were treated. The time of the reconstruction varied from 2 to 7 weeks after exposure of the device. The patients received intravenous antibiotics on the basis of wound culture reports for 1 week before the operation. There was no case of leukocytosis more than 10,000 per μL, and patients did not have fever.

A complete capsulectomy was performed. All skin and soft tissue suspicious of infection were debrided and irrigated with saline. To cover the device and reconstruct the defect, a partial LD myocutaneous flap was prepared. Incisions were made along the anterior border of the LD muscle. The avascular plane under the LD was easily dissected. A small muscle cuff was preserved at the bifurcation of the descending and transverse branches of the thoracodorsal vessels. The skin flap was drawn according to the defect size, and the flap was harvested. The thoracodorsal vessels were harvested as a pedicle. A subcutaneous tunnel to the defect was constructed, and the flap was rotated. The muscle cuff was placed over the device, and the skin flap was inset over the defect. The suction drain was inserted inside the muscle cuff, adjacent to the device. The donor site was closed primarily (Video 1).

The total operating time ranged from 95 to 130 minutes, and the flap size ranged from 9×6 cm^2 to 13×9 cm^2. The



VIDEO 1. Surgical technique of partial LD myocutaneous flap. Video available at: http://www.jtcvsonline.org/article/S0022-5223(16)30646-8/addons.

TABLE 1. Characteristics of the patients

Sex/age, y	Associated disease	Time since exposure (wk)	Culture organism	Previous operation	Previous device pocket	Operation duration (min)	Size of flap (cm^2)	Complications	Follow-up (mo)
Male/40	Dilated cardiomyopathy Pulmonary thromboembolism	7	MRSE	None	Subcutaneous (left)	115	10 × 7	Wound disruption (donor)	12
Female/80	Dilated cardiomyopathy Hypertension Diabetes mellitus	2	MRSA	Local flap × 2	Subcutaneous (left)	100	13 × 9	None	24
Male/56	Dilated cardiomyopathy	3	MRSE	Local flap × 2	Subcutaneous (left)	130	9 × 6	None	18
Female/55	Dilated cardiomyopathy Hypertension	3	MSSE	None	Subcutaneous (left)	95	8 × 10	None	60
Male/70	Dilated cardiomyopathy Hypertension Pulmonary edema	5	MSSE	None	Subcutaneous (left)	100	7 × 9	None	30

MRSE, Methicillin-resistant *Staphylococcus epidermidis*; *MRSA*, methicillin-resistant *Staphylococcus aureus*; *MSSE*, methicillin-sensitive *Staphylococcus epidermidis*.

patients had maintained intravenous antibiotics for 3 weeks after the operation. There was 1 wound disruption of the donor site, which was healed conservatively. The mean follow-up period was 12 to 60 months. Table 1 summarizes the patient information.

DISCUSSION

A pacemaker usually requires puncture of the subclavian vein for inserting leads to the heart, and the generators are placed at the subcutaneous pocket. Because of the location of the generators, infection and exposure are potential complications.[1,3] It is generally accepted that when there are clinical signs of infection, with or without exposure of the device, the device should be removed and replaced or repositioned.[1-3] However, the removal of the device involves potential complications.[1,2] Moreover, it causes significant discomfort to the patient and delays treatment.[3] Therefore, it is reasonable to consider salvage operation for the exposed but well-functioning device.[3,4]

The exposed device should be replaced or covered within 48 hours.[1] However, our patients' devices were exposed for 4 weeks because of the delay in detection or preparation for general anesthesia.[1] There was no sign of clinical infection. It has been reported that positive culture from a clinically noninfected device is not related to recurrence and is not incompatible with a successful outcome.[1,3,5]

Transfer of the device at a separate site may eradicate the infection. Transfer of the device has surgical difficulties, but is applied in inevitable conditions requiring a new pocket. The submuscular or subfascial layer of the pectoralis muscle is often used as a new location.[1] However, positioning the device near the muscle may cause pain or muscle twitching, which is uncomfortable. In addition, transfer of the device requires disconnection and reconnection with the lead, which possess risk.[2]

Most infections are due to opportunistic pathogens that spread over the capsule of the device rather than invade the device itself.[3,5] Eradication of all pathogens by debridement enables preservation of the device.[5] However, this procedure results in an extensive defect around the device.[1,3] Instead of using the already insufficient local tissue, we applied a partial LD myocutaneous flap. The pedicle length and rotation arc were sufficient to reach the left infraclavicular area. A small muscle cuff could cover the device to prevent infection and reduce the mechanical force from the device.[5] The skin flap created a large new pocket with durable skin coverage without tension. The procedure is straightforward and fast, taking only approximately 95 to 130 minutes of operation.

CONCLUSIONS

Preservation of an exposed pacemaker instead of removal is feasible. This technique allows salvage of the exposed device in most cases as first-line treatment or as the second or final treatment for recurring cases, when other procedures have failed. The partial LD myocutaneous flap allows salvage of the exposed device, involving a single straightforward operation with minimal donor site morbidity.

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