



Synthetic Mesh Re-Styling of Pacemaker Pockets

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Article ID: WMC002887

Article Type: Original Articles

Submitted on: 16-Jan-2012, 09:41:51 AM GMT **Published on:** 16-Jan-2012, 02:14:25 PM GMT

Article URL: http://www.webmedcentral.com/article_view/2887

Subject Categories: SURGICAL TECHNIQUE

Keywords: Pacemaker complications, Pacemaker Pocket, Pacemaker re-implantation

How to cite the article: Manenti A , Palmieri B . Synthetic Mesh Re-Styling of Pacemaker Pockets .
WebmedCentral SURGICAL TECHNIQUE 2012;3(1):WMC002887

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Source(s) of Funding:

None

Competing Interests:

None

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Abstract

Different complications after Pacemaker (PM) implantation, as skin erosion, cutaneous exposure or even extrusion of the generator device, require surgical decision, with different procedures. We describe our experience, with new pocket manufacturing beneath the pectoralis major muscle (PmM) associated to wrapping of the PM generator in a polypropylene synthetic mesh. Safe anchorage and muscular plane strengthening is then achieved.

Introduction

The procedure of PM implantation is usually a subcutaneous pocket in the anterior side of the thorax, beneath the clavicle; rarely, and only in thin chest patients, beneath the PmM (1).

In this way the PM device is exposed to different mechanical vectors, due to autonomous and voluntary thorax movements. This condition must to be considered an important co-factor of PM displacement, usually laterally towards the axilla, following the chest wall shape.

At this moment a subsequent chain of events can follow, usually prompted by the mechanism of tissues pressure and erosion: skin dermatitis and ulceration, exposure of the PM device and eventually its partial extrusion (2-7).

Our study deals with PM generators dislodging, sometimes followed by their exposure through skin erosion and even partial extrusion.

The most common and widespread surgical repair rebuilds a new pocket in the contralateral anterior part of the chest (8-12). When this procedure is contraindicated for unsuitable topography, like in case of extensive scars from previous failed implantations or infections, the simple old location revisiting can be taken into account.

Thus, re-access to the old pocket is approached, followed by debridement of exceeding granulation tissue and, possible relocation of the PM device behind the PmM. Nevertheless, different anatomical conditions, as tissue weakness, fragility or dense fibrosis can make this solution unsafe.

Therefore, in selected cases, we have adopted a new technique of PM pocket re-styling with the use of a prosthetic mesh, where the only real contraindication

is concomitant suppurative infection, being the primary indication the weakness of the muscular plane of the anterior wall of the chest.

Methods

Our experience includes 6 cases, 4 men and 2 women, aged from 67 to 84 years. All the patients had been previously submitted, one or twice, to other simple re-implantation procedures for PM generator displacement. In three cases there was a concomitant skin erosion, complicated in two by exposure of the PM device, and in one by its partial extrusion, with no purulent infection in any case.

For our procedure a general antibiotic prophylaxis was started, and local anaesthesia was preferred. In case of total heart rate PM dependency, a temporary device was implanted, usually through a transfemoral approach.

The main steps of our surgical technique can be summarized as follows.

-The PM pocket is re-opened with an incision over the old scar and debrided from exuberant granulating or scarring tissue.

-The PM generator is mobilized, paying attention to the lead-wires, which are visualized and dissected in their proximal subcutaneous tract (Illustration 1).

-The PmM, usually weak and almost fibrotic, is traversed following the direction of its fibres, up to the pre-thoracic sheath. In front of this, a suitable space for the relocation of the device is prepared by blunt dissection.

- A polypropylene synthetic mesh, of adequate size, is trimmed in a rectangular shape to completely envelope the PM generator; its anterior and posterior sheet are sutured together, along the superior and the two lateral borders, with single stitches. In such a way it is easy to find a convenient point of outlet for the wire leads in between (Illustration 2).

-The PM generator, so enveloped in the synthetic mesh, is placed in the new space, created beneath the PmM; it is secured to the pre-thoracic sheath with single stitches. Then, the muscular plane of the PmM is reconstituted, approaching its edges (Illustration 3).

- The wound is closed in two planes, subcutaneous and cutaneous.

Results

We had no intra- or post-operative complications, especially hematoma, infection, pneumothorax, leads fracture, phrenic nerve or diaphragm stimulation. At middle and long term follow-up (12-36 months) any case of PM dislocation, extrusion, or of "tiddler syndrome" was observed. In one patient, three years later, the exhausted PM batteries were replaced. This new procedure did not present any particular difficulty: we found the mesh strictly adherent to the posterior surface of PmM and to the pre-thoracic sheath, but not to the stainless PM device, which could be easily manipulated and removed like a "paper sheet from its envelope".

Discussion

The use of a synthetic mesh to envelope the PM generator permits its safe anchorage to the pre-thoracic sheath, and, at the same time, obviates to the weakness of the PmM, which will be subsequently reinforced by a connective fibroblastic reaction, so providing a more consistent anatomical plane.

On the other hand, the choice of a prosthetic mesh to rebuild a muscular plane is today widely accepted in surgery of inguinal hernias. It has been demonstrated that the polypropylene mesh, which contains large pores (> 75 micron), is inhabited by fibroblasts, monocytes, macrophages, collagen fibres, and blood vessels, which protect against infections and favour the generation of new connective tissue (13).

Conclusion(s)

Our PM pocket restyling technique, although performed on few cases, has been simple and effective, and can be considered an appealing and suitable alternative to PM complete removal. Synthetic mesh is required to reinforce the muscular plane surface of the PmM, under which a safe anchorage of the device effectively prevents any further dislocation.

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Illustrations

Illustration 1

PM device is mobilized out of its old pocket in the anterior wall of the chest. (Schematic representation).

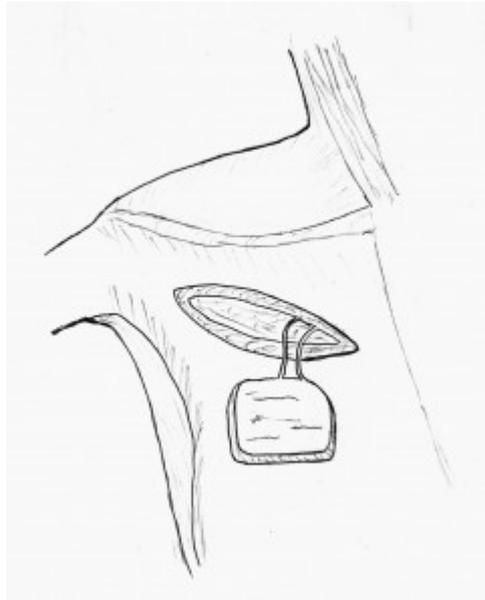


Illustration 2

"In situ" wrapping of the PM device with a synthetic polypropylene mesh. (Schematic representation).

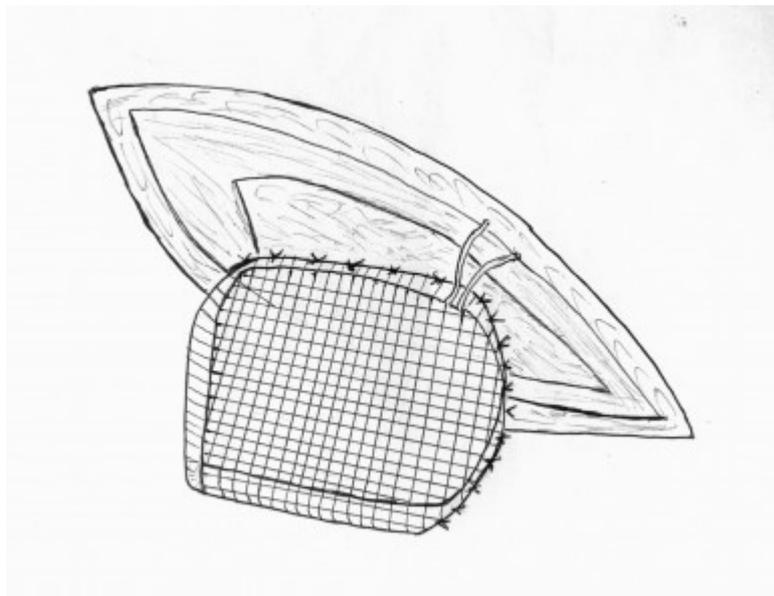
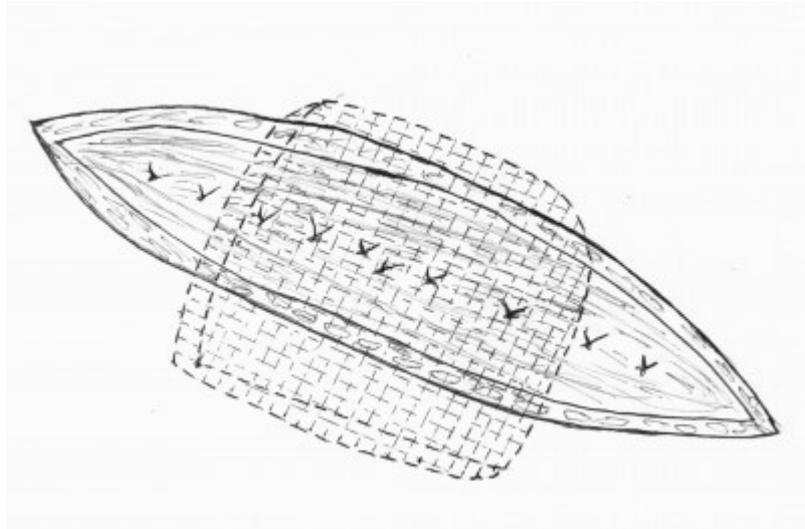


Illustration 3

The PM device, wrapped in a polypropylene mesh, is located beneath the PmM fibres, which are then sutured together. (Schematic representation).



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