

**BOON COMPANION TURNING FOE- CULTURE NEGATIVE PACEMAKER  
POCKET INFECTION AFTER THREE YEARS MANAGED BY IPSILATERAL  
SUBPECTORALIS MAJOR IMPLANTATION- A CASE REPORT**

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**ABSTRACT**

**Background-** Defects of cardiac impulse and generation occur at various levels in the conduction system of heart. A permanent pacemaker implantation is generally a lifelong commitment for a patient; the need for generator changes and surgical revisions for malfunction and due to complications related to implantation, short term or long term are important considerations in patients. The decision to implant a pacemaker should not be taken lightly. Pacemaker infection is a nightmare for cardiologists. Even a non-eroded pacemaker implantation site may become infected. Acute infections may manifest within the first few weeks of implantation and are often associated with the accumulation of pus. A more indolent infection caused by less virulent agents like streptococcus epidermidis may present months or years after implantation. A fungal infection may also occur in the pocket and present as indolent process with relatively scant growth of the organism. Here we are presenting a case who came with infection of pacemaker implantation site three years after pacemaker implantation with a negative blood culture who was managed by a less invasive approach by performing a procedure in which the sterilized generator was successfully reimplanted ipsilaterally, but in a different site i.e beneath the left pectoralis major above rib cage.

**Conclusion-** Infection at pacemaker implantation site with negative blood culture can be managed by a less invasive approach by performing a procedure by reimplanting the sterilised generator ipsilaterally, but in a different site i.e beneath the left pectoralis major above rib cage.

**Keywords:** Pacemaker, Infection, Pectoralis major, Reimplantation

### **Introduction**

Globally it is estimated that there are over 3.5 million patients with cardiovascular implantable electronic devices (CIEDs).[1] Significant expansion in the clinical indications has led to an increase use of CIEDs over the past several decades. Thereby causing increase burden of device associated infection. Cardiac device infections are associated with increased morbidity, health care costs, and mortality.[2] The usual treatment of these type of infections is complete removal of device and reimplantation in a contralateral side.

Here we report a case of patient with complicated pacemaker pocket infection, who presented three years after implantation. The patient was treated by partial generator removal, debridement, and reimplantation of the sterilized pulse generator on the ipsilateral side, beneath the pectoralis major along with antimicrobial therapy. Successful treatment of complicated pacemaker pocket infection with a less invasive approach is rarely found in literature.

### **Case presentation**

A 66 year old gentleman, known case of type 2 diabetes mellitus and hypertension, underwent a permanent single-chamber pacemaker implantation over the left prepectoral area 3 years ago due to complete heart block. The patient was discharged after the wound was satisfactorily healed. Unfortunately, after two and half years of implantation, he developed complaints of pain, swelling and redness around the site of incision i.e over the left prepectoral area. It was associated with high grade fever and intermittent chills. Over a period of few days, he developed skin necrosis around the pacemaker pocket. The skin infection was conservatively managed with multiple courses of antibiotics, local wound care, and debridement for 6 months by the local physician. However, there was no improvement and as the ongoing pressure necrosis of the overlying skin led to the gradual extrusion of pacemaker generator from the site of implantation, he was referred to our i.e a tertiary care centre, for further management.

The patient was on medicines such as Tab.Telmisartan 40 mg once daily, Tab. Metformin 2gm once daily, Tab. Glimiperide 2mg once daily, antiplatelet and statin. According to the informant his blood sugar was never controlled satisfactorily at home. At the time of admission, he was afebrile, hemodynamically stable with a blood pressure of 166/74 mmHg, and heart rate of 60 beats per minute. Local examination revealed adherence of erythematous skin to the device with overt erosion and draining sinus (Fig. 1) with minimal pus on squeezed. Rest of the systemic examination were unremarkable. A Transthoracic Echocardiography (TTE) displayed normal left ventricular ejection fraction (60%) and there was no evidence of infective Endocarditis on TTE as well as Transesophageal Echocardiography (TEE). Three sets of blood culture were taken and pus was analyzed for gram stain and culture, all were later come out as sterile. He was treated with insulin, Inj. Gentamycin (3mg/kg/day) mg and In.clindamycin 300 mg thrice daily in accordance with prior culture and sensitivity report. Simultaneously, an extensive daily dressing was done with povidone iodine and hydrogen peroxide.



**Fig 1: Discharging sinus.**



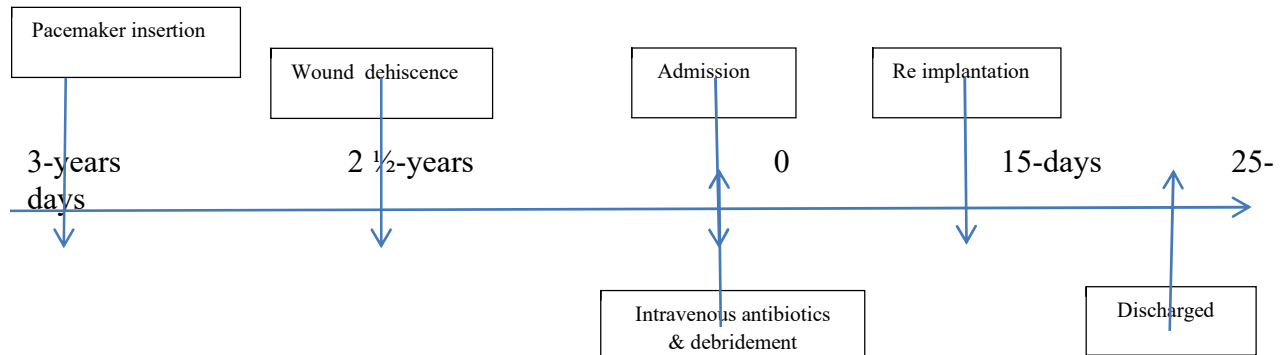
**Fig 2: Post reimplantation**

Infection was under control after 15 days of antibiotics, daily dressing and adequate glycemic management. Generally, the treatment of choice for this type of complicated pacemaker infection is complete removal of both the generator and transvenous pacing leads and reimplantation to the contralateral side. However, this strategy has its own complications like laceration, intravascular rupture and death. Therefore, a less invasive approach was performed in which the sterilized generator was successfully reimplanted ipsilaterally, but in a different site i.e beneath the left pectoralis major above rib cage. (Fig 2) After 10 days of operation he was successfully discharged without any signs of local infection. Three months follow up also showed complete wound healing without any sign of wound dehiscence (Fig. 3) and pacemaker malfunction.



**Fig 3: Reimplantation site at 3 months follow up.**

The course of a disease is depicted in Fig. 4.



**Figure 4: Flowchart showing the course of the disease**

## Discussion

Despite improvements in the design and implantation techniques, infection of the cardiac devices remains a serious problem. The incidence of pacemaker pocket infection varies between 1% - 12.5% [3]. A recent study by Uslan et al reported that the overall incidence of device-related infection is 1.9 per 1,000 device years [4]. Pacemakers have both intravascular and extra vascular components, therefore infection can occur at different sites- pacemaker pocket, pacing leads and native cardiac structures or combinations. Several factors like diabetes, repeat procedure, chronic renal failure, chronic obstructive airway disease, immunosuppressive agents are known risk factors for pocket infection. Lead dislodgement, vascular injury, pocket hematoma and pocket infection are common short term complications of permanent pacemaker implantation (PPI). Long term complications include lead fracture, insulation failure, premature battery depletion, infective endocarditis and pocket infection.

Generator pocket infection is characterized by cellulitis, swelling, discharge, dehiscence or pain. Generator pocket infection and CIED-infective endocarditis or CIED lead infection (CIED-LI) frequently may coexist. Non-specific signs and symptoms of systemic infection (including fevers, chills, night sweats, malaise and anorexia) may be the only clinical features of CIEDI and less than 10% of patients present with septic shock. [5]

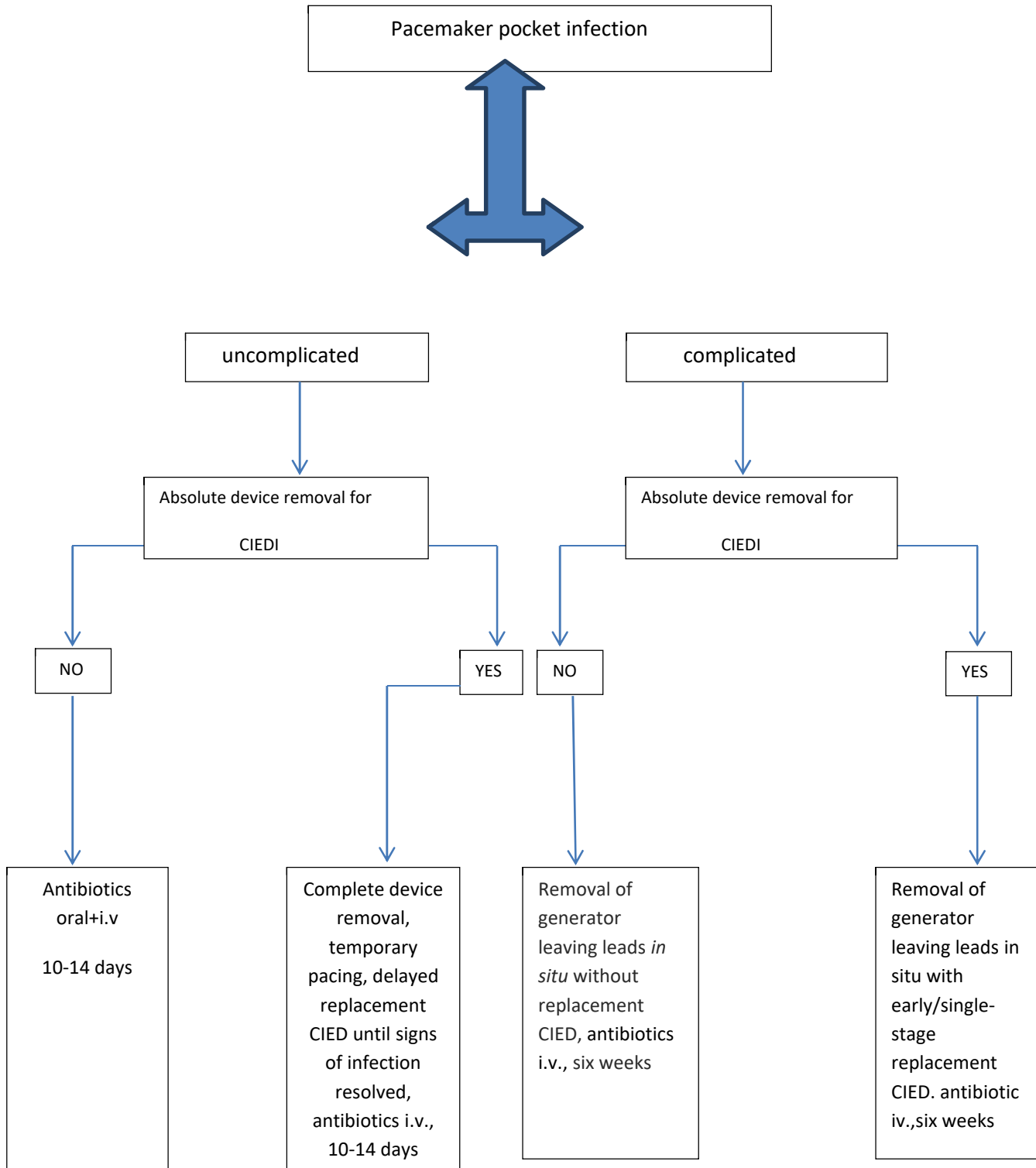
The causative organisms of CIED infections are related to the pathogenesis of infection and the selection of both antimicrobial prophylaxis and empirical treatment regimens. Generally, Gram-positive bacteria (Staphylococci) cause majority (68%–93%) of infections, while Gram-negative bacteria cause fewer than 18% of infections. Approximately 15% of CIED infections are culture negative. [5] Asymptomatic colonization of CIEDs can occur with normal skin commensals and this may develop into symptomatic infection at a later stage. Le et al reported that the conservative antibiotic therapy combined with limited debridement and irrigation of infected sites without removal of the infected device system may lead to poor outcomes. In this large cohort study with CIEDIs, the 30-day mortality rate was 5.5%, and 1-year mortality was

14.6%. [6 ] Erosion of any part of the CIED indicates contamination of the entire system, and complete device removal should be performed. Complete removal of prosthetic material in any cardiovascular implantable electronic device infection is safe and associated with low morbidity and mortality. In contrast conservative therapy with partial device removal leads to increase rate of infection relapse.[7]

Although complete removal of CIED is safe and considered as the primary treatment for device infection, it is also associated with major complications like vascular laceration, death etc. [8] Low Body Mass Index (BMI), older age, renal disease, and diabetes mellitus are the major risk factors associated with device infection and increased rate of death during hospitalization. [9][10]

Since our patient is elderly, poorly controlled diabetic, and hypertensive, complete lead removal and reimplantation to another side was deferred. We successfully managed with less invasive strategy - partial generator removal from the leads and reimplantation at ipsilateral side. As partial generator removal may lead to a high rate of relapse, we are planning to follow up this patient at least a year.

Figure 5: The general approach to the management



**Conclusion:**

Infection at pacemaker implantation site with negative blood culture can be managed by a less invasive approach by performing a procedure by reimplanting the sterilised generator ipsilaterally, but in a different site i.e beneath the left pectoralis major above ribcage.

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