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Twiddle`S Syndrome: A Rare Complication of Pacemaker Therapy: Initial Assessment with Evidence Based Study

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Abstract

Twiddle's syndrome is a rare but hazardous complication of cardiac pacemaker treatment, characterized by device malfunction due to dislodgment of cardiac leads resulting from some form of unintentional or deliberate manipulation by the patient. It is the permanent malfunction of a pacemaker resulting from manipulation of the pulse generator within its skin pocket. Estimated to occur in 0.07 to 7% of implanted devices mostly with the 1st year of implantation.

The usual challenges encountered in identification and diagnosis of pacemaker twiddler syndrome is lack of awareness in clinical practice of potential complication, due to its vague symptoms like dizziness, fatigue or syncope resembling other cardiac issues leading in delayed diagnosis. To evaluate patient behavioral factors leading to pacemaker manipulation by the patient is not well studied especially in elderly and psychiatric patients.

Retrospective study of a 59-year-old female who presented with recurrent syncopic attacks, headache, dizziness, twitching of the right pectoral muscle is evaluated. ECG showed loss of capture and unsatisfactory pacing parameters in pacemaker evaluation. Patient was re-operated and pacemaker re-inserted, which resulted in full recovery of symptoms.

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Key words:

Pacemaker Therapy, Twiddler's syndrome, Post Pacer maker malice

Introduction

Twiddler`s syndrome is a rare but hazardous complication of cardiac pacemaker treatment.
Initially described by Bayliss et al.in 1968, Pacemaker twiddler`s syndrome (PTS) often occurs when a patient unintentionally or deliberately manipulates the pacemaker device, often leads to device displacement or pacemaker leads dislodgment which can result in device failure [1].

Globally PTS is considered a rare condition. It accounts for a small percentage of pacemaker-related complications. Most data come from individual case reports or smaller studies. Incidence of PTS to be between 0.1% and 1% of all pacemaker patients [2]. However, with the rising number of pacemaker and implantable cardioverter defibrillators (ICD) implantations worldwide, the potential risk of PTS has become more relevant.

European countries with advanced healthcare systems, such as the United Kingdom (UK), Germany and France, also report low incidence of PTS, but this may be underestimated due to lack of systematic screening [2]. Pacemaker use is increasing due to aging populations and improved access to cardiac care in Asia, and the rising number of pacemaker implantations suggests that PTS could become a more recognizable complication in the region [3].

In African continent low- and middle-income countries where access to advanced cardiac devices is growing, PTS may be under reported due to limited healthcare resources, lack of patient education, and inconsistent follow-up care. Pacemaker implantations are generally less frequent in these regions, but growing access to cardiac devices will likely increase PTS diagnosis in the future [4].In Kenya, PTS is rare, complication that occur in patents with pacemakers or implantable cardiac defibrillators (ICDs).

Symptoms of PTS are subtle; resembling other cardiac issues making it difficult to identify early [5] Research is needed to improve diagnostic protocols, emphasizing early recognition of tell-tale signs and symptoms.

Most of devices are easily manipulable by near normal activities as the modern pace makers are lighter and smaller aiding in dislodgement on manipulation within the pocket created during surgery [6].

The elderly are vulnerable to PTS due to increased subcutaneous tissue laxity and cognitive decline older patients also suffer dementia which impairs self-care post-surgery [7]. The aging process often makes the device more prone to movement within its surgical pocket and tacking to the wall with non-absorbable sutures and counseling is essential.

Materials & Methods

A 59-year-old female, re-admitted 8 months after pacemaker therapy, secondary to third degree heart block, the initial Pace maker therapy being in 2023. She reported of syncope episodes on and off and dizziness, generalized headache for one month. She was treated and discharged on medication as an outpatient without resolution. She also reports twitching of her right pectoral muscle for a day with no history of loss of consciousness and trauma.

Past medical history: No childhood-related cardiovascular illness, rheumatic fever, stroke or intermittent claudication.

Past surgical history-pacemaker insertion 2023

Drug history: She had a history of oral contraceptive use with no history of using recreational drugs and no reported drug allergies.no known food or drug allergies

Family history: No history of any related heart disease, hypertension or any other heritable cardiovascular risk factors.

General Examination

Patient was sick looking, Afebrile, no pallor, no jaundice, no lymphadenopathy, nor dehydrated or cyanosed.

Blood Pressure of 123/67mm/Hg, Pulse rate:-35B/m She had no lower limb Oedema.

Cardiovascular system: - S1 and S2 heart sounds were heard normal, no murmurs

Respiratory system: - Normal vesicular break sounds heard.

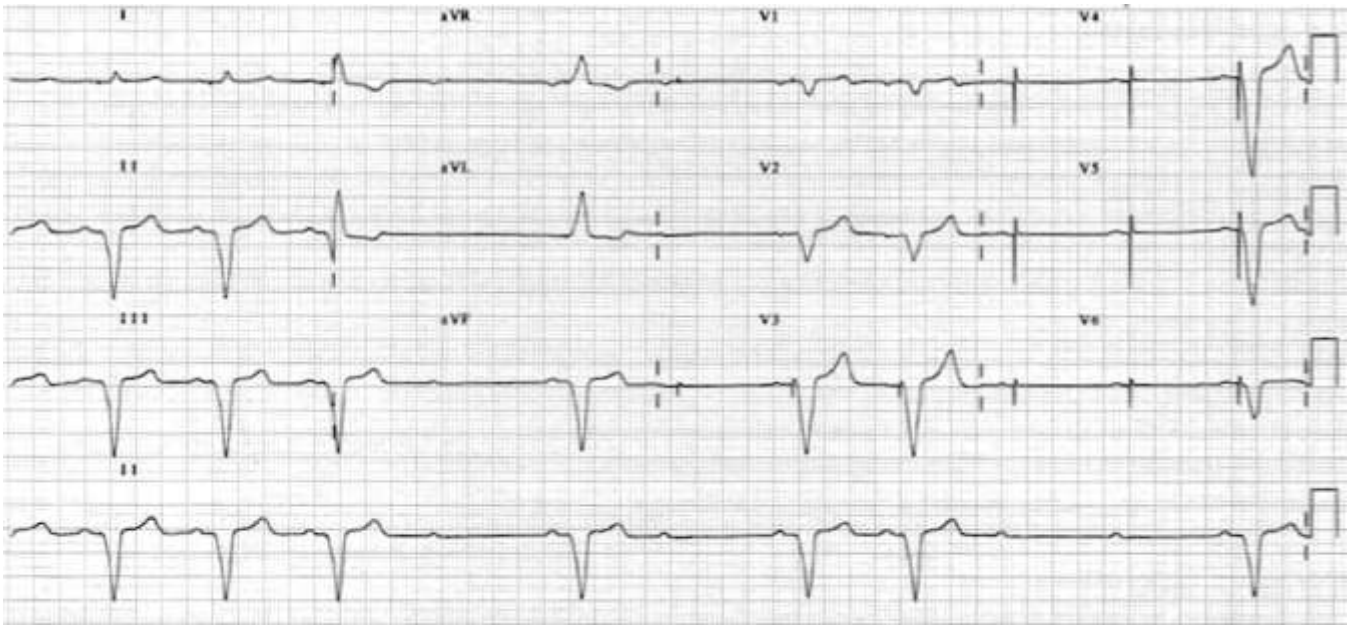
Gastro Intestinal system: -Soft, no tenderness or Organomegaly.

Genito- Urinary Tract:-Normal bowel movements, Central **Nervous System:-** GCS 14/15, Not well oriented to time place and person

Vitals signs: Date Vitals Reference Range 14Th February 2023 BP 103/52mmHg Pulse 29b/min SPO2 89%.

ECG at emergency department revealed loss of capture of pacemaker spikes **[Figure 1]**. Pacemaker interrogation showed complete loss of pacing and sensing of the ventricular lead. The patient admitted to any manipulation of the pace maker. Fluoroscopy revealed coiling of the pacing lead around the pulse generator **[Figure 2].** The pacemaker pocket was reopened. Fortunately, both the insulation and the conductor of the lead were intact. The same lead was repositioned and proved to be functional with good pacing and sensing parameters **[Figure 3].** The pulse generator was fixed on the pectoral muscle with non-absorbable sutures. No further complications were detected in one year follow-up.

Figure 1



The ECG done on 14th February 2023, revealed loss of capture of pacemaker spikes (before or after).

Figure 2

Date	**Vitals**	**Reference range**
14th February 2023	BP 103/52 mmHg Pulse 79b/min SPO2 89%	<120/80 60-100 90-95%

Laboratory investigations

14-02-2023

UECs	Results	Reference range
Sodium	133mmol	145-150mmol
Potassium	4.59mmol	3.3-5.3mmol
Chloride	104mmol	99-110mmol
Urea	8.9mmol	2.6-7.0mmol

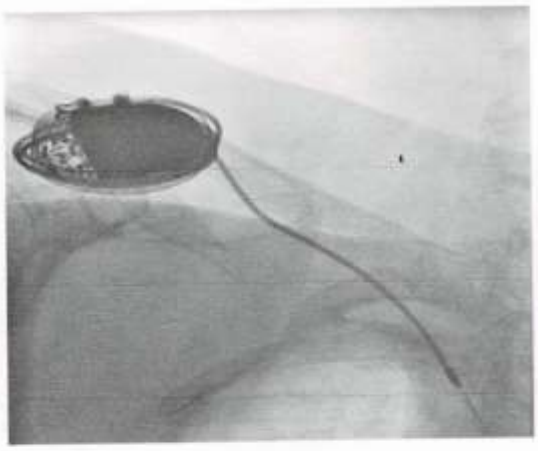
Creatinine	136.66mmol	50-120mmol

Liver functioning tests	Results	Reference range
Alkaline phosphatase	119 UL	35.360UL
Aspartate aminotransferase	104 UL	0.0-50UL
Gamma glutamyl transferase	256 UL	5-40UL
SGPT – Direct bilirubin	81	11-50
Prothrombin lime	68.5	11-13.5

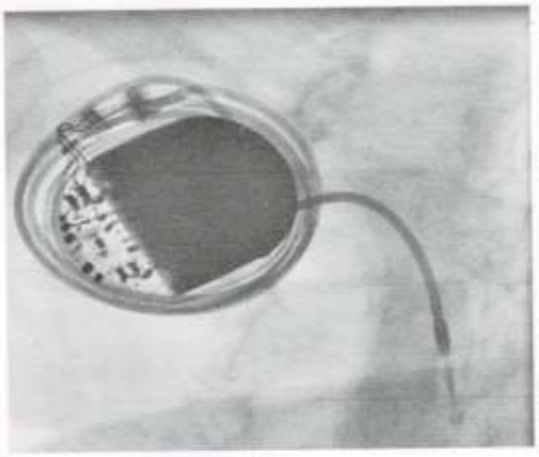
14-02-2023

Diagnosis	Results	Reference image
CRP	211.54 mg dl	0.3-1.0mg dl
Uric acid	456.34mmol	149-339mmol
Random blood sugar	7.7mmol	3.3.7.8mmol
Cardiac troponin	204ugl	0-0.4ugl

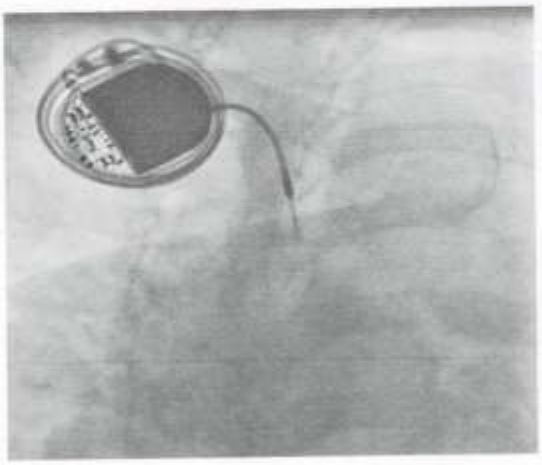
Details from a fluoroscopy showing the coiling of the pacing lead around the pulse generator of a pacemaker.



2 A



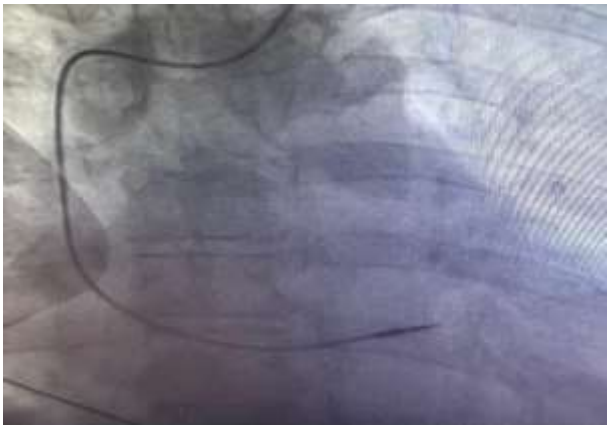
2 B



2 C

2A&**2B:** Pacemaker Defender Where both insolation and of the lead were intact.

2C&2D: The same lead was repositioned and proved to be functional with good pacing and sensing .



Discussion

Pacemaker Twiddler`s Syndrome (PTS) is a rare phenomenon typically observed in patients who have undergone cardiac pacing. It is characterized by the presence of two distinct pacemaker systems—one being a physiological, intrinsic rhythm and the other an artificial pacing rhythm from a pacemaker. This syndrome can be challenging to diagnose, especially when it occurs late in the patient's management [8].

Patients present with symptoms that a can be attributed to other cardiac issues, such as fatigue, palpitations, or syncope. The coexistence of both pacemaker activity and intrinsic rhythm can lead to an irregular heart rhythm, making symptoms more difficult to interpret. Late diagnosis often occurs when there is a lack of awareness about PTS among healthcare providers, particularly in patients with a complex medical history or multiple comorbidities. Diagnosis typically relies on careful analysis of an electrocardiogram (ECG) to distinguish between the two pacing sources [9].

Pacemaker devices are prone to manipulation through factors such as movement of the body causing PTS, careful matching the size of the device pocket to the implanted device is essential. It is considerable to consider device manipulation when there is PTS. Older patients may have age-related cardiac changes, such as fibrosis and decreased responsiveness of the heart, which can complicate the interaction between intrinsic rhythms and pacemaker activity. Cognitive decline, which may affect understanding of their condition, symptoms, and the importance of adherence to follow-up care [9].

Understanding the roles of age, mental health, and education level in the context of Pacemaker Twiddler`s Syndrome is crucial for optimizing patient care. Addressing these factors can enhance patient outcomes, promote timely diagnosis, and improve management strategies for PTS [10].

Conclusion

Understanding Pacemaker Twiddler`s Syndrome is vital for improving patient outcomes. Late diagnosis poses significant risks. Increased awareness, proper diagnostic protocols, and ongoing education will enhance management of this syndrome [9].

Advancements in technology and design must prioritize adaptability and responsiveness to reduce the risks associated with PTS.

Understanding the roles of age, mental health, and education level in the context of Pacemaker Twiddler`s Syndrome is crucial for optimal patient care. This can enhance patient outcomes, promote timely diagnosis, and improve management strategies for PTS. Tailored education and interdisciplinary support are essential in helping patients navigate their care effectively [11]. Emerging technologies in future, aim to create more intelligent pacing systems that better understand and adapt to individual patient rhythms, potentially reducing the risk of PTS.

There is need to explore the possibility of modifying pacemaker designs or lead placement to minimize the risk of twiddling There is limited literature specifically addressing PTS available now.

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