

Introduction

- Pacemaker malfunctions occur when a device fails to deliver electrical impulses to the heart as intended- common causes of pacemaker malfunctions include battery depletion, infection, insulation breaks, electrolyte imbalances, and programming errors^{1,2},
- Twiddler's Syndrome has been identified as an atypical cause of pacemaker malfunction-classically described as the intentional manipulation of the pacemaker causing the withdrawal of leads^{1,2,3}
- Common presentation of device malfunction include inappropriate defibrillation, chest pain, SOB, palpitations, and dizziness. For many patients, initial diagnosis is via CXR and EKG. Formal interrogation of the pacemaker should be done to confirm the diagnosis^{2,4}
- It is thought that the major cause of this intentional manipulation is neurocognitive decline or psychiatric abnormalities; however, research on this condition is limited¹
- Growing research demonstrates other risk factors such as advanced age and body habitus may play a role in Twiddler's Syndrome^{4,7}

Aims and Objectives

- The primary goal of this study is to determine common risk factors present in Twiddler's syndrome patients featured in published case reports via a review of current case reports
- The secondary goal is to use these findings to develop recommendations for clinicians to allow for prompt recognition of patients with Twiddler's syndrome.

Methods

- PubMed was utilized to conduct a search of the literature and to locate published case reports of Twiddler's Syndrome
- Date range was isolated to 2004-2024 in order to include current data while also including as many cases as possible
- Publications were limited to case reports only and excluded any literature reviews
- Search terminology included "Twiddler's syndrome," "Twiddler," "pacemaker AND malfunction"
- Given that some cases provided scant information about the patient and case, articles were required to include age, sex, description of presenting symptoms, and findings from clinical workup
- Seven total cases met the criteria and were therefore included in this study

Results

	Case 1 ¹	Case 2 ²	Case 3 ³	Case 4 ⁴	Case 5 ⁵	Case 6 ⁶	Case 7 ⁷
Age(yrs)	57	63	52	33	70	80	82
Sex (M/F)	F	F	F	M	F	F	F
Documented neurocognitive changes (yes/no)	no	yes	no	no	yes	no	no
Presented with cardiac symptoms (yes/no)	yes	no	yes	yes	yes	yes	yes
Imaging consistent with Twiddler's Syndrome (yes/no)	yes	yes	yes	yes	yes	yes	yes

Table 1: Summary of Case Data

- Only case 2 did not report any notable cardiac symptoms on presentation, cardiac changes suspicious for ICD malfunction were noted on ECG²
- All cases besides case 2 described cardiac symptoms such as palpitations, chest pain, shortness of breath, and/or syncope¹⁻⁷
- All cases conclusively demonstrated twisting of the ICD and lead retraction consistent with Twiddler's Syndrome¹⁻⁷
- Case 4 is notable for being the only case in an individual under the age of 30 and in a male- it should be noted that the patient had significant morbid obesity⁴

Conclusions

- While Twiddler's Syndrome does occur in patients with known neurocognitive decline, it is clear that this is not the only risk factor
- Cases seem to be consistently present in female patients above the age of 50, although these are not the only risk factors given its presentation in a younger male in Case 4
- Data may demonstrate presence of Twiddler's syndrome in patients with higher body fat ratios (women older than 50, obese patients), although further data points are needed to definitively draw conclusions
- Clinicians should have suspicion for Twiddler's syndrome in ICD patients regardless of neurocognitive or psych disorders
- All pacemaker patients should undergo chest imaging and pacemaker interrogation if they are presenting with cardiac symptoms

References

1. Glick JE. Twiddler's Syndrome. *J Emerg Med*. 2022;63(1):109-110. doi:10.1016/j.jemermed.2022.04.026
2. Robin Anthony Patrick Weir, C. Aengus Murphy, Brian O'Rourke, Colin J. Petrie, Twiddler's syndrome: a rare cause of implantable cardioverter defibrillator malfunction, *European Heart Journal*, Volume 37, Issue 46, 7 December 2016, Page 3439, <https://doi.org/10.1093/eurheartj/ehv383>
3. Liang JJ, Fenstad ER. Twiddler's syndrome. *Lancet*. 2013;382(9909):e47. doi:10.1016/S0140-6736(13)61419-1
4. Liano Calavia H, Awadalla M, Nasir SA, Hammel J. An Atypical Presentation of Twiddler's Syndrome: A Case Report. *Cureus*. 2022;14(7):e27207. Published 2022 Jul 24. doi:10.7759/cureus.27207
5. Tahirovic E, Haxhibeqiri-Karabdic I. Twiddler's Syndrome: Case Report and Literature Review. *Heart Views*. 2018;19(1):27-31. doi:10.4103/HEARTVIEWS.HEARTVIEWS_89_17
6. Zygowiec CJ, Pham JT, Smithgall S. Pacemaker Twiddler Syndrome. *J Am Osteopath Assoc*. 2017;117(5):339. doi:10.7556/jaoa.2017.066
7. Alamri Y, Mann V. Twiddler's Syndrome. *Heart Lung Circ*. 2020 Jan;29(1):e19-e21. doi: 10.1016/j.hlc.2019.07.019. Epub 2019 Sep 13. PMID: 31543402.