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Mitral Valve Prolapse with Syncope: Don't Judge the Book by its Cover! - Case Report

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Abstract

A 33-year-old female with recurrent syncope episodes showed normal ECG and Holter results, but had mitral valve prolapse (MVP) with moderate mitral regurgitation (MR) on an echocardiogram. Cardiovascular magnetic resonance (CMR) revealed mitral annulus disjunction (MAD) with fibrosis. She received an implantable loop recorder (ILR). Several months later, she experienced a syncope event, which correlated with self-terminating polymorphic ventricular tachycardia (PMVT) preceded by narrow complex tachycardia, which was proven to be atrioventricular nodal reentrant tachycardia (AVNRT) in an electrophysiology study. Post-ablation, she had no recurrences of syncope. This case highlights the importance of ILR in avoiding unnecessary ICDs in MVP patients with syncope.

Keywords: Syncope, Mitral valve prolapse (MVP), Implantable loop recorders (ILR), Supraventricular tachycardia (SVT), Polymorphic ventricular tachycardia (PMVT)

1. History of presentation, past medical history, differential diagnosis

A 33 years old female presented to the clinic with recurrent palpitations lasting for 15–20 min and associated with syncopal attacks. The patient experienced 3 episodes of syncope over the course of 2 months that were abrupt. Her palpitations were not captured on electrocardiogram (ECG) or Holter monitor. She had no relevant past medical history or family history of cardiac conditions.

2. Investigations

A baseline electrocardiogram (ECG) (Fig. 1) was performed and returned normal results. The patient was then advised to have an ECG during palpitations and was put under a Holter monitor. The Holter showed no premature ventricular contractions (PVCs) and no significant arrhythmia. An ECG stress test was conducted, which was also unremarkable. An echocardiography showed moderate

mitral regurgitation (MR) and MVP. She underwent further testing with cardiovascular magnetic resonance (CMR), which showed mitral annulus disjunction (MAD) and MVP with fibrosis.

3. Management (medical/interventions)

Given her concerning syncope episodes and high-risk features for sudden cardiac death (SCD), the options of implantable cardioverter-defibrillator (ICD) insertion or implantable loop recorder (ILR) insertion were discussed, and we elected for ILR insertion. ILR (Figs. 2 and 3) later recorded polymorphic ventricular tachycardia (PMVT) correlating with her syncope and proceeded by a narrow complex tachycardia (NCT) at a rate of 290 ms. This was suggestive of supraventricular tachycardia (SVT) induced PMVT. An electrophysiology study (EPS) ± ICD implantation was discussed with the patient and the plan was to proceed with ICD insertion if no SVT was induced and withhold ICD insertion if SVT is induced and successfully

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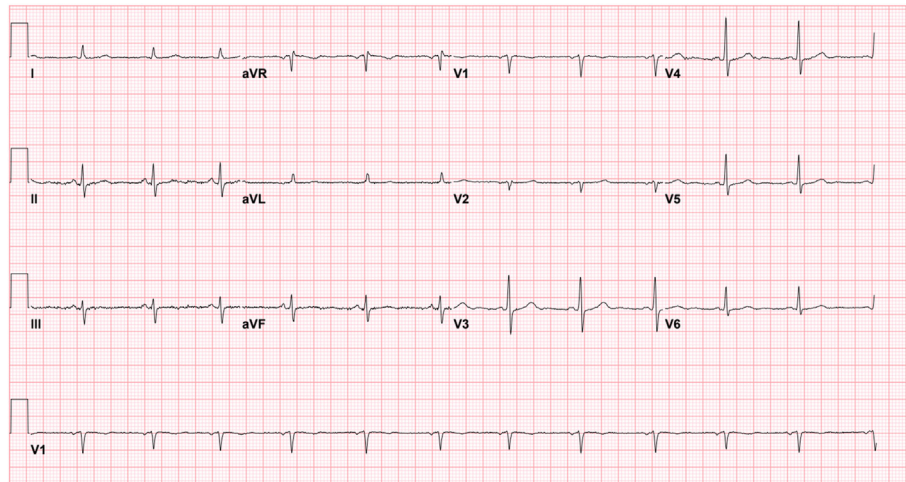


Fig. 1. Baseline electrocardiogram.

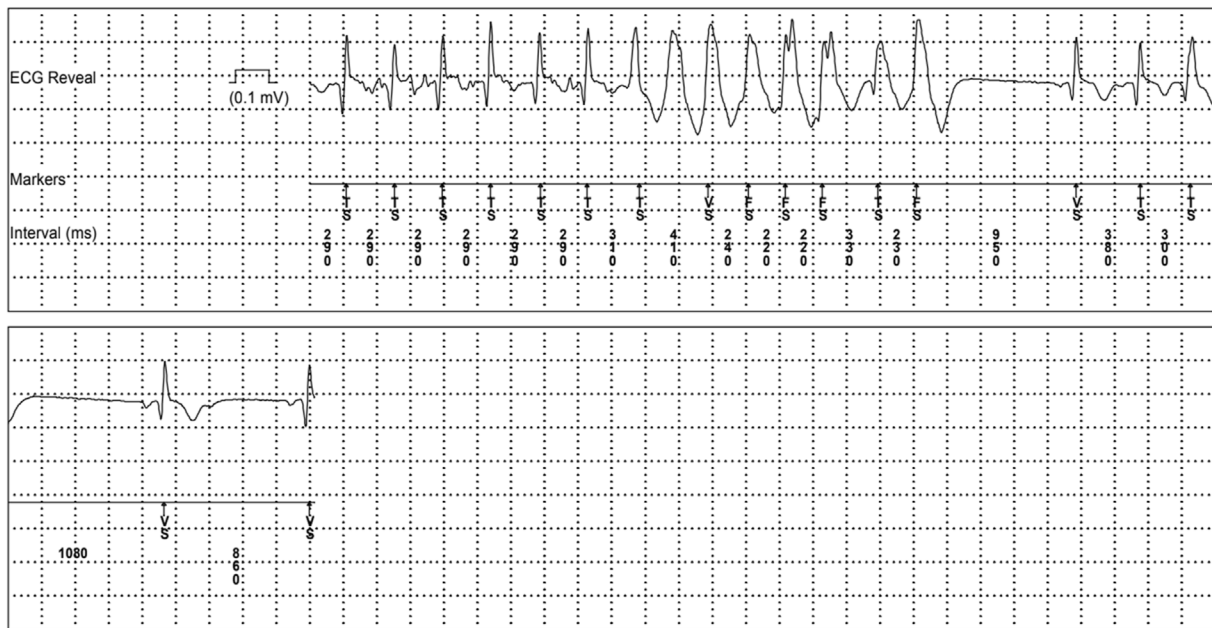


Fig. 2. The implantable loop recorder's tracing showing an episode supraventricular tachycardia (SVT) induced polymorphic ventricular tachycardia (PMVT) that spontaneously terminated. Post termination, 3 supra-ventricular beats at a rate slower than SVT were observed before sinus rhythm resumes.

ablated. Later, she underwent an EPS which induced sustained typical atrioventricular nodal reentrant tachycardia (AVNRT) at a rate of 280 ms (similar to the clinical SVT rate). Repeated induction was performed and AVNRT was left for few minutes, but no ventricular arrhythmias (VAs) were observed. Successful ablation was performed with no complications and ICD insertion was aborted. ILR was left in place given the uncertainty about the risk of VAs.

4. Discussion

SVT is a benign arrhythmia originating at or above the atrioventricular (AV) node. In rare circumstances, it can degenerate to more dangerous arrhythmias, such as PMVT [1,2]. The mechanisms causing this transformation are not fully understood [1–3]. Genetic susceptibility might explain the transition in some patients. Both SVT's and PMVT's can be inherited by cardiac channelopathies [4].

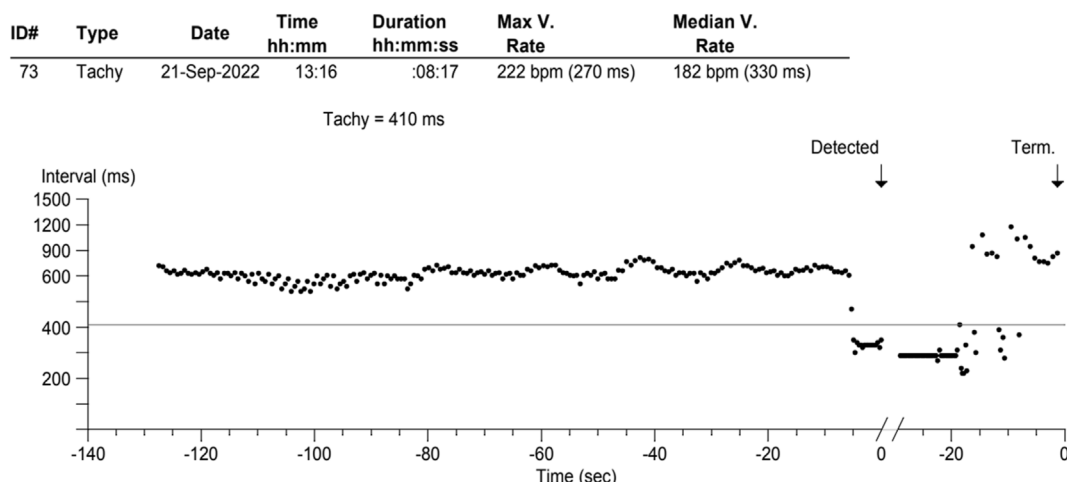


Fig. 3. The implantable loop recorder's dot plot showing an episode supraventricular tachycardia (SVT) induced polymorphic ventricular tachycardia (PMVT) that spontaneously terminated.

Three other cases of otherwise healthy patients with typical AVNRT deteriorating into polymorphic VT have been documented [5]. However, to our knowledge, none have been documented with underlying MVP. We hypothesized that the underlying structural abnormalities associated with MVP is the cause of SVT-induced PMVT in our case.

MVP is a common valve abnormality that affects 1–2.5% of the population [6]. It is generally considered to be a benign condition, but there is evidence to suggest that it can lead to sudden cardiac death (SCD) [7]. Risk markers such as MAD and fibrosis have been shown to be associated with ventricular arrhythmias in MVP [8]. Therefore, it is imperative to thoroughly investigate and follow MVP patients with these risk markers. In patients presenting with multiple risk markers for syncope, the utilization of an implantable loop recorder (ILR) is highly recommended. The ILR's ability to provide prolonged and continuous cardiac monitoring makes it an invaluable tool in diagnosing the underlying arrhythmic causes in such high-risk populations [9].

5. Follow-up and outcomes

Close follow-up with ILR interrogation was commenced after the procedure. Repeated ILR interrogation showed sinus rhythm only. She hasn't had syncope, SVT nor PMVT since ablation (2022-current).

6. Conclusion

MVP patients with syncope should be considered for ILR monitoring, particularly in the absence of

ventricular arrhythmias (VAs) on routine Holter monitoring.

Learning Objectives

- Don't jump to ICD in MVP with syncope, especially with no VT/PVCs on repeated Holter.
- SVT can degenerate into PMVT possibly due to an abnormal substrate.

Ethics information

There are no ethical issues related to this case report.

Funding

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Author contributions

Conception and design of Study: GAA, LAA, SQ, WA. Literature review: GAA, LAA, SQ, WA. Acquisition of data: GAA, LAA, SQ, WA. Analysis and interpretation of data: GAA, LAA, SQ, WA. Research investigation and analysis: GAA, LAA, SQ, WA. Data collection: GAA, LAA, SQ, WA. Drafting of manuscript: GAA, LAA, SQ, WA. Revising and editing the manuscript critically for important intellectual contents: GAA, LAA, SQ, WA. Data preparation and presentation: GAA, LAA, SQ, WA. Supervision of the research: GAA, LAA, SQ, WA. Research coordination and management: GAA, LAA, SQ, WA. Funding for the research: GAA, LAA, SQ, WA.

Conflict of interest

There's no conflict of interest.

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