EJCRIM
European Journal
of Case Reports
in Internal Medicine

A CARDIOMYOPATHY TO REMEMBER: A CASE REPORT OF DESMOPLAKIN CARDIOMYOPATHY

Tarek Mahdy, Salaheldin Agamy, Mahmoud Khedr, George Doos, Mohamed Mansour, Mubarak Ahamed

University Hospitals Birmingham NHS Foundation Trust, Birmingham, UK

Corresponding author's e-mail: Tarek.hmmahdy@uhb.nhs.uk

Received: 11/04/2026
Accepted: 18/04/2026
Published: 15/05/2026

Conflicts of Interests: The Authors declare that there are no competing interests.
Patient Consent: The patient gave written informed consent to the publication of this case.
This article is licensed under a CC Attribution-NonCommercial-NoDerivatives 4.0 License

How to cite this article: Mahdy T, Agamy S, Khedr M, Doos G, Mansour M, Ahamed M. A cardiomyopathy to remember: a case report of desmoplakin cardiomyopathy. *EJCRIM* 2026;**13**:doi:10.12890/2026_006749

ABSTRACT

Introduction: Arrhythmogenic cardiomyopathies are an under-investigated common cause for myocardial infarction with no obstructive coronary artery disease.

Case description: A 56-year-old male presented with myocardial infarction with no obstructive coronary artery disease in three different occasions. His transthoracic echocardiography showed dropped left ventricle function in the last presentation. This was further investigated by cardiac magnetic resonance imaging which showed distinguishable pattern of myocardial fibrosis. He had primary prevention with an implantable cardioverter-defibrillator. He tested positive for pathological variant for the desmoplakin (DSP) gene.

Conclusion: Recurrent myocardial injury left ventricular fibrosis, and frequent premature ventricular contractions should always raise the suspicion of DSP cardiomyopathy.

KEYWORDS

Cardiomyopathy, MINOCA, desmoplakin, genetic, case report

LEARNING POINTS

- Recurrent episodes of myocardial infarction with non-obstructive coronary artery disease should raise the suspicion of desmoplakin cardiomyopathy.
- Cardiac magnetic resonance imaging is the gold standard imaging tool for diagnosis.
- No consensus regarding risk assessment however primary prevention towards ventricular arrhythmias needs to be considered.

INTRODUCTION

Myocardial infarction with no obstructive coronary artery disease is a diagnosis which necessitates detailed investigations. One of its common causes is arrhythmogenic cardiomyopathies. Desmoplakin (DSP) cardiomyopathy can easily to be missed especially in the early stages where there is no overt left ventricle (LV) dysfunction. Our case is an example of how such patients could be diagnosed earlier if we have a low threshold of suspicion for DSP cardiomyopathy.

EFIM
European Federation of Internal Medicine

Publisher
smc media srl

© EFIM 2026 - European Journal of Case Reports in Internal Medicine - Doi: 10.12890/2026_006749

CASE DESCRIPTION

In 2012, a 56-year-old man presented with exertional chest tightness. His medical background includes diabetes and hypertension. He never smoked. He had a myocardial infarction in 1985 with subsequent coronary angiography revealing mild non obstructive coronary artery disease. His family history was remarkable for sudden cardiac death: a sister, who died at age 38 and was found to have cardiac scarring on the postmortem examination.

Consequently, he underwent a myocardial perfusion scan which was considered negative. However, an increase in LV volume following stress was noted. Transthoracic echocardiography (TTE) showed normal LV function with no regional wall motion abnormalities. The patient was discharged after his symptoms improved with bisoprolol initiation.

In 2021, the patient had a non-ST segment elevation myocardial infarction (NSTEMI). High sensitivity troponin was elevated at 229 ng/l and 1563 ng/l. Coronary angiography was performed and showed minor atheroma with no flow limiting lesions *(Fig.1)*.

TTE also showed a small sized inferior wall hypokinesis and normal LV systolic function. The patient was discharged on dual antiplatelet therapy.

In 2022, he was admitted again with a history of chest pain associated with troponin elevation of 750 ng/l and 785 ng/l. Electrocardiogram (ECG) showed sinus rhythm, normal PR interval and QRS duration, low voltage QRS complex and left axis deviation *(Fig. 2)*. Coronary angiogram was repeated showing no obstructive coronary artery disease.

TTE revealed a mildly dilated LV, global hypokinesia with LV ejection fraction (EF) =39% and reduced average global longitudinal strain (-11%) *(Fig. 3)*. The right ventricle appeared non dilated with only impaired radial systolic function. During his cardiac rehabilitation, the patient managed to complete a submaximal cycle stress test with normal physiological and satisfactory metabolic equivalents of task.

In 2023, cardiac magnetic resonance imaging (CMRI) revealed dilated with moderately impaired LV. The LV function was estimated as 41%. A globular late gadolinium enhancement most evident within the inferior wall along with some pericardial involvement was noted *(Fig. 4)*.

The patient was reviewed in the heart failure clinic for medication optimizations. Prior to that, his blood tests showed mildly elevated N-terminal pro-B-type natriuretic peptide (518 ng/l), normal troponin (15 ng/l) and raised creatine kinase (462 U/l).

Considering the cardiomyopathy features on the CMRI and the family history of sudden cardiac death, our team believed that the patient would benefit from primary prevention with implantable cardiac defibrillator (ICD) insertion.

In 2024, a transvenous ICD was implanted. Eight months later, an episode of ventricular tachycardia lasting 21 sec at a rate of 156 bpm was noted on his device check. Also, frequent premature ventricular contractions (PVCs) were noted on multiple occasions and managed by up titrating bisoprolol.

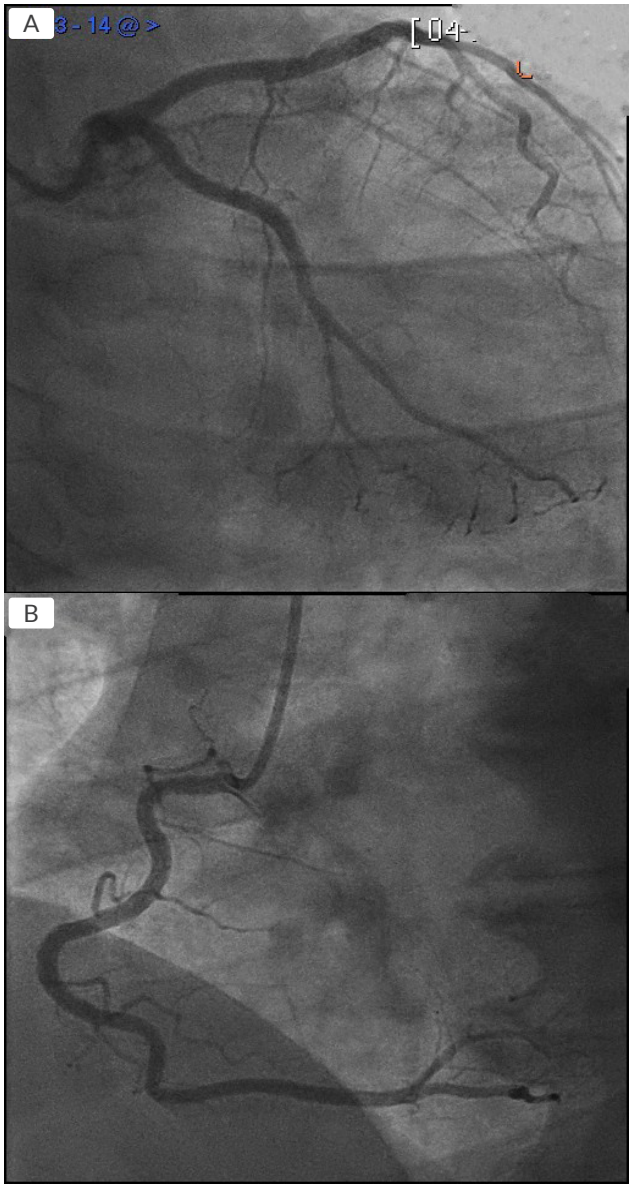


Figure 1. *Coronary angiography shows non-obstructive coronary arteries in both A) left coronary system B) right coronary artery.*

The patient was sent for genetic testing which came positive for being a heterozygous for a pathogenic (causative) variant in DSP gene called c.939+1G>A.

DISCUSSION

Arrhythmogenic cardiomyopathy (ACM) is defined as myocardial diseases that are not caused by ischemia, hypertension, valvular disease. It can be related to systemic diseases such as sarcoidosis or amyloidosis, infection such as Chagas disease, genetic factors such as arrhythmogenic right ventricular cardiomyopathy (ARVC), arrhythmogenic left ventricular cardiomyopathy (ALVC), lamin (LMNA) gene-associated cardiomyopathy, and finally to ion channel diseases[1].

ACM is considered rare, with a prevalence of 1:2000-1:5000 adults[2].

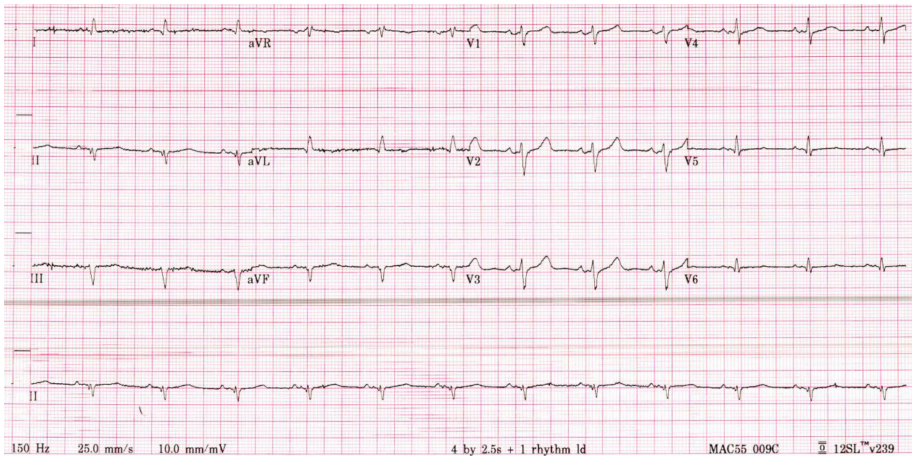


Figure 2. Electrocardiogram showed inverted T wave changes with low voltage QRS complex.

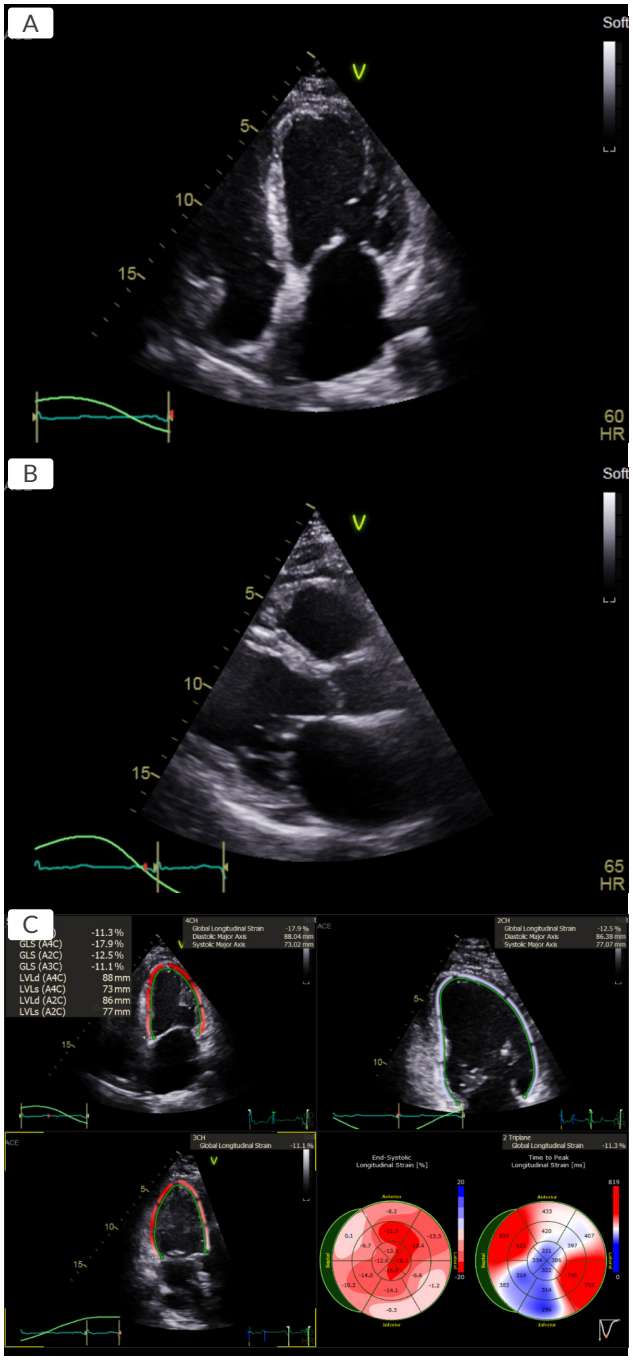


Figure 3. Transthoracic echocardiogram showed dilated left ventricle cavity size with impaired systolic function evident on the strain measures.

DSP is the most abundant intracellular protein which helps in cell adhesion by anchoring intermediate filaments to desmosome in cardiomyocytes[3]. DSP is encoded by the DSP gene which is located on chromosome 6p24[1].

Interestingly, DSP is expressed in both the skin and myocardium[4]. The presence of curly hair and thick callused skin on the hands and soles of the feet (palmoplantar keratoderma) support the likelihood of DSP cardiomyopathy[5]. Rare examples of DSP-related syndromes are Naxos disease and Carvajal syndrome where those extra-cardiac findings are associated with right ventricular involvement or LV involvement respectively[1].

Pathogenic and likely pathogenic (P/LP) variants in DSP provide a wide range of cardiomyopathy spectrum ranging from classical dilated cardiomyopathy (DCM), left-sided arrhythmogenic cardiomyopathy, right sided arrhythmogenic cardiomyopathy, biventricular arrhythmogenic cardiomyopathy, and the newer group of non-dilated left ventricular cardiomyopathy either with or without systolic dysfunction[6].

Historically, Pathogenic/likely pathogenic (P/LP) DSP variants are identified in 3–15% of patients with arrhythmogenic right ventricular cardiomyopathy (ARVC) However DSP cardiomyopathy is a separate and unique form of arrhythmogenic cardiomyopathy (ACM)[3].

Variations in DSP gene mutations are classified into truncating (a more aggressive phenotype) or missense. A pathogenic mutation in the DSP gene can result in recurrent LV inflammation and myocardial injury seen as recurrent myocarditis-like episodes. The cardiomyocytes damage trigger lymphocyte infiltration and necrosis followed by myocardial fibrosis and fibrofatty tissue replacement eventually leading to LV systolic dysfunction[2,7].

The cardinal clinical feature of DSP cardiomyopathy is disproportionate involvement of the LV and presentation with recurrent myocardial injury in the form of chest pain and troponin elevation in absence of any significant obstructive coronary artery disease[3]. Recurrent "myocarditis-like" episodes have been defined as the hot phases[4].

Smith et.al reported that during the hot phases, the cardiac

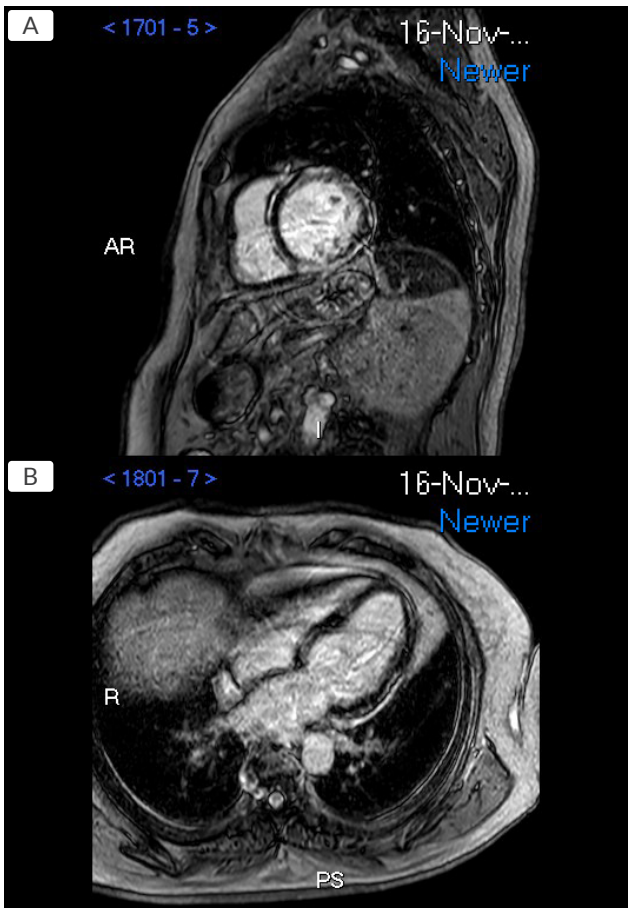


Figure 4. Cardiac magnetic resonance imaging views showing gadolinium enhancement suggestive of the fibrosis.

^{18}F-fluorodeoxyglucose positron emission tomography scans that showed typical findings for left ventricle myocardial inflammation[5].

Female patients with DSP variants were more commonly diagnosed as having LV involvement. however, the sex difference did not clearly predict the arrhythmic risk unlike the typical ARVC[8,9].

Regarding the ECG, the presence of low QRS voltages in limb leads and negative T waves in inferolateral leads can point toward the differential diagnosis. The electrophysiologic features are strongly associated with higher risk for both ventricular arrhythmia and heart failure hospitalizations. The risk significantly increases with the more T waves changes noted on 12-lead ECG and with PVC burden on 24-hour monitor[4,6].

Echocardiography has limited role in the assessment of DSP carriers despite the coexisting extensive scar. Wall motion abnormalities and LV dysfunctions usually do not appear until the advanced stages[10].

CMRI remains the most sensitive imaging tool to help in diagnosis ACM. DSP cardiomyopathy is mainly characterized by the presence of a distinctive "ring-like" scar pattern of myocardial fibrosis and late gadolinium enhancement which is often disproportionate to the degree of LV dysfunction. This pattern is better visualised in the subepicardial layer of the inferolateral LV segments[10]. This specific finding helps in distinguishing DSP cardiomyopathies from non-ischaemic dilated cardiomyopathies where fibrosis is usually less prominent and mostly located in the interventricular septum[5]. An explanation for this is that fibrosis represents the main driving factor of the disease. whereas in cases of DCM, fibrosis is a result of the dilatation of the ventricle[4].

Patients experiencing recurrent episodes of myocardial injury had a two-fold increase in their risk for arrhythmia and a five-fold increase in their risk for hospitalizations for heart failure (HF) which often occurs in young individuals without HF or significant LV dysfunction[6,9].

Despite the absence of global consensus regarding assessment of the arrhythmia risk associated with DSP cardiomyopathies, it was noted that 25% of the patients experienced sustained ventricular arrhythmia or sudden cardiac death during their follow up, even in the absence of significant LV dysfunction. Risk stratification for primary ICD implantation is needed especially in patients with left-dominant phenotypes who showed worse survival to severe arrhythmias[3,5].

If an inherited cardiomyopathy is suspected, genetic testing is always necessary for confirmation. If a pathogenic variant is identified, further genetic testing should be offered to the other family members[2].

CONCLUSION

Recurrent myocardial injury with chest pain and troponin elevation, a unique LV fibrosis pattern on CMRI, and frequent PVCs are the hallmark features of DSP cardiomyopathy. These episodes of myocardial injury suggest progressive injury and fibrosis preceding systolic dysfunction.

REFERENCES

1. Yuan ZY, Cheng LT, Wang ZF, Wu YQ. Desmoplakin and clinical manifestations of desmoplakin cardiomyopathy. *Chin Med J (Engl)* 2021;**134**:1771-1779. doi: 10.1097/CM9.0000000000001581
2. Schoonvelde SAC, Hirsch A, Yap SC, Verhagen JMA, van Slegtenhorst MA, Segers Det al. Desmoplakin cardiomyopathy-an inherited cardiomyopathy presenting with recurrent episodes of acute myocardial injury. *Neth Heart J*;**31**:282-286. doi: 10.1007/s12471-022-01735-2
3. Wang W, Murray B, Tichnell C, Gilotra NA, Zimmerman SL, Gasperetti A, et al. Clinical characteristics and risk stratification of desmoplakin cardiomyopathy. *Europace* 2022;**24**:268-277. doi: 10.1093/europace/euab183
4. Brandão M, Bariani R, Rigato I, Bauce B. Desmoplakin Cardiomyopathy: Comprehensive Review of an Increasingly Recognized Entity. *J Clin Med* 2023;**12**:2660. doi: 10.3390/jcm12072660
5. Smith ED, Lakdawala NK, Papoutsidakis N, Aubert G, Mazzanti A, McCanta AC, et al. Desmoplakin Cardiomyopathy, a Fibrotic and Inflammatory Form of Cardiomyopathy Distinct From Typical Dilated or Arrhythmogenic Right Ventricular Cardiomyopathy. *Circulation* 2020;**141**:1872-1884. doi: 10.1161/CIRCULATIONAHA.119.044934
6. Gasperetti A, Carrick RT, Protonotarios A, Murray B, Laredo M, van der Schaaf I, et al. Clinical features and outcomes in carriers of pathogenic desmoplakin variants. *Eur Heart J* 2025;**46**:362-376. doi: 10.1093/eurheartj/ehae571
7. Ghawanmeh M, Simon Frances B, Kerai A, Patel P, Du J, Kumar P. Management of Recurrent Myocarditis Due to Desmoplakin Cardiomyopathy: Diagnostic and Therapeutic Challenges. *JACC Case Rep* 2022;**4**:59-62. doi: 10.1016/j.jaccas.2021.10.005
8. Bariani R, Cason M, Rigato I, Cipriani A, Celeghin R, De Gaspari M, et al. Clinical profile and long-term follow-up of a cohort of patients with desmoplakin cardiomyopathy. *Heart Rhythm* 2022;**19**:1315-1324. doi: 10.1016/j.hrthm.2022.04.015
9. Norgett EE, Hatsell SJ, Carvajal-Huerta L, Cabezas JC, Common J, Purkis PE, et al. Recessive mutation in desmoplakin disrupts desmoplakin-intermediate filament interactions and causes dilated cardiomyopathy, woolly hair and keratoderma. *Hum Mol Genet* 2000;**9**:2761-2766. doi: 10.1093/hmg/9.18.2761
10. Augusto JB, Eiros R, Nakou E, Moura-Ferreira S, Treibel TA, Captur G, et al. Dilated cardiomyopathy and arrhythmogenic left ventricular cardiomyopathy: a comprehensive genotype-imaging phenotype study. *Eur Heart J Cardiovasc Imaging* 2020;**21**:326-336. doi: 10.1093/ehjci/jez188. PMID: 31317183