

Game changer? A sporting indication to implant a left atrial appendage closure device in a rugby player with atrial fibrillation: a case report

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Background

Caring for athletes with cardiac disease requires an approach that caters to the specific needs of the athlete.

Case summary

A 27-year-old professional rugby player was admitted with decompensated heart failure and atrial fibrillation (AF). Transthoracic echocardiogram showed features in keeping with a dilated cardiomyopathy with severe left ventricular (LV) systolic impairment. He made good progress on evidence-based heart failure medication and his LV systolic function returned to normal. He failed to maintain sinus rhythm with cardioversion and remained in persistent AF. He then suffered a transient ischaemic attack despite appropriate anticoagulation. At 1-year follow-up, he was asymptomatic and against medical advice continued to play competitive rugby whilst taking rivaroxaban. He subsequently underwent implantation with a percutaneous left atrial appendage occlusion device, allowing him to discontinue anticoagulation, reduce his bleeding risk and resume his career, whilst simultaneously lowering the thromboembolic risk.

Discussion

Counselling should include different management options aimed at minimizing the risks to athletes if they to return to competitive sports. Left atrial appendage occlusion devices are a suitable AF-related stroke prevention strategy in athletes competing in full-contact sports.

Keywords

Sports cardiology • Atrial fibrillation • Dilated cardiomyopathy • Stroke • Left atrial appendage occlusion • Watchman device • Case report

Learning points

- Management decisions appropriate for a non-athlete might be inappropriate in an athlete as they may result in disqualification, financial loss, or put the athlete at additional risk of complications.
- Cardiologists with expertise in sports cardiology should be involved in the management of athletes as it is often complex and requires a holistic approach.
- Left atrial appendage occlusion devices can play an important role in reducing stroke risk in selected cases.

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Introduction

Caring for athletes with cardiac disease requires an approach that caters to the specific needs of the individual. Often athletes require their care to fit around training and competition requirements and this can come into conflict with the best care their clinicians feel they can offer. Medications and interventions with proven symptomatic and prognostic benefit may affect athletes' performance and lead to poor adherence. Moreover, they may result in disqualification from competitive sports which are likely to carry both personal and financial consequences. In some individuals, engaging in demanding physical activity and competitive sports against medical advice may carry significant health risks. Therefore, shared decision-making is vital and alternative management strategies are often warranted to ensure appropriate adherence to prescribed treatment.

This case illustrates this conflict in a professional rugby player with a cardiomyopathy and atrial fibrillation (AF) on anticoagulation who wished to continue to play and discusses how an alternative approach was able to optimize his care.

Timeline

Date	Events
November 2017	Admission with decompensated heart failure and new diagnosis of atrial fibrillation (AF). Transthoracic echocardiogram (TTE) showed evidence of left ventricular (LV) dilatation and severe LV systolic dysfunction. Discharged on heart failure medications and anticoagulation for stroke prevention.
January 2017	Unobstructed coronary arteries on angiography. Early recurrence of AF following direct current cardioversion.
February 2017	Left ventricular systolic function remained severely impaired on outpatient TTE.
April 2018	Cardiac magnetic resonance showed dilated cardiomyopathy with ejection fraction (EF) 37%. No scarring or fibrosis seen on late gadolinium enhancement.
July 2018	Right arm weakness and paraesthesia in keeping transient ischaemic attack. Screening for connective tissue disorders, HIV, syphilis, and Fabry disease was negative.
October 2018	Left ventricular systolic function returned to 'near normal' (EF 50%). Euvolaemic. Advised not to play rugby due to high bleeding risk on anticoagulation.
November 2018	Playing rugby on anticoagulation. Referred for consideration of left atrial appendage occlusion (LAAO) device.
July 2019	Successful LAAO device implantation. Anticoagulants stopped.

Case presentation

A 27-year-old male professional rugby player was admitted to his local district general hospital with a 2-day history of chest tightness and breathlessness. He had no other significant past medical history and was not taking any regular medications. He admitted to regularly taking cocaine and performance-enhancing steroids. He was haemodynamically stable with normal saturation. The main findings on physical examination were an irregularly irregular pulse and bibasal crackles. His admission electrocardiogram (ECG) showed AF and his chest X-ray findings were in keeping with pulmonary oedema. Initial bloods tests were within normal range. Transthoracic echocardiogram (TTE) revealed bi-atrial dilatation and a moderately dilated left ventricle (left ventricular end diastolic diameter 7 cm) with mild concentric left ventricular (LV) hypertrophy with an ejection fraction (EF) 35–40%.

He was acutely managed with intravenous diuretics and initiated on evidence-based heart failure medications including beta-blockers and angiotensin-converting enzyme inhibitors. In view of his drug history, a working diagnosis of drug-induced dilated cardiomyopathy (DCM) was made. Once stabilized, he was discharged on bisoprolol 2.5 mg and ramipril 2.5 mg. In anticipation of a direct current cardioversion (DCCV), he was started on rivaroxaban 20 mg. He was counselled not to participate in any competitive sports.

To further investigate his cardiomyopathy, he underwent an outpatient coronary angiogram which revealed unobstructed coronary arteries. In addition, a cardiac magnetic resonance (CMR) confirmed a dilated left ventricle with globally impaired systolic function and a calculated EF of 37%. There was no evidence of scarring or fibrosis on delayed enhancement images. He was unable to maintain sinus rhythm following DCCV and relapsed back into persistent AF. His CHA₂DS₂-VASc score was 1 (LV dysfunction) which does not strictly mandate anticoagulation; however, he made an informed decision to continue rivaroxaban.

On a follow-up TTE performed 3 months later, LV systolic function remained unchanged. His ramipril was increased and he was initiated on eplerenone. Left ventricular function gradually improved on optimal medical therapy and, at 8 months of follow-up, had returned to near-normal (EF 50–55%). He remained in AF and experienced a brief episode of left arm weakness and paraesthesia suggestive of a transient ischaemic attack (TIA) despite being compliant with anticoagulation. As his CHA₂DS₂-VASc score increased to 3 (TIA, LV dysfunction) he now had a clear indication for anticoagulation. Connective tissue disorders, syphilis, and Fabry disease screening were negative.

At 1-year follow-up, he was asymptomatic (New York Heart Association 1) but remained in AF and continued to participate in competitive rugby, whilst on oral anticoagulation despite counselling regarding the high bleeding risk. He was reluctant to terminate his professional rugby career prematurely and sought alternative stroke prevention strategies that obviated the need for continuous anticoagulation. He was referred to a Tertiary Cardiology Centre for further management of his AF and consideration of a left atrial appendage occlusion (LAAO) device. A 27 mm Watchman Flx (Boston Scientific, MA, USA) device was successfully deployed under general

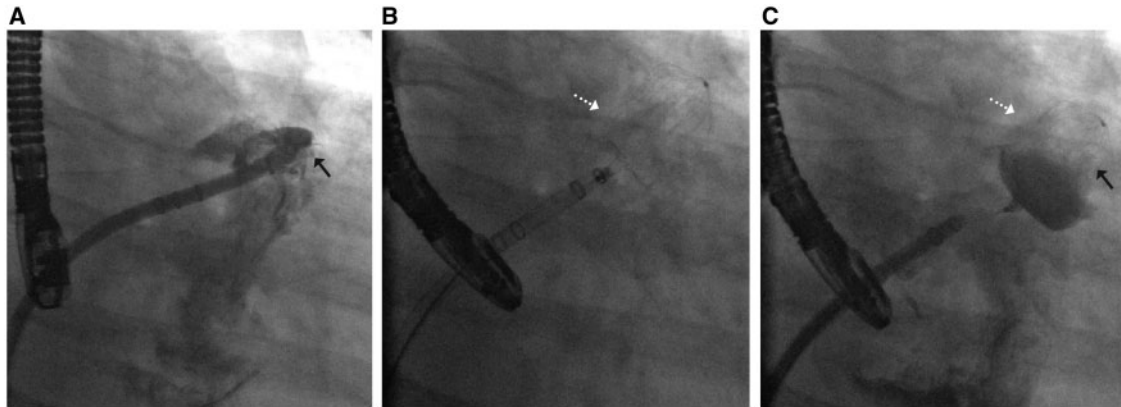


Figure 1 Watchman implant procedure under transoesophageal echocardiogram and fluoroscopy guidance. (A) Contrast injection delineating the left atrial appendage (black arrow). (B) Watchman device (white interrupted arrow) is deployed but still connected to the delivery system. (C) Watchman (white interrupted arrow) successfully deployed with no contrast entering the left atrial appendage (black arrow).

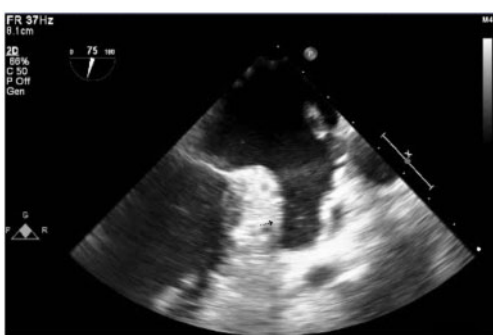


Figure 2 Transoesophageal echocardiogram at 75° (mid-oesophageal) showing the left atrial appendage (black interrupted arrow).

anaesthetic in the left atrial appendage with a good seal and no leaks (Figures 1–4, Supplementary material). He was discharged home on a 6-week course of aspirin and clopidogrel therapy with a follow-up transoesophageal echocardiogram to assess LAAO device position and guide cessation of antiplatelet strategy.

Discussion

Recommendations regarding participation in competitive sports should be given following comprehensive evaluation of the athlete's disease characteristics and a thorough risk assessment. The work-up includes a 12-lead ECG, echocardiography, CMR, 24-h Holter monitor, and cardiopulmonary exercise testing. Disqualification from competitive sports is likely to carry both personal and financial consequences for athletes.¹ Ensuring that the athlete is involved in the decision-making process is therefore paramount.

This athlete was strongly advised not to engage any competitive sports, in line with the European Association of Preventive

Cardiology (EAPC) recommendations. The EAPC position paper states that athletes with DCM should not participate in competitive sports if any of the following are present¹:

- (1) symptomatic, or
- (2) Ejection fraction <40%, or
- (3) extensive late gadolinium enhancement (i.e. >20%) on CMR, and/or
- (4) frequent/complex ventricular tachyarrhythmias on ambulatory ECG monitoring and exercise testing, or
- (5) history of unexplained syncope.

Once his LV systolic function had improved there was no further restriction on exercise from a cardiomyopathy perspective.

On admission, his CHA₂DS₂-VASc score was 1 (LV dysfunction) which is not a strict indication to initiate oral anticoagulation [Class IIA, level of evidence (LOE B)] as the evidence supporting a net clinical benefit of oral anticoagulation in patient with a single stroke risk factor (excluding gender) is limited.^{2–4} Oral anticoagulation was started in anticipation of a DCCV and, after appropriate counselling, he made an informed decision to continue on rivaroxaban. However, his CHA₂DS₂-VASc increased to 3 (TIA, LV dysfunction) and he had definitive indication to continue term-anticoagulation (Class I, LOE A).² As a professional rugby player, he was susceptible to repeated trauma. Avoidance of playing rugby competitively was warranted due to the high risk of bleeding whilst on anticoagulation. If, despite counselling, athletes continue to participate in full-contact sports, advice should be offered in order to mitigate the bleeding risks. In this case, the most viable management strategy that would enable simultaneously adequate stroke prevention and a return to his professional career was an LAAO device.

An LAAO device may be considered for stroke prevention in patients with AF with contra-indications to long-term anticoagulation (Class IIb, LOE B).² The most widely used catheter-based devices are the Watchman (Boston Scientific, MA, USA) and AMULET (St. Jude Medical, MN, USA). They are all self-expanding devices deployed via a percutaneous, endocardial approach.⁵ Alternatively, if the left atrial appendage anatomy is deemed unsuitable, the Lariat (SentreHeart,

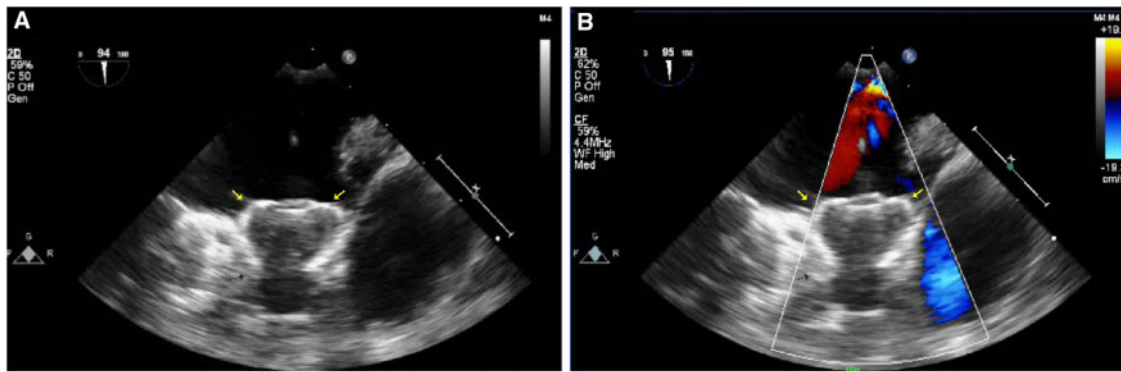


Figure 3 Transoesophageal echocardiogram at 95° (mid-oesophageal). (A) Watchman device (yellow arrows) implanted in the left atrial appendage (black interrupted arrow). (B) Colour flow Doppler shows a successful deployment of the Watchman device (yellow arrows) with a good seal of the left atrial appendage (black interrupted arrow) and no residual leaks.

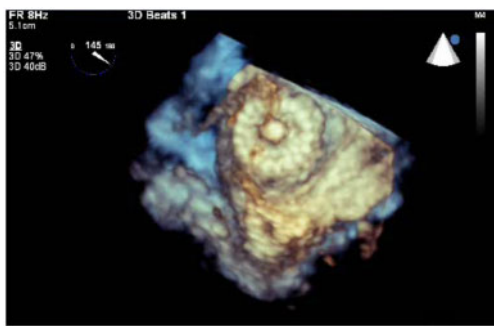


Figure 4 Transoesophageal echocardiogram showing a 3D reconstruction of the Watchman device.

CA, USA) combines an epicardial and endocardial technique to ligate the left atrial appendage.⁶ In the last decade, a large body of evidence of their efficacy and safety has emerged mainly through large multi-centre global registries. Only the Watchman has been compared to vitamin K antagonists (VKAs) in two non-inferiority, randomized controlled trials, PROTECT AF, and PREVAIL.^{7,8} In both trials, the Watchman was non-inferior to VKA for the composite primary endpoint of stroke, systemic embolism, and cardiovascular or unexplained death. Further supporting these findings, a meta-analysis combining the data of PROTECT AF and PREVAIL with two registries showed an 80% reduction in the risk of haemorrhagic stroke and a 50% reduction in the risk of cardiovascular/unexplained death when compared with VKA.⁹

The risk of AF in athletes appears to have a U-shaped dose–response curve to exercise, from being protective in low-intensity training to a marked increase in high-intensity endurance athletes.^{2,10,11} The pathophysiology is unclear but likely results from a complex interaction of atrial remodelling, inflammation, and increased vagal tone.¹² The recommended initial approach is to assess response to a period of deconditioning for 2 months; an approach not always acceptable to

athletes.¹³ A rhythm control strategy, including catheter ablation, may be pursued to mitigate significant AF related symptoms or to preclude the use of antiarrhythmic drugs which may impair performance or be prohibited.² This athlete had an early recurrence of AF following DCCV and deconditioning that did not reduce his AF burden. A catheter ablation was considered but not indicated as he was asymptomatic, beta-blockers were not affecting his performance and there was no evidence of tachycardia-associated cardiomyopathy. Catheter ablation has not been shown to lower the risk of stroke (CABANA trial) and current international guidelines highlight that it is a treatment for symptoms and cannot be used as a means to stop OAC in patients with a high-risk profile.^{2,14}

Conclusion

Management of athletes presenting with cardiomyopathy and AF is often challenging. Expert opinion should be sought, and guidance should be individualized. Management options are aimed to minimize the risks to the athletes if they choose to return to competitive sports. It is reasonable to consider an LAAO device in athletes with AF and a risk profile that would normally warrant oral anticoagulation who are competing in contact sports.

Lead author biography



Dr Andre Briosa e Gala graduated from Charles University of Prague in 2011. He completed his Foundation and Core Medical Training in the Oxford Deanery, attaining membership of the Royal College of Physicians (UK) in 2015. In 2016, he started his Cardiology training in the University Hospital of Southampton. He is currently an electrophysiology clinical research

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Supplementary material

Supplementary material is available at *European Heart Journal - Case Reports* online.

Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as [Supplementary data](#).

Consent: The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: none declared.

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