CASE REPORT

Ventricular fibrillation due to coronary vasospasm

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SUMMARY

A 43-year-old woman developed a sudden-onset severe chest pain and breathlessness at home. She collapsed within minutes and received bystander cardiopulmonary resuscitation from her husband. On arrival, the paramedics identified ventricular fibrillation requiring defibrillation. She was admitted to the intensive care unit for observation. A coronary angiogram performed at our hospital demonstrated non-obstructive disease of the right coronary artery. Her antidepressant medications were discontinued and she was discharged. No specific cause was found for the arrhythmia and collapse. One week later, she developed similar chest pain. An ECG showed transient ST-elevation in the inferior leads. Symptoms and ECG changes resolved with sublingual nitroglycerin. During the course of a repeat coronary angiogram the patient developed severe spasm of the right coronary artery associated with typical chest pain and ST-elevation in the inferior leads. She was treated with insertion of a drug-eluting stent and a cardiac defibrillator.

BACKGROUND

Variant angina (VA), better known as Prinzmetal angina, is a rare condition that presents with episodes of anginal chest pain. The episodes usually occur at rest, and can be associated with ST-segment elevation on an ECG.¹ Prinzmetal's angina can

rarely cause cardiac arrest.² We describe a case of Prinzmetal angina presenting as cardiac arrest, including the challenges in managing such a case.

CASE PRESENTATION

A 43-year-old woman developed sudden central crushing chest pain associated with 'difficulty breathing' while she was having her breakfast. She also felt cold and clammy. Within 2 min of the onset of pain, she collapsed in her seat and lost consciousness. Her husband, who had previous paramedic training, started cardiopulmonary resuscitation CPR.

She complained of similar non-exertional pain for the previous 4 months. An exercise test performed 4 months previously was normal. She was taking a proton pump inhibitor for acid reflux demonstrated by oesophagogastroduodenoscopy 2 months ago. There was a medical history of post-natal depression for which she was taking Mirtazepine and Lamotrigine. Apart from smoking cigarettes on an occasional basis, there were no risk factors for heart disease.

Ambulance paramedics arrived after 10 min and the defibrillator ECG demonstrated ventricular fibrillation (figures 1 and 2). The patient received a total of 5 shocks before the circulation restored spontaneously.

Figure 1 Ventricular fibrillation during cardiac arrest requiring defibrillator shocks.

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Figure 2 Ventricular fibrillation requiring fourth and fifth shock.

Figure 3 Right coronary artery with mild proximal lesion.

On return to sinus rhythm the ECG appeared normal. On admission to hospital, CT of the brain and echocardiography were normal. Blood results including full blood count, kidney, liver and thyroid function were normal. Troponins were mildly

elevated at 46. Although she required intubation at the time of the arrest, it was possible to extubate on the following day. Coronary angiography demonstrated non-obstructive disease of the right coronary artery ([figure 3](#)). No intervention was recommended, other than stopping her antidepressant medications.

Three days later, the patient reported further episodes of chest pain. Although initial ECG was normal, she developed typical symptoms of chest pain. An ECG performed during the episode showed ST-elevation in the inferolateral leads with posterior involvement ([figures 4](#) and [5](#)). Three minutes after sublingual nitroglycerin pain resolved and ECG normalised.

A diagnosis of coronary artery vasospasm was suspected, and treatment with nitrates and calcium channel blockers was initiated. The patient underwent repeat coronary angiography and developed typical chest pain and inferior ST-elevation during injection into the right coronary artery. This was associated with marked spasm of the artery ([figures 6](#) and [7](#)).

In view of persistent spasm despite drug therapy and the presence of underlying atherosclerotic disease, a drug-eluting stent was inserted. An intracardiac defibrillator was implanted because of the risk of further spasm in non-obstructed coronary arteries and a history of ventricular fibrillation.

Figure 4 Inferior ST-elevation during chest pain.

Figure 5 ST-segments normalise with resolution of chest pain.

OUTCOME AND FOLLOW-UP

The patient remained asymptomatic at a 3-month outpatient review.

DISCUSSION

The anginal attacks in Prinzmetal angina are caused by focal vasospasm of one or more coronary arteries, usually in areas without high-grade stenosis.³ The exact pathogenesis is unknown but vascular smooth muscle hyper-reactivity is thought to be the key inciting phenomenon.⁴ Chest pain is not necessarily related to exertion and may lead to delay in diagnosis, especially when the patient presents without ongoing symptoms. Resting ECG and even exercise testing may be normal and lead the physician away from a cardiac cause. In this case, the presence of inflammation of the oesophagus was probably an incidental finding but led to a false reassurance that symptoms were non-cardiac. Medical treatment including nitrates and calcium channel blockers are effective therapies for VA where they help prevent vasoconstriction and promote vasodilation in the coronary vasculature.⁵ Percutaneous coronary stenting may be performed in those refractory to medical treatment.⁶ Ventricular fibrillation is very rare. However, it would seem prudent to consider a defibrillator in those with a documented arrhythmia even after stenting because spasm may occur in other parts of the coronary artery tree.⁷

Figure 6 Right coronary artery spasm.

Figure 7 Right coronary artery after balloon and proximal stent insertion.

Learning points

- ▶ Symptoms of Prinzmetal angina are atypical and may be easily confused with common non-cardiac pathologies. If symptoms of these conditions fail to improve with therapy, other diagnoses should be considered.
- ▶ Although usually a benign condition, Prinzmetal angina may rarely be associated with potentially lethal arrhythmias.
- ▶ Calcium channel blocker and long-acting nitrates are the medical treatment required to prevent coronary spasm.
- ▶ Very rarely coronary artery stenting and implantable cardioverter defibrillator insertion may be required for treatment of this condition.

Contributors SYN wrote the case report and gathered the images. AH edited the case report. JC was the physician responsible for the management of this case.

Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 Prinzmetal M, Kennamer R, Merliss R, *et al.* Angina pectoris. I. A variant form of angina pectoris; preliminary report. *Am J Med* 1959;27:375–88.
- 2 Kaski JC, Crea F, Meran D, *et al.* Local coronary supersensitivity to diverse vasoconstrictive stimuli in patients with variant angina. *Circulation* 1986;74:1255–65.
- 3 Hung MJ, Cheng CW, Yang NI, *et al.* Coronary vasospasm-induced acute coronary syndrome complicated by life-threatening cardiac arrhythmias in patients without hemodynamically significant coronary artery disease. *Int J Cardiol* 2007;117:37–44.
- 4 Kaski JC, Maseri A, Vejar M, *et al.* Spontaneous coronary artery spasm in variant angina is caused by a local hyperreactivity to a generalized constrictor stimulus. *J Am Coll Cardiol* 1989;14:1456–63.
- 5 McMahon MT, McPherson MA, Talbert RL, *et al.* Diagnosis and treatment of Prinzmetal's variant angina. *Clin Pharm* 1982;1:34–42.
- 6 Gaspardone A, Tomai F, Versaci F, *et al.* Coronary artery stent placement in patients with variant angina refractory to medical treatment. *Am J Cardiol* 1999;84:96–8.
- 7 Matsue Y, Suzuki M, Nishizaki M, *et al.* Clinical implications of an implantable cardioverter-defibrillator in patients with vasospastic angina and lethal ventricular arrhythmia. *J Am Coll Cardiol* 2012;60:908–13.

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