CASE REPORT

Platypnoea-orthodeoxia in an elderly man with patent foramen ovale and dilated ascending aorta

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Abstract

We report the case of an 85-year-old male with platypnoea-orthodeoxia associated with patent foramen ovale (PFO) and ectatic ascending aorta, in the absence of any significant pulmonary pathology.

Keywords: platypnoea-orthodeoxia, postural hypoxaemia, patent foramen ovale, elderly, right-to-left shunt

Introduction

Platypnoea-orthodeoxia is a rare clinical entity characterised by arterial hypoxia and breathlessness induced by erect position which subsequently improves with recumbency. This has been described in patients with an intra-cardiac shunt as well as in the context of pulmonary and liver disease. Atrial right-to-left shunt without elevated right heart pressure is uncommon but has been reported as a cause of this phenomenon [1].

Case report

An 85-year-old man presented to the Emergency Department with acute right-sided chest pain and shortness of breath. There was no history of cardiac, respiratory or liver disease. On examination he was found to be haemodynamically stable with a respiratory rate of 18 breaths per minute and normal oxygen saturation of 96% on pulse oximetry while breathing room air. Physical examination was normal. Investigations demonstrated normocytic anaemia with haemoglobin 10.5 gm/dl, C-reactive protein 11 mg/dl and normal urea and electrolytes. D-Dimer level was within normal limits. Twelve-lead ECG revealed sinus rhythm with left-axis deviation and chest X-ray demonstrated clear lung fields with no abnormalities. The patient was treated with oral antibiotics for possible lower respiratory tract infection.

The following day the patient had recurrence of arterial desaturation and dyspnoea while sitting out in a chair. He was tachypnoeic (respiratory rate 34 breaths per minute) and had oxygen saturations of 88% on 15 l O2/min, with arterial pO2 7.3 kPa on arterial blood gas measurement. Heart rate, blood pressure and physical examination were again normal, with a clear chest to auscultation and no murmurs or added heart sounds. Following the patient’s transfer back to his bed for further care, his oxygen saturations improved to 100% and dyspnoea settled quickly.

A CTPA did not show evidence of pulmonary embolism, with only mild sub-pleural fibrotic changes and no other abnormalities. An initial transthoracic echocardiogram (TTE) showed ascending aorta to be dilated (4 cm in diameter), but no other structural abnormalities. A relationship between his symptoms, oxygen saturations and angle of recumbency became apparent. With repeat pulse oximetry measurements it emerged that when breathing room air, the patient had oxygen saturations of 73% when sitting and 99% on
becoming supine. A diagnosis of platypnea-orthodeoxia was made.

When TTE was repeated with intravenous agitated saline contrast via the left antecubital vein, it revealed a large spontaneous right-to-left shunt at the level of the interatrial septum. Transoesophageal echocardiogram confirmed the presence of a large patent foramen ovale (PFO).

The patient underwent percutaneous closure using Amplatzer PFO closure device (Figure 1) which resulted in resolution of his postural shortness of breath and hypoxia. His cognition and exercise tolerance also improved, following which he was discharged home. On review in follow-up clinic, he remains asymptomatic.

Discussion

This case demonstrates the benefits in identifying platypnea-orthodeoxia and closure of the causative PFO in a frail older adult. Platypnea-orthodeoxia is a rare condition that occurs in patients with right-to-left shunting of blood through a PFO, atrial septal defect (ASD) or fenestrated atrial septum. It is often accentuated by other medical problems such as dilatation of ascending aorta, severe COPD, pulmonary embolism, post pneumonectomy, ARDS, pulmonary arterio-venous fistula and liver cirrhosis (hepato-pulmonary syndrome) [2].

The hallmark of this condition is right-to-left shunting of blood. This may arise either in the setting of elevated right heart pressure caused by pulmonary hypertension resulting from respiratory disease or less commonly in the presence of normal right atrial pressure, as in the case discussed above [3].

For patho-physiology of platypnea-orthodeoxia with normal right heart pressures, see Supplementary data available in Age and Ageing online, Appendix 1.

Transthoracic echocardiography using intravenous injection of agitated saline should demonstrate most right to left shunts and is more sensitive for this purpose than transoesophageal echocardiography (TOE). If a shunt is not detected with agitated saline contrast via the antecubital vein, sensitivity can be increased using the femoral vein. Having identified a shunt, TOE identifies the anatomy of the defect and suitability for device closure [4, 5].

The definitive treatment in these patients is closure of PFO, which was previously achieved with open cardiac surgery. Latterly there is an increasing use of percutaneous transcatheter closure of these defects under general anaesthesia with fluoroscopic and TOE imaging. Such non-invasive techniques are more suited to a frailer person with additional co-morbidities, and may lead to resolution of the patient’s symptoms with a lower post-procedure morbidity rate [6].

Although breathlessness is a common presentation in older adults admitted to hospital, careful history and examination may be indicative of platypnea-orthodeoxia syndrome. We recommend clinicians consider further investigations, such as TTE with agitated saline contrast in patients presenting in a similar manner to the case reported here. Identification and closure of such abnormalities may improve symptoms, confer functional benefits and positively affect quality of life even in frail older people.

Key points

- Platypnea-orthodeoxia is an uncommon condition presenting with shortness of breath and arterial desaturation on sitting or standing that resolves with lying flat.
- Careful assessment of the pattern of dyspnoea is required to make the diagnosis.
- TTE with agitated saline bubble contrast can reliably detect inter-atrial shunt.
- As some patients may present in the later years of their life with this condition, there is a need to raise its awareness among elderly care physicians.

Conflicts of interest

None declared.

Supplementary data

Supplementary data mentioned in the text is available to subscribers in Age and Ageing online.

References


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