CASE REPORT

Platypnea-Orthodeoxia syndrome after repair of a paraesophageal hernia

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SUMMARY

The Platypnea-Orthodeoxia syndrome is characterised by dyspnoea and deoxygenation accompanying a change from the recumbent to the upright position. An 81-year-old woman had an elective paraesophageal hernia repair. She developed dyspnoea and hypoxemia post-operatively that was worse when upright. An agitated saline echocardiogram revealed a right-to-left shunt through a patent foramen ovale that increased when the patient was upright. Over 3 weeks the patients' shunt, dyspnoea and hypoxemia improved and she was discharged home.

BACKGROUND

The Platypnea-Orthodeoxia syndrome is characterised by dyspnoea and deoxygenation accompanying a change from the recumbent to the upright position. We report a case of the Platypnea-Orthodeoxia syndrome which occurred following a paraesophageal hernia repair.

CASE PRESENTATION

An 81-year-old woman was admitted for an elective repair of a recurrent type 4 paraesophageal hernia. She had undergone a paraesophageal hernia repair 6 years previously, but developed recurrent nausea and vomiting. She underwent repair of the paraesophageal hernia with fundoplication. Postoperatively she developed hypoxaemia which persisted despite adequate analgesics and use of incentive spirometry to expand the lungs. Initially she required non-invasive ventilatory support utilising bi-level positive airway pressure (BiPAP) delivered via a full-face mask to improve oxygenation in all positions. Despite the use of supplemental oxygen and BiPAP, however, the PaO₂ never normalised. Multiple studies were performed to investigate the cause of the patient's hypoxaemia. A CT scan of the chest performed 1 week postoperatively revealed normal pulmonary parenchyma and vasculature and therefore eliminated pulmonary causes of hypoxaemia. Fluoroscopy was performed and there was no evidence of diaphragmatic paralysis. Positioning the patient demonstrated an improvement in dyspnoea and pulse oximetry when she was supine as compared with when she was upright. Performance of the Valsalva manoeuvre caused oxygenation to decrease immediately after release when the patient was upright, but not when the patient was supine. A transthoracic echocardiogram with injection of agitated saline revealed a patent foramen ovale (PFO) with right-to-left shunting (figures 1 and 2), which increased when she was upright. The

bubbles appeared within the first 3–5 heart beats after injection in both the supine and upright positions, but were more numerous in the upright position. This was diagnostic of a right-to-left shunt through the PFO. Her symptoms slowly improved over a 3-week period. A repeat echocardiogram with injection of agitated saline revealed the PFO, but failed to demonstrate right-to-left shunting. She was discharged home without oxygen and had no hypoxaemia or dyspnoea.

OUTCOME AND FOLLOW-UP

The patient improved over a 3-week period and maintained normal oxygen saturations in all body positions without supplemental oxygen. She was successfully rehabilitated and discharged home.

DISCUSSION

The Platypnea-Orthodeoxia syndrome is a relatively uncommon condition defined by dyspnoea and oxygen desaturation, which are worse in the upright position. It is caused by right-to-left shunting which can be cardiac or pulmonary in origin.^{1–3} It has been associated with hepatopulmonary syndrome, pulmonary arterial venous malformations, fenestrated atrial septum and PFO.^{4–5}

PFO is a fairly common condition seen in up to 27% of the general population.⁶ Most are asymptomatic, however, it is rarely associated with the Platypnea-Orthodeoxia syndrome. At present the diagnosis of right-to-left shunting through a PFO is best made by injection saline echocardiography, which reveals the early passage of injected microbubbles through the PFO.^{7–9} An echocardiogram with microbubble study may identify PFOs not detected by a cardiac catheterisation.¹⁰ It is extremely rare for orthodeoxia to develop after abdominal surgery. We feel that venous blood flow from the inferior vena

Figure 1 Echo image before injection of saline.

To cite: Vallurupalli S, Lodha A, Kupfer Y, et al. *BMJ Case Reports* Published online: [please include Day Month Year] doi:10.1136/bcr-2012-007444

Figure 2 Echo during injection of saline bubbles seen in left atrium.

cava was altered as a result of the displacement of the interatrial septum towards the horizontal position, which resulted from the repair of the paraesophageal hernia. This alteration in the blood flow resulted in right-to-left shunting through the PFO.^{3 11} This persisted for 3 weeks postoperatively but did not require surgical closure. In conclusion, this case demonstrates the potential for development of right-to-left shunting via a PFO after abdominal surgery and the development of the Platypnea-Orthodeoxia syndrome.

Learning points

- ▶ The Platypnea-Orthodeoxia syndrome is characterised by dyspnoea and desaturation in the upright position.
- ▶ Patent foramen ovale (PFO) is a common condition that can rarely cause the Platypnea-Orthodeoxia syndrome.
- ▶ Upper abdominal surgery may trigger the Platypnea-Orthodeoxia syndrome in patients with a PFO.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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