Diagnosis of interatrial shunts and the influence of patent foramen ovale on oxygen desaturation in obstructive sleep apnea

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av
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Professor Eva Nylander,
Universitetssjukhuset Linköping.

Avhandlingen baseras på följande delarbeten.

I Availability of percutaneous closure for an adult population with interatrial shunts. Johansson M, Söderberg B, Eriksson P. Cardiology 2003; 99: 85-89

II Sizing of Atrial Septal Defects in Adults. Helgason H, Johansson M, Söderberg B, Eriksson P Cardiology 2005; 104: 1–5

III The influence of patent foramen ovale on oxygen desaturation in obstructive sleep apnoea. Johansson M. C., Eriksson P, Peker Y, Hedner J, Råstam L, Lindblad U. European Respiratory Journal 2007; 29: 149–155

IV Sensitivity for detection of patent foramen ovale increased with increasing number of contrast injections. A descriptive study with contrast transesophageal echocardiography. Johansson M. C., Helgason H, Dellborg M, Eriksson P. Journal of the American Society of Echocardiography. E-published ahead of print, October 2007.

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Diagnosis of interatrial shunts and the influence of patent foramen ovale on oxygen desaturation in obstructive sleep apnea

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Abstract

Patent foramen ovale (PFO) is found in 27% of the population and although mostly asymptomatic, PFO has been associated with e.g. cryptogenic stroke and, rarely, also with oxygen desaturation. PFO and atrial septal defects may nowadays be closed percutaneously without open heart surgery. Obstructive sleep apnea is a common condition, characterised by cessation of ventilation due to collapse of the upper airways and oxygen desaturation of varying degree.

The availability for percutaneous closure was studied in 66 consecutive patients with an indication for closure of an interatrial shunt and 58 % of the patients were found to be available.

A descriptive study on 51 consecutive patients with atrial septal defect hypothesised that balloon sizing of the defect during percutaneous closure can be replaced by the size measured with pre-catheterisation transesophageal echocardiography. The results showed that the differences between measurements were too large for substituting pre-catheterisation size for balloon sizing.

The influence of PFO on the frequency of oxygen desaturations in proportion to the frequency of ventilation disturbances in obstructive sleep apnea was studied in a case control study. The presence of a PFO was assessed with contrast transesophageal echocardiography and ≥20 bubbles passing over to the left atrium was considered as a large PFO. The prevalence of large PFOs was 9 out of 15 (60%) cases with frequent desaturations, versus only 2 out of 15 controls (13%) ($p=0.02$) with infrequent desaturations, in proportion to the frequency of ventilation disturbances.

The effect of increasing numbers of contrast injections during transesophageal echocardiography, on the sensitivity for PFO detection, was studied. The sensitivity increased with increasing numbers of contrast injections and to safely rule out the presence of a PFO, up to five contrast injections were needed.

In conclusion, interatrial shunts can often be closed percutaneously and balloon sizing is an important part of the procedure. Nocturnal oxygen desaturation occurred proportionally more often in obstructive sleep apnea subjects with a PFO than in subjects without a PFO, indicating the importance of right-to-left shunting in obstructive sleep apnea subjects with a concomitant PFO. Furthermore, sensitivity for PFO detection increased with increasing numbers of contrast injections during transesophageal echocardiography.

Keywords: Patent foramen ovale, atrial septal defect, obstructive sleep apnea, contrast transesophageal echocardiography, percutaneous closure.

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