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Patent Foramen Ovale Closure in Patients with Orthodeoxia-Platypnea Syndrome

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Background: Orthodeoxia-platypnea syndrome (OPS) is a rare clinical condition characterized by hypoxemia in the upright position that is improved in the supine position. Although several etiologies of OPS exist, it is frequently associated with right-to-left shunting of blood at the cardiac or pulmonary level, usually via a patent foramen ovale (PFO). The aim of this study was to describe the outcomes of PFO closure in OPS. **Methods:** Patients with OPS and a PFO referred to UCLA from 2001 to 2012 who elected to have their PFO closed were assessed for the severity of their symptoms and interval SaO2 changes, and classified according to the outcomes of "resolved," "improved" or "no change." The results were compared between the three groups. **Results:** Of 683 patients with PFO-associated conditions, 17 (2.5%) had OPS and elected to close their PFO. Approximately a third of patients experienced complete resolution of their dyspnea and hypoxemia, requiring no supplemental oxygen use (improved SaO2 from baseline 8.5% when recumbent and 26% when upright; p=0.03 and p< 0.0007 respectively). Another third experienced significant improvement in dyspnea, with baseline SaO2 improved to >93% and a smaller decrease in saturation on sitting upright; they continued using supplemental oxygen (improved SaO2 from baseline 4% when recumbent and 11% when upright, p=0.29; p=0.05 respectively). Patients with no change after PFO closure predominantly had a pulmonary etiology for their hypoxia, with elevated mean pulmonary pressures measured before closure (51.4±16.8 mmHg, p=0.06).

Variable	Resolved Mean ± SD, or N (%)	Improved Mean ± SD, or N (%)	No change Mean ± SD, or N (%)	p-value
Total patients	6 (100%)	5 (100%)	6 (100%)	-
Age	59.9 ± 14.8	58.2 ± 12	69.3 ± 14	0.36
BMI (kg/m2)	28.7 ± 6.8	31.6 ± 4.5	29.1 ± 7.6	0.74
SaO2 resting (%, pre-procedure)	89.2 ± 7.1	90.7 ± 7.1	83.2± 5.4	0.31
SaO2 in the upright position (%, pre-procedure)	75.7 ± 5.9	76.7 ± 4.9	76 ± 6.9	0.98
PFO canal height on cath (mm)	10.3 ± 3.2	8.5 ± 3.1	11.5 ± 4.9	0.61
Presence of atrial septal aneurysm	0 (0%)	1 (20%)	2 (33.3%)	0.47
Presence of residual shunt	1 (16.7%)	1 (20%)	2 (33.3%)	0.47
SaO2 resting (%, post-procedure)	96.8 ± 1.9	94.4 ± 1.5	87.2 ± 3.5	<0.0001
SaO2 in the upright position (%, post-procedure)	95.8 ± 2.8	87.6 ± 9.3	78.5 ± 4.9	0.033
Mean pulmonary pressure (mm Hg, pre-cath)	32.3 ± 16.5	26.4 ± 8.8	51.4 ± 16.8	0.06

Conclusions: PFO closure may resolve symptomatic postural dyspnea and hypoxemia and is an effective method for treating OPS.