CHEST Online Supplement

Patent Foramen Ovale in Severe Obstructive Sleep Apnea

Clinical Features and Effects of Closure

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e-Appendix 1.

METHODS

Additional details on PFO detection

Contrast transthoracic echocardiography (TTE): Contrast TTE was performed in the four chamber view.

Contrast transcranial Doppler (TCD): A 2MHz Power M-mode digital TCD system (ST3/PMD150, Spencer Technologies, Seattle, USA) was used to insonate the middle cerebral arteries bilaterally through the temporal bone windows. The probes were secured using an adjustable head frame with the patient in the supine position. The Doppler signal gain, depth and gate size was adjusted to detect flow. Automatic signal detection was used to detect microemboli in the cerebral circulation for 1 minute following contrast injection at rest and after a Valsalva maneuver.

Contrast: Agitated saline (8 ml saline, 1 ml autologous blood, 1 ml air) contrast was injected in a single push via a cannula in an antecubital vein. Injections were performed at rest and during a Valsalva maneuver.

Additional details for the percutaneous closure study

Subjects: OSA patients were recruited from the case finding study. Exclusion criteria were: major lung disease (FVC <80% predicted, FEV_1/FVC <70%), active infections, serum creatinine ≥1.5mg/dL, known or suspected pregnancy, predisposition to haemorrhage, sensitivity to porcine material, road traffic accident or near miss related to sleepiness, sensitivity to aspirin, clopidogrel or heparin, baseline thrombocytopaenia, thrombus visualised within the heart, seizure disorder, other cardiac disease (valve disease, known cardiomyopathy, left ventricular failure,

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known coronary disease, known congenital heart disease), previous atrial septal closure device, known pulmonary arteriovenous malformation, pulmonary hypertension (tricuspid regurgitation maximum velocity > 3metres/second), atrial fibrillation or flutter

Additional details on polysomnography measurement

Attended nocturnal polysomnography (NPSG) was performed in patients undergoing closure of PFO in the hospital sleep laboratory (SomnoScreen system, SOMNOmedics, S-Med UK). Electroencephalograms (C3/A2 and C4/A1) were placed according to standard 10-20 system of electrode placement. Left and right electrooculograms, submental electromyograms (EMG) and bilateral anterior tibialis EMG (to detect periodic limb movements) were recorded. A 2 lead electrocardiogram was recorded throughout. Chest and abdominal respiratory effort were monitored using respiratory inductance plethysmography. Oxyhaemoglobin saturation was monitored with a finger probe oximeter. Nasal airflow was monitored with a nasal cannula connected to a pressure transducer, oral and nasal temperature changes were monitored as an index of airflow using a thermistor. A tracheal microphone recorded snoring.

Agreement between contrast transthoracic echocardiography and transcranial Doppler studies

There were conflicting results between contrast TTE and TCD in 24 OSA patients. Seventeen patients had poor echo windows and in these cases the TCD shunt size was used. Seven patients had poor trans-temporal bone windows and in these patients, TTE was used. Similarly, 8 healthy controls had differences in shunt size; four had bigger shunts with TTE and 4 had bigger detectable shunts with TCD.

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