**ARE PATENT FORAMEN OVALE INHERITED? A MONOZYGOTIC TWIN STUDY**

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Introduction: Patent foramen ovale (PFO) persists in 25% of all adults and may allow paradoxical embolism causing cryptogenic stroke, migraine with aura and decompression sickness. Although genetic mutations associated with a variety of congenital heart defects have been identified, the genetic contribution to PFO has not been investigated.

Objective: To explore if venous to arterial circulation shunts (v-aCS), usually due to PFO, are heritable by investigating concordance in monozygotic twin pairs.

Methods: v-aCS was detected using a standardised contrast transcranial Doppler (TCD) technique in 15 monozygotic twin pairs from the Twins UK Registry. Microbubble contrast solution was injected into an antecubital vein twice under each of the following conditions: i) at rest, ii) while coughing and iii) followed by Valsalva manoeuvre. The severity of v-aCS was determined by counting the number of microembolic signals (MES) entering the middle cerebral artery on TCD as follows: absent (0), ‘minor’ (0-14), ‘significant’ (15 or more) or ‘major’ (more than 50 at rest, or more than 10 at rest and 80 after provocation). 'Significant' and 'major' v-aCS have been shown to be sensitive and specific for PFO.

Results: A v-aCS was detected in five twin pairs, absent in nine and discordant in only one pair. 14 of 15 twin pairs were concordant (p=0.001). In 13 out of the 15 pairs there was also concordance for severity of v-aCS.

Conclusions: The presence and the severity of v-aCS was highly concordant in monozygotic twin pairs. V-aCS, most commonly due to PFO, are likely to be heritable.