

Conclusion Although our numbers are small, the incidence of complications during pregnancy or immediately post partum are similar to those that we quote to our patients. Pregnant and post partum women complaining of severe chest pain should be brought to the immediate attention of senior staff and investigated urgently.

74 NON-INVASIVE ASSESSMENT OF PULMONARY HAEMODYNAMICS IN FONTAN PATIENTS

Aderonke Abiodun*, Luke Pickup, Heather Moore, Sarah Bowater, Sara Thorne, Lucy Hudsmith, Paul Clift. *Queen Elizabeth Hospital Birmingham*; *Presenting Author

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Introduction The Fontan circulation relies on a low pulmonary vascular resistance. At present the gold standard method of measuring this is with invasive cardiac catheterisation which can be difficult in this group. Previous work has shown that pulmonary vascular resistance is inversely correlated with pulmonary capacitance which can be approximated non-invasively using data derived from a maximal cardiopulmonary exercise test (CPEX). We have determined the non-invasive pulmonary artery capacitance (Ventilatory Product) in a large cohort of adult Fontan patients.

Methods 220 patients under regular follow up at University Hospital Birmingham were identified and CPEX results were available for 131 patients. We subdivided these into two groups, those with an atriopulmonary Fontan (AP) and combined those with lateral tunnel and total cavo-pulmonary connexion (TCPC). Parameters obtained were: NYHA functional class, maximum workload, ventilatory product, peak oxygen consumption, peak end tidal CO₂ and VE/VCO₂ slope.

Results 77 patients with TCPC/lateral tunnel versus 54 AP Fontan were included. In the AP Fontan group, mean ventilatory product correlated positively with pVO₂ ($r^2=0.344$) and maximum workload ($r^2=0.515$) and negatively with VE/VCO₂ slope ($r^2=-0.366$). In the combined TCPC/lateral tunnel Fontan group, mean ventilatory product correlated positively with pVO₂ ($r^2=0.484$) and maximum workload ($r^2=0.485$) and negatively with VE/VCO₂ slope ($r^2=-0.127$). When determined for each functional class ventilatory product was as follows in TCPC/lateral tunnel group: NYHA I 355.8 \pm 100, NYHA II 272.14 \pm 105, NYHA III 241.76 \pm 90.3. In the AP Fontan group mean ventilatory product was as follows: NYHA I 349.2 \pm 131.8, NYHA II 271.5 \pm 121.5, NYHA III 273.9 \pm 140.6. The mean VO₂ peak was significantly higher in the combined TCPC/lateral tunnel group (26.64 vs 20.56, $p = 0.00$). Further sub analysis within each functional class between both groups also showed statistical significance. TCPC/lateral NYHA class I mean V0₂ peak 29.56 vs 25.11 vs ($p = 0.01$), class II mean V0₂ peak 22.72 vs 18 ($p = 0.038$) and class III mean 22.14 vs 15.31 ($p = 0.018$).

Discussion Invasive measurements of PVR are difficult in the Fontan patient. We have demonstrated that a non-invasive indirect measurement of pulmonary artery capacitance -the ventilatory product, correlates with measures of performance, and negatively correlates with VE/VCO₂, which is known to be of prognostic significance in heart failure. Furthermore our data shows that ventilatory product falls with increasing functional class. From this, we propose that the ventilatory

product may be used to identify Fontan patients suitable for pulmonary vasodilator therapy. Our hypothesis however will require testing in prospective studies of pulmonary vasodilator therapy in Fontan patients.

75 THE BURDEN OF AF AND STROKE IN ADULT CONGENITAL HEART DISEASE

Aderonke Abiodun*, Heather Moore, Sayqa Arif, Sarah Bowater, Sara Thorne, Paul Clift, Lucy Hudsmith, Joseph De Bono. *Queen Elizabeth Hospital Birmingham*; *Presenting Author

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Introduction Atrial arrhythmias are strongly associated with thromboembolism with 1 in 5 strokes being attributed to atrial fibrillation (AF). Patients with adult congenital heart disease (ACHD) are at an increased risk of developing atrial arrhythmias compared to those with structurally normal hearts either due to the inherent cardiac anomaly or due to scar formation from surgery. The CHA₂DS₂VASC score is validated for stroke risk stratification for those with acquired heart disease. Its role in adult congenital heart disease however, is unclear.

Methods A retrospective review of the electronic ACHD database of all patients at a large quaternary specialist ACHD Centre with approximately 4500 patients under regular follow up. Data spanned from year 2000–2015 and data collected from referral letters, clinic letters, ECG and echocardiograms.

Results 376 patients with atrial arrhythmias were identified. Mean age was 57.7 \pm 15.8 years with 51% female. 88 (23%) of patients had complex disease (including those with a Fontan circulation) with the remainder having simple or moderate forms of congenital heart disease. In this cohort, 52 (13.8%) patients had at least one thrombo-embolic event with 77% being either transient ischaemic attacks or strokes. The remainder of events were embolic peripheral artery occlusions, deep vein thromboses and pulmonary emboli. The mean age of first occurrence of thromboembolic event was 44.2 \pm 19 years and mean CHA₂DS₂VASC score was 1.04 \pm 0.7 prior to the event. In 46% of cases the thromboembolic event occurred after the atrial arrhythmia had been diagnosed and 71% of patients were not anticoagulated at the time of their first event. Of those patients anticoagulated at the time of their event ($n = 9$), 2 patients had a documented subtherapeutic INR, 2 were non-compliant with their medication and 1 was on a Novel Oral Anticoagulant (NOAC). It was unclear in 11% of cases whether they were anticoagulated before the event. 88% of patients with a CHA₂DS₂VASC score of 2 or more were anticoagulated, with 93% on warfarin and 5% on NOACs and 2% on low molecular weight heparin. Of those with a CHA₂DS₂VASC score of 0–1, 74% were on either warfarin or a NOAC. There were 4 known deaths from complications related to anticoagulation (2 gastrointestinal bleeds and 2 from massive haemoptysis).

Discussion Atrial arrhythmias are common in ACHD and there is a high incidence of stroke in those with AF. In those groups with higher incidence of AF, loop recorders may be beneficial for detecting asymptomatic disease. The CHA₂DS₂VASC scoring system does not appear to be applicable for stroke risk stratification in ACHD. The mean pre-event CHA₂DS₂VASC was 1. Another marker for patients with