ARTERIAL FUNCTION IN PREADOLESCENT CHILDREN FOLLOWING KAWASAKI DISEASE: A SYSTEMATIC REVIEW

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Background Kawasaki disease (KD) is a paediatric systemic vasculitis, which may alter arterial structure and function and predispose affected patients to long-term cardiovascular sequelae. Increased arterial stiffness is an independent predictor of cardiovascular morbidity and mortality and could be used as a biomarker of cardiovascular risk in KD patients. Objectives To systematically review available literature in order to understand whether KD impacts arterial stiffness. Methods This review was performed following PRISMA guidelines. PubMed was searched using the terms: ‘pulse wave velocity’ (PWV), ‘carotid intima-media thickness’ (cIMT), ‘arterial stiffness index’ (Sx), ‘flow-mediated dilatation’ (FMD), ‘flow imaging’, ‘laser flow Doppler’, ‘venous plethysmography’, ‘cardi’ magnetic resonance imaging’, ‘aortic intima-media thickness’, ‘vascular ultrasound’ and ‘neonat’; ‘paediatric’, ‘infant’; ‘child’. Case reports, case series, reviews, commentaries, conference proceedings, animal studies, articles not in English and articles with children >12 years old were excluded. Reference lists of relevant studies were searched for additional eligible studies. Studies assessing arterial structure and function in children affected by KD were included. Results 12/1087 studies identified were included. Brachio-radial (brPWV) and aortic PWV (aPWV) were performed as measures of arterial stiffness in four studies, using techniques including echocardiography, photoplethysmography and magnetic resonance imaging. Five studies assessed cIMT and four studies measured flow-mediated dilatation (FMD), as arterial wall structure and endothelial dysfunction can both affect arterial stiffness. Eight studies assessed biophysical properties of the aorta relating to stiffness (such as Sx and distensibility). brPWV and aPWV were significantly higher in children with KD than healthy controls in all studies. This was independent of the presence of coronary artery lesions (CALs) in all but one study, which suggested a dose-response relationship between coronary involvement and brPWV. cIMT and Sx were also increased in children with KD except in one study. Children with KD had lower aortic distensibility than controls, and this was even lower in children with CALs compared to those without (0.6±0.2 vs 0.9±0.3 cm²/dyne x 10⁻⁴, p=0.001).

All four studies showed FMD was impaired in children with KD, and most impaired in children with CALs or longer fever duration, suggesting a potential role of the endothelium in the pathogenesis of the disease. FMD improved with Pravastatin or intravenous Vitamin C treatment. CRP +1444 and TNF-α-308 polymorphisms were associated with higher carotid artery Sx and cIMT in patients with KD but not controls, suggesting a genotype-modulating effect on the pro-inflammatory state that may mediate the increased risk of developing higher arterial stiffness in KD. Conclusions Clearly, arterial stiffness measurements are increased in patients with KD, though the effect of presence of CALs on stiffness is yet to be conclusively determined. Variability between studies can be explained by the wide variety of techniques, patient demographics, and time from disease onset studied. An improved understanding of the pathophysiological mechanisms behind increased arterial stiffness may allow more targeted interventions to mitigate future cardiovascular risk. We recommend long-term cardiovascular monitoring of patients with KD as well as further longitudinal observational and interventional studies aimed at better understanding and offsetting the long-term arterial sequelae of KD.

British Society of Paediatric Endocrinology and Diabetes

NEW ALPL GENETIC ALTERATION ASSOCIATED WITH AN ODONTOHYPOPHOSPHATASIA PHENOTYPE

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Background Hypophosphatasia is a rare autosomal dominant/recessive metabolic disease characterized by defective bone mineralization as a result of defective alkaline phosphatase activity caused by mutations in the gene encoding the tissue nonspecific alkaline phosphatase (TNSALP) enzyme. Patients with isolated dental manifestations, typically presenting as premature loss of primary teeth, are classified as having odontohypophosphatasia. A subset of patients diagnosed with odontohypophosphatasia in childhood can later develop extraphosphatase activity which has a novel mutation and contribute to an increase in the awareness of this disease group. Methods In the genetic analysis, a homozygous c.214A>Gp.172V mutation was found in the ALPL gene. According to the literature, this mutation had not been reported before. Heterozygous c.214A>Gp.172V mutation was found in the ALPL gene of the mother and father. Results A 14-year-old girl was admitted to our hospital because of tooth deformity and discoloration. The patient’s body weight was 51 kg (–0.5 SDS), and height was 154 cm (–1.04 SDS). According to the mother, the patient’s milk teeth came out on time, but around the age of 3, her teeth began to fall off spontaneously. There was no similar complaint in the family of the patient. Somatic and motor development was normal and there was no walking problem. There was early loss of the anterior incisors due to insufficient mineralization in the teeth, lack or absence of cement on the tooth surface. The yellowish and brownish discoloration was also observed in the teeth. In the biochemical examination, ALP: 14.2 U/L (40–150), Calcium: 10.1 mg/dl (8.4–10.2), Phosphor: 4 mg/dl (4–7), Magnesium: 1.93 mg/dl (1.3–2.1) PTH: 36.55 pg/ml (15–65),
Background One in four infants have a hospital admission in their first year of life, of which 75% are unplanned. Clinically vulnerable infants have more planned and unplanned hospital contacts than other infants. They are therefore likely to have been disproportionately affected by restricted access to hospitals during the COVID-19 pandemic.

Objectives To compare trends in planned and unplanned hospital contacts among clinically vulnerable and other infants before and during the COVID-19 pandemic.

Methods We included infants born between September 2016 and March 2020 in Hospital Episode Statistics (HES).

We defined clinically vulnerable infants by (i) long-term health conditions (chronic conditions or congenital anomalies), or (ii) adverse birth outcomes (low birth weight <2500g or preterm birth <37 weeks of gestation). We included characteristics and diagnoses recorded at birth, during subsequent hospital admissions, or as a cause of death.

We described rates of planned and unplanned hospital admissions (excluding the birth admission) between January 2017 and March 2020 for infants with and without vulnerability.

Results Of 2,184,114 infants in the study, 9.1% had a long-term health condition in such patients is difficult to establish the unmet needs that will result from the pandemic. Prioritisation of interventions to address unmet clinical need during lockdown should focus on clinically vulnerable infants.

British Association of Child and Adolescent Public Health

TRENDS IN HOSPITAL ADMISSIONS FOR CLINICALLY VULNERABLE INFANTS IN ENGLAND DURING THE COVID-19 LOCKDOWN

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Methods

We included infants born between September 2016 and March 2020 in Hospital Episode Statistics (HES).

We defined clinically vulnerable infants by (i) long-term health conditions (chronic conditions or congenital anomalies), or (ii) adverse birth outcomes (low birth weight <2500g or preterm birth <37 weeks of gestation). We included characteristics and diagnoses recorded at birth, during subsequent hospital admissions, or as a cause of death.

We described rates of planned and unplanned hospital admissions (excluding the birth admission) between January 2017 and March 2020 for infants with and without vulnerability.

Results

Of 2,184,114 infants in the study, 9.1% had a long-term health condition (6.8% had a chronic condition; 3.8% had a congenital anomaly), 9.3% had an adverse birth outcome (6.1% were low birth weight and 6.7% were preterm), and 16.4% had one or more.

Between January 2017 and March 2020, an average of 0.12% of the infants had a planned and 0.69% had an unplanned admission each week. Infants with a long-term health condition were at a higher risk for hospital admissions with 16 times (RR: 15.38 (11.16–21.74)) as many weekly planned and over four times (RR: 4.56 (4.00–5.20)) as many weekly unplanned admissions as infants without these conditions. This was similar for infants with an adverse birth outcome who had twice as many weekly planned (RR: 2.36 (1.86–3.02)) and unplanned (RR: 1.75 (1.59–1.93)) admissions as infants without.

Both weekly planned and unplanned hospital admissions started to fall two weeks before the first lockdown on March 23, 2020 for infants compared with the same period (averaged over 2017 and 2019); unplanned admissions fell more steeply. The reduction was greater for clinically vulnerable infants: there was a ten-fold decrease in planned admissions and a four-fold decrease in unplanned admissions for infants with long-term health conditions compared to those without.

Conclusions The impact of the COVID-19 pandemic was greatest for unplanned admissions in infants with long-term health conditions. This may be due to restricted access to hospitals, fear of COVID-19 infection, lower rates of other infections, closer monitoring by carers at home, or deferred presentations. Reducions in planned admissions could reflect postponement of elective procedures. Further research is needed to establish the unmet needs that will result from the pandemic. Prioritisation of interventions to address unmet clinical need during lockdown should focus on clinically vulnerable infants.

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Paediatricians with Expertise in Cardiology Special Interest Group

MILD AORTIC ARCH TURBULENCE – WHAT IS THE LONG TERM OUTLOOK

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Methods

Review clinical notes of these five patients and analyse the findings.

Results

There were 5 children in this study, which included 4 girls and 1 boy who were all non-syndromic. All children had normal blood pressures and palpable femoral pulses. All of them were diagnosed with mild aortic arch hypoplasia with turbulence noted at the distal transverse arch with velocities of around 2.2–3.0 m/s before their first birthday. All 5 children had left sided arch and it was an isolated finding in 3 of the 5 cases. One child also had a small secundum ASD (Atrial septal defect) and one patient had mild mitral regurgitation. At the time of this study these children were in 5–7 year age group. Most of the cases were followed up annually. Only 1 child had evidence of mild concentric left ventricular hypertrophy. All 5 patients had trileaflet aortic valve. None of the 5 patients needed cardiac interventions. One patient had resolution of flow acceleration and was discharged at 4 years of age. The rest of the patients have continued to be followed up with minimal or no increase in flow velocities.