Cardiology

**GLE2** TELE-ECHOCARDIOGRAPHY—ACCESS TO SPECIALIST SERVICES IN PAEDIATRIC CARDIOLOGY

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**Background:** Real time telemedicine systems are used in paediatric cardiology but are expensive. For video conferencing, the cost is around £7,000 per year and more for television or optical fibre. They require simultaneous attention of specialists in separated centres.

**Aims:** To undertake a pilot study of a digital tele-echo system and to determine its clinical use.

**Methods:** Digital video clips were captured during echocardiography by a trained consultant paediatrician (DM) onto an optical disc. These were sent in a commercially available programme (Medarchive), using the NHS net and a paged message, to a paediatric cardiologist (RT). Clinical data was sent by attached email, with faxed ECG.

**Results:** The system was bought for £5,800 with no running costs and 32 patients referred over 15 months, from 2 days to 17 years old. All clinical and echocardiographic data was successfully transferred. In 4, additional data were required for complete diagnosis. 18 patients avoided emergency transfer being seen in the next joint clinic. 6 were admitted for elective interventional cardiac catheter, without prior consultation, 5 were transferred acutely, advice was given, ensuring safe transfer. 3 children required semi-urgent surgery and were transferred the day before an elective and appropriate surgical list. The cost saving was £408,000.

**Conclusions:** The advantages are 1) Allowing echoes to be performed locally and reviewed by the specialist at a convenient time 2) It is inexpensive and 3) It uses widely available resources. It aids the diagnosis and management of acutely ill patients with congenital heart disease and reduces need for urgent transfer. Elective procedures can be planned and waiting times reduced.

**GLE23** CONGENITAL CARDIOVASCULAR MALFORMATIONS IN INFANTS OF DIABETIC MOTHERS—A 6 YEAR PROSPECTIVE STUDY

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**Objective:** To examine the prevalence at live birth and spectrum of structural cardiovascular defects in infants of diabetic mothers.

**Methods:** Data on the numbers and types of cardiovascular malformation diagnosed in infancy in babies born to diabetic mothers in 1995–2000 were collected prospectively from the northern diabetic pregnancy survey. Similar data on offspring of non-diabetic pregnancies were obtained from the regional paediatric cardiology database.

**Results:** During the 6 years of the study there were 192 618 live births. 609 babies were born to diabetic mothers and 22 (3.6%) of them had cardiac malformations. 1417 (0.7%) babies from non-diabetic mothers had a cardiac malformation. The odds ratio for congenital heart disease in the offspring of diabetic mothers was 5.0 (95% CI 3.3–7.8). Combining our findings with the few small published studies and comparing them with the spectrum of defects in non-diabetic pregnancies shows a substantial excess of transposition of the great arteries, truncus arteriosus and tricuspid atresia.

**Conclusions:** This first population based prospective study of babies of diabetic mothers shows a five-fold excess of cardiovascular malformations in general and an even greater excess of some specific diagnoses.

**GLE24** OUTCOME OF NEONATAL PATENT DUCTUS ARTERIOSUS LIGATION, A THREE CENTRE STUDY

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**Aim:** Patent ductus arteriosus (PDA) is a common problem in the ventilated premature neonates. Despite different medical strategies a small number of infants require surgical PDA ligation. The aim of this study was to determine the short and long term outcome of neonates undergoing this procedure in a regional neonatal intensive care unit and two cardio-thoracic centres.

**Methods:** Premature infants undergoing isolated PDA ligation were identified from each unit’s surgical database. A retrospective case note review was performed. Local paediatricians were contacted to provide long term follow up details. The study periods in the three centres overlapped but were not identical due to database limitations and availability of research personnel.

**Results:** A total of 85 infants were identified. The number of cases and period of study were: Centre A (1995–2000) n = 21; B (1995–1999) n = 42 and C (1999–2000) n = 22. All results are expressed as median (range). Birth gestation was 26(22–35) weeks, and birth weight 828 (501–2100) g. PDA ligation was performed at 24(19–93) days at a weight of 1036(550–2700) g. There were no peri-operative deaths. Day 7 post-operative survival (POS) was 98% and day 30 POS was 94%. Overall 70 (82%) infants have survived long term. The interval between surgery and death was 47(6–124) days, most deaths result from respiratory complications.

**Conclusion:** Survival following surgical PDA ligation is initially high. Late deaths need to be taken into account when counselling parents about the long term outlook. Communication between professionals is essential to provide accurate information for parents.
A ONE-STOP ECHOCARDIOGRAPHY CLINIC AS AN EFFICIENT MEANS OF INVESTIGATING CHILDHOOD HEART MURMURS

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Background: Congenital heart disease may be suspected following the detection of a heart murmur on routine examination. Traditionally children have been referred to general paediatricians for initial assessment and investigation with a chest X-ray (CXR) and electrocardiogram (ECG). Some children with heart murmurs may have no specific diagnosis and regularly return to the clinic for further assessment. There may be no clear recommendations regarding antibiotic prophylaxis. Children with suspected heart problems have been referred to a one-stop clinic where echocardiograms could be performed. CXR and ECG are no longer routinely performed. The aim of this study was to review the outcome of children referred to the clinic for assessment of a heart murmur.

Methods: Patients attending the clinic between 1997–2000 were included and the outpatient database. A retrospective case note review was performed. Patients with known cardiac defects were excluded. Infants less than 3 months of age were usually seen elsewhere in a neonatal echocardiography clinic.

Results: 344 children were seen, at a mean age of 4.6 years (range 10 days to 17.5 years). The echocardiogram was abnormal in 298 (8.4%). Structural anomalies detected were: atrial septal defect n=5; ventricular septal defect n=4; patent ductus arteriosus n=2; coarctation aorta n=2; pulmonary valve pathology n=2; mitral valve pathology n=3; and one child had multiple defects. Only 6 (1.7%) children attending the clinic required surgical intervention. Children attending the clinic required surgical intervention. Children attending the clinic required surgical intervention. Children attending the clinic required surgical intervention. Only 6 (1.7%) children attending the clinic required surgical intervention.

Conclusions: Only a small number of patients attending paediatric clinics with heart murmurs will have confirmed structural anomalies and few will require surgery. Echocardiographic investigation allows healthy children to be efficiently discharged from the clinic with appropriate reassurance and information.

EARLY DETECTION OF LEFT VENTRICULAR DYSFUNCTION IN PATIENTS WITH β-THALASSEMIA BY DOBUTAMINE STRESS ECHOCARDIOGRAPHY

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Aims: To refine the prediction of left ventricular dysfunction in patients with β-thalassemia using the index of myocardial contractility under dobutamine stress echocardiography.

Methods: Twenty-six patients with β-thalassemia and 20 normal subjects were initially examined by echocardiogram at rest and under stress (dobutamine 5µg/min/kg). All were rated class I according to the New York Heart Association (NYHA) functional classification. The reference myocardial contractility index, which is the relationship between rate-corrected velocity of circumferential left ventricular fiber shortening and wall stress derived from normal subjects, was used as normal standard linear regressions in the conditions of rest and stress.

Results: Results showed that there was no significant difference in fractional shortening (FS) and ejection fraction (EF) between controls and thalassemia patients (FS=0.41±0.05, EF=0.76±0.06, p=0.054) at rest. Based on dobutamine stress echocardiographic findings, the patients were divided into two subsets: "normal" (above or within the linear regression line ± 2SD) and "abnormal" (below - 2SD). Eleven patients were found to have "abnormal" contractility under stress, while only 3 were noted to be abnormal at rest. At follow up studies two years later, using the same measures, all patients in the "abnormal" subset under stress were found to have reduced myocardial contractility even at rest. Of these 11 patients, 1 died of congestive heart failure, 7 were rated NYHA class II, and 1 NYHA class III, although all of these were in NYHA class I 2 years previous. Their FS (p=0.00) and EF (p=0.00) were significantly decreased as compared with the data obtained two years previous, while the "normal" subset revealed no significant change (p=0.05).

Conclusions: This study shows that the myocardial contractility index under dobutamine stress echocardiography is a sensitive technique for early detection of preclinical myocardial dysfunction in β-thalassemia patients two years before the development of clinical symptoms.

TEN-YEAR SECULAR BLOOD PRESSURE TRENDS IN ADOLESCENCE: THE N.I. YOUNG HEARTS PROJECT

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Introduction: A trend to decreasing blood pressure (BP) has been reported across a number of adult populations worldwide during the last two decades. In 1989–90, the first N.I. Young Hearts Project (YH1) measured resting BP in 1015 12 and 15 year-olds as part of an epidemiological study of cardiovascular risk factor prevalence. We report secular trends in BP from a 10-year cross-sectional follow up study (YH2000) of an equivalent cohort of Northern Irish schoolchildren.

Methods: A randomly selected demographically representative 3.6% province population sample of 1152 children aged 12 and 15 years was studied in 1999–2000. YH1 methodology was replicated exactly: BP was measured by a single observer throughout each study, using a Hawksley random-zero sphygmomanometer on each subject’s right arm, after a period of sitting quietly at rest.

Results: Both systolic and diastolic BP’s have demonstrated a substantial and consistent fall between YH1 and YH2000 across all four age-sex groups measured (p<0.0001). Mean BP in 12-year-olds decreased from 111/68 to 103/58; in 12-year-old girls from 112/71 to 105/61; in 15-year-old boys from 123/73 to 113/62; and in 15 year-old girls from 118/74 to 110/64. These changes have occurred despite significant secular increases in mean height, weight and some indices of fatness over the same period. Using cut-offs defined in YH2000, we set the prevalence of “high” systolic and/or diastolic BP at these three levels across sex and age groups. Among high BP in the N.I. adolescent population. The prevalence of high BP in the N.I. adolescent population.

Conclusions: We report a marked decrease in both absolute BP levels and prevalence of high BP in the N.I. adolescent population. The reasons for these secular trends are unclear from our data. Further follow up studies would clearly be of benefit, but there is a substantial potential public health benefit if these decreases are sustained through the adult life of this population.