205 BLOOD PRESSURE PERCENTILE CHARTS IN AUSTRALIAN SCHOOL CHILDREN:

Jureidini, K.F., Adams, A.P.S., Burnell, R.H. Goldblatt, E., Roberts, M.E. & Vimpani, G.V. Renal Unit, Adelaide Children's Hospital, Nth Adelaide, South Australia

Blood pressures (BP) were measured in 3,000 school children aged between 7 & 13 years in the Adelaide metropolitan area. Schools cover wide socio-economic groups. All measurements were by one nurse at schools using a London School of Hygiene Blind Reading Sphygmomanometer. Each child had BP measured sitting. The first reading was taken as soon as practical after the child had been seated. Subsequent readings were 5 & 10 minutes later. First, 4th & 5th sounds were recorded. Each child had a cuff that totally encircled the upper arm and was the maximum width that would fit.

Mean BP at the initial recording ranged from 98/58/55 at 7 to 118/70/68 at 13. At 5 minutes the range was 95/58/56 at 7 to 113/70/68 at 13, and at 10 minutes 90/55/54 at 7 to 108/67/65 at 13. There was a steady rise in all BP recordings with age. In each age group there was a consistent fall from zero time to 10 minutes. This was more pronounced with systolic than diastolic readings. At all ages there was a small difference in BP between boys and girls - boys being consistently higher. Adequate percentile charts for BP in Australian children have not previously existed. Our figures show lower mean BP than studies in North American children, stressing importance of such studies in individual populations. Recording of readings at 5 & 10 minutes are useful in the overall assessment of BP in children.

206 SODIUM CONTENT OF RED BLOOD CELLS IN ACUTE RENAL FAILURE AND HYPERTENSION.

DIEKMANN, F.L.: CHILDREN'S CLINIC, UNIV. OF MUNSTER, W.-GERMANY

The erythrocyte is a valuable model for the study of the metabolism of elektrolytes. Sodium metabolism of red blood cells (rbc) is altered in hypertension and renal diseases. Therefore we investigate the intracellular electrolytes in rbc of 23 children with acute renal failure. 12 children suffered from HUS, 11 from dehydration, septicemia etc. 10 of them had elevated blood pressure. Na^+ was measured by flame photometry.

In the majority the sodium content of rbc was elevated: Na^+ 10.7 ± 3.5 mmol/l in HUS, 10.2 ± 5.5 mmol/l in others (normal values: 6.1 ± 0.6 mmol/l). In hypertensive patients Na^+ was significant elevated: Na^+ 13.6 ± 6.1 mmol/l, 8.3 ± 2.2 mmol/l ($p < 0.02$).

Retention of sodium and disturbances of Na-K transport by uremic toxins induce slight elevation of sodium in acute renal failure. The reasons of the higher concentration of Na^+ in rbc are yet speculative. Intracellular sodium elevation is one of several factors producing hypertension. The clinical course was frequently complicated in children with high sodium content of rbc.

207 BLOOD PRESSURE ELEVATION IN A PEDIATRIC ORTHOPAEDIC HOSPITAL.

R. Padman, N. L. Steg, Alfred I. duPont Institute, Wilmington, Delaware, USA

There are continued isolated reports of hypertension in patients with orthopaedic problems. We believe this to be a common occurrence. This study was undertaken to determine the incidence and possible etiologies of this blood pressure elevation.

We evaluated twenty patients between the ages of ten and eighteen years who were referred for elevated blood pressure (BP) post-operatively and 200 consecutive patients in the same age group undergoing various orthopaedic surgical procedures whose BPs were closely monitored. Patients who had elevation of BP post-operatively were studied regarding their primary problem, family history of hypertension, adequate pain control and metabolic studies to define the etiology.

Post-operative elevation of BP occurred most often in patients undergoing procedures involving the extremities. BP elevation was most common in patients with underlying central nervous system problems, labile pre-operative BP and patients with a strong family history of hypertension. None of our patients appeared to have underlying renal disease.

The most marked elevation of BP occurred early in the post-operative period. Careful management of post-operative pain appeared to be a major factor in the management of these patients.

208 BLOOD PRESSURE MEASUREMENT IN NEWBORN INFANTS OF TOXEMIC, HYPERTENSIVE, AND NORMAL MOTHERS.

Mausner, J; Levison, S.P.; Gabrielson, I.; Gabrielson, M.; Hiner, L.; Bartlett, E.: The Medical College of Pennsylvania, Philadelphia, Pennsylvania, U.S.A.

This study was designed to compare blood pressures of infants of women with hypertensive disorders during pregnancy and/or delivery and labor with blood pressures of infants whose mothers' were normotensive during gestation and delivery. The infants' blood pressure was measured with an Arteriosonde 1020 at 3 days of age. (Further analyses are in progress of examinations at 9, 18, and 24 months). One hundred and ninety infants qualified as cases and 201 as controls. Systolic blood pressures at age 3 days averaged 71 mmHg. Diastolic blood pressures averaged 46 mmHg. Infants' blood pressures were not related to mothers' race, age, or pay status; infants' sex or mode of feeding. Pressures were measured between 9 a.m. and 7 p.m. and no diurnal variation was detected. There was a direct correlation between infants' pressure and birth weight and also with level of activity (asleep versus awake or agitated) at the time of measurement. Little, if any, relationship was seen between mothers' and infants' pressure.

209 PULSE RATE AND BLOOD PRESSURE DURING ADOLESCENCE,

Schall, J.I., Hediger, M.L., Bowers, E.J., Gruskin, A.B., and Katz, S.H., Children's Hospital of Philadelphia, St. Christopher's Hospital for Children, Phila. Penna.

Pulse rate and blood pressure have been found to be significantly and positively correlated in children and adults in a number of studies, however, during adolescence, this relationship has not been as carefully elucidated. The pulse rate trends and associations between pulse rate and blood pressure in a sample of Philadelphia black adolescents aged 12 to 17 were analyzed using a mixed longitudinal design. Supine and seated pulse means decreased significantly over the entire age span for males and up to age 16 for females. Female pulse means were significantly higher than male means in both the supine and seated positions at all chronological ages. In addition, seated pulse means were significantly higher than supine means for each age and sex group. Correlations of pulse rate with systolic, diastolic phase 4 and diastolic phase 5 blood pressure by sex and chronological age groups reveal changing relationships over the adolescent period. Pulse and blood pressure are not positively correlated at all chronological ages, especially at those ages of peak pubertal maturation when pulse rate is dropping and blood pressure rising as a normal response to cardiovascular maturation. Analyses of variance indicate that, those with the highest blood pressure do not necessarily have the highest pulse rates. These results suggest that the patterns of association between pulse rate and blood pressure at adolescence are significantly different from those found in childhood and adulthood. This work was supported by NHLBI Grant #HL-19869.

210 BLOOD PRESSURE IN THE OFFSPRING OF TOXEMIC MOTHERS,

Hediger, M.L., Gruskin, A.B., Eveleth, P.B., and Katz, S.H., Children's Hospital of Philadelphia, St. Christopher's Hospital for Children, Philadelphia, Penna.

It has been hypothesized that pregnancy toxemia or pre-eclampsia may be associated with an increased risk for high blood pressure in the products of toxemic pregnancies. We have followed longitudinally for three years the blood pressure (BP) of 321 black adolescents, initially ages 11-15, who were products of mildly (N=278) and severely (N=43) toxemic pregnancies as diagnosed by the Collaborative Perinatal Project (CPP) and 621 adolescents representative of the CPP. The CPP diagnosed toxemia on the bases of high BP, proteinuria, and marked edema occurring any time after the 24th week of gestation irrespective of prior history of maternal hypertension or parity. We found that, overall, the adolescents born of severely toxemic pregnancies had a significantly ($p < .001$) higher incidence (45.5%) of transient elevated BP (> 95th percentile on one visit) than the representative sample (17.1%) or those born of mildly toxemic pregnancies (18.7%). Those with transient elevated BP appear to come mostly from the severely toxemic pregnancies where the pregnancy hypertension was of long duration or where there was a prior history of maternal hypertension. Therefore, both intrauterine and genetic factors may be implicated in the transient elevated BP in adolescent offspring associated with maternal severe hypertension or pre-eclampsia during pregnancy. This work was supported by NHLBI Grant #HL-19869.