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REDUCTION IN AORTIC COMPLIANCE IN ADOLESCENTS WITH SUBOPTIMAL INTRAUTERINE GROWTH

Objective: To study the impact of birth weight (BW) on indirect measurements of aortic compliance: office and ambulatory pulse pressure (PP) and augmentation index (AI).

Subjects and Methods: Three hundred and sixteen subjects (185 girls), age from 10 to 18 years, and BW ranging from 2 to 4.8 kg were included. Ambulatory BP was assessed (SpaceLab 90217) during a 24-hour period. In a subgroup of seventy-one subjects (BW <3.1 kg, n=37; BW >3.5 kg, n=34) the AI was measured by tonometry (O'Rourke method). The radial artery pressure waveform data were processed by the SphygmoCor radial/aortic transform software module to produce the estimated aortic pressure waveform. The extent of wave reflection was estimated by the AI defined two ways: as the amount and as the ratio of the amplitude of pressure wave above its systolic shoulder to the pulse pressure.

Results: Children in the lowest BW had the highest office and ambulatory PP. In a multiple regression model current weight (p<0.001) and BW (p<0.03) were independent determinants of 24-hour PP. Likewise, AI in subjects with low BW was higher as compared to those with higher BW. In a multiple regression model, BW <p<0.04) was the only determinant of AI (p=0.015), accounting for 16% of the variance, when current height, office systolic BP and sex were included in the model. The main characteristics of the groups are shown in the Table (average±standard error).

<table>
<thead>
<tr>
<th>BW (kg)</th>
<th>Age (yr)</th>
<th>Height (cm)</th>
<th>AI (mmHg)</th>
<th>AI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3.1 kg</td>
<td>2.8 ± 0.6</td>
<td>134 ± 4.7</td>
<td>157 ± 1.0</td>
<td>3.2 ± 0.9</td>
</tr>
<tr>
<td>&gt;3.5 kg</td>
<td>4.0 ± 0.7</td>
<td>128 ± 4.6</td>
<td>160 ± 1.6</td>
<td>−0.2 ± 0.7</td>
</tr>
<tr>
<td>P</td>
<td>0.0001</td>
<td>0.277</td>
<td>0.149</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Conclusion: Children with the lowest BW shown an early reduction in the aortic elasticity. Whether or not this abnormality preludes the development of high BP and the risk for hypertension later in life, needs to be assessed in further studies.

Key Words: Birth Weight, Pulse Pressure, Augmentation Index

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ENHANCED RECOGNITION OF REVERSIBLE POSTERIOR LEUKOENCEPHALOPATHY SYNDROME SECONDARY TO ACUTE POSTSTREPTOCOCCAL GLOMERULONEPHRITIS IN CHILDREN
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Hypertensive encephalopathy (HE) is a classic clinical syndrome characterized by headaches, visual symptoms, altered mental status and seizures, associated with hypertension. Magnetic resonance imaging (MRI) provides excellent pathophysiological correlation with intracranial events. The clinical and imaging findings are described as Reversible Posterior Leukoencephalopathy Syndrome (RPLS).

The purpose of this study is to illustrate the role of MRI in improving the recognition of RPLS and to recognize the importance of acute poststreptococcal glomerulonephritis (PSGN) as a common cause of RPLS in children.

We present three children ages 8, 12, and 13 admitted to the pediatric intensive care unit, between February 2000 and May 2001, at a single institution. All presented with headaches, visual symptoms, altered mental status, and seizures, associated with hypertension. Initial blood pressures were 133/104, 182/110 and 185/111, respectively. Two patients were treated intravenously with one or more of these antihypertensives: labetalol, sodium nitroprusside or furosemide. One patient’s hypertension resolved spontaneously, before treatment was instituted. All patients underwent laboratory and imaging investigations. Serum creatinine levels were 1.0, 0.7 and 1.0 mg/dl, on admission. Serum complement levels were low, antistreptolysin O titer was elevated (>1000 IU/ml), antinuclear antibodies were negative, and anti-neutrophilic cytoplasmic antibodies were negative in all patients. A kidney biopsy was performed in 2 patients: because of initial positive antinuclear antibodies in the first one and because of a previous history of juvenile rheumatoid arthritis in the second one. Kidney biopsy confirmed the diagnosis of PSGN. No acute complications occurred during antihypertensive treatment. MRI was positive for RPLS in all patients. Extensive increased signal intensity was noted on subcortical areas, tempo-occipital and frontoparietal cortex in the younger child. He also had mild left ventricular hypertrophy by echocardiography.

The clinical course was benign in all patients. All improved clinically and did not require maintenance anticonvulsant therapy. Follow-up MRI showed significant improvement of RPLS in one patient (after 1 month) and complete resolution (after 4 months) in a second patient.

PSGN remains a common cause of HE in children. HE is a medical emergency that demands prompt diagnosis and aggressive treatment before irreversible damage or death ensues. Hence, improved recognition of RPLS with the use of MRI, facilitates proper treatment and prevention of neurologic sequelae.

Key Words: Encephalopathy, Glomerulonephritis, Hypertension