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ROCK2 Gene Single Nucleotide Polymorphisms and Association with Bronchopulmonary Dysplasia in Extremely Low Birth Weight Infants

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Background

Bronchopulmonary dysplasia (BPD) leads to significant morbidity in ELBW infants.

Rho associated coiled-coil containing protein kinase 2 (ROCK-2) gene
- On chromosome 2p24
- ROCK: Serine/threonine protein kinase

Fig 2. ROCK-2 functional domains

Antenatal/postnatal insults

Fig 1. Pathogenesis of BPD

We hypothesize that ROCK2 gene SNP variants rs2290156, rs726843 and rs978906 are associated with development of BPD in ELBW infants.

Methods

Inclusion criteria
- ELBW infants (birth weight < 1kg)
- Informed parental consent

DNA was isolated from buccal swabs of 137 ELBW infants and analyzed via real-time PCR using Taqman probes for ROCK2 gene SNP variants rs2290156, rs726843 and rs978906.

BPD was defined by the need for Oxygen supplementation at 36 weeks postmenstrual age.

Statistics
Chi-square test, Fisher's exact test, Mann-Whitney Rank Sum test and t-test were performed for statistical analysis; p <0.05 was considered significant.

Results

Demographic Characteristics

<table>
<thead>
<tr>
<th></th>
<th>No BPD (n = 57)</th>
<th>BPD (n = 80)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age, wks, median (IQR)</td>
<td>26 (24, 27)</td>
<td>25 (24, 26)</td>
<td>0.22</td>
</tr>
<tr>
<td>Birth weight, g, mean (SD)</td>
<td>792.9 (123.8)</td>
<td>752.0 (147.3)</td>
<td>0.09</td>
</tr>
<tr>
<td>Female Gender, n (%)</td>
<td>32 (56)</td>
<td>48 (60)</td>
<td>0.78</td>
</tr>
<tr>
<td>Race, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non Hispanic White</td>
<td>18 (33)</td>
<td>29 (38)</td>
<td></td>
</tr>
<tr>
<td>Non Hispanic Black</td>
<td>16 (29)</td>
<td>20 (26)</td>
<td>0.89</td>
</tr>
<tr>
<td>Hispanic</td>
<td>16 (29)</td>
<td>23 (30)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>5 (9)</td>
<td>5 (6)</td>
<td></td>
</tr>
<tr>
<td>Antenatal steroids, n (%)</td>
<td>43 (81)</td>
<td>68 (91)</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Conclusions

- ROCK2 gene SNP rs978906 shows association with BPD
- We speculate that this variant may play a role in the development of BPD by influencing smooth muscle tone in the pulmonary vasculature

References