PIEZO1 mutation: a rare etiology for fetal ascites

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Background
- PIEZO1 gene codes for a mechanically activated ion channel in the erythrocyte cell membrane.
- Role in erythrocyte function and development of lymphatic structures.
- Mutations linked to disorders including Dehydrated Hereditary Stomatocytosis (DHS), generalized lymphatic dysplasia, and nonimmune hydrops of unknown etiology.

Case Presentation
- Healthy 32-year-old G1P0 presents for routine anatomy scan at 20w0d, notable for fetal ascites and 3 mm pericardial effusion.
- Repeat anatomy ultrasound 23w4d with persistent fetal ascites.
- Negative infectious and immunologic work up.
- Paternal medical history significant for chronic jaundice and splenomegaly due to hemolytic anemia.
- Paternal family history notable for father and brother affected by similar hemolytic anemia.
- Termination of pregnancy performed at outside hospital and products of conception sent for whole exome sequencing.

Whole Exome Gene Sequencing

<table>
<thead>
<tr>
<th>Gene</th>
<th>Mode of Inheritance</th>
<th>Variant</th>
<th>Zygosity</th>
<th>Classification</th>
<th>Parent of Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIEZO1</td>
<td>Autosomal Recessive</td>
<td>Autosomal</td>
<td>c.C6008A</td>
<td>Heterozygous</td>
<td>Paternally Inherited</td>
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<td>PIEZO1</td>
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</tbody>
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Learning Points
- In cases of fetal ascites of unknown etiology, exome sequencing to identify rare causes is a necessary next step, especially if there is a family history of genetic disorders.
- Mutations in PIEZO1 have been linked to disorders including Dehydrated Hereditary Stomatocytosis with or without pseudohypermotremia, generalized lymphatic dysplasia, and nonimmune hydrops of unknown etiology.
- There are no current guidelines regarding the treatment of these conditions in the antenatal period, however several case reports in the literature report favorable fetal outcomes.

References