ULTRASONOGRAPHIC HYDRONEPHROSIS-TO-PARENCHYMA AREA RATIO IN THE FOLLOW-UP OF CHILDREN AFTER PYELOPLASTY


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**Conflict of Interest:** none to disclose

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Introduction

• Study Rationale:
  • Success after pyeloplasty, resolution of UPJ obstruction (UPJO), is determined by assessing improvement of imaging parameters.
    • Serial ultrasounds (US) assess hydronephrosis
    • Diuretic renography (MAG3) more commonly done in specific cases where US is concerning

• Study Objective:
  • To assess the hydronephrosis-to-parenchyma area (HPA) ratio as a more objective tool to predict success after pyeloplasty for UPJO
23.9 cm = Parenchyma Area

9.52/23.9 = 0.40
HPA
## Results

71 analyzed patients (190 HPA ratios)

**Preop US**

- Age at pre-op US (months): 87.53 [47.5-141.46]
- Hydronephrosis area (cm²): 22.05 [12.25-32.32]
- Parenchymal area (cm²): 23.91 [17.03-37.8]
- HPA ratio: 0.85 [0.53-1.48]

**1st postop US**

- US after surgery (months): 3.63 [2.4-5.33]
- Hydronephrosis area (cm²): 6.9 [2.29-12]
- Parenchymal area (cm²): 23.3 [19.7-32]
- HPA ratio: 0.30 [0.09-0.54]

**Last postop US***

- Hydronephrosis area (cm²): 4.36 [1.14-10.02]
- Parenchymal area (cm²): 27.27 [22.97-34.36]
- HPA ratio: 0.13 [0.04-0.26]

Median [interquartile range].

* 48 patients analyzed.
Results

2.5 yo M with Rt UPJO

<table>
<thead>
<tr>
<th>Preop US</th>
<th>1st postop US, 7 weeks after stent removal</th>
<th>Last postop US (22 months postop)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA ratio</td>
<td>0.48</td>
<td>HPA ratio</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HPA ratio</td>
</tr>
</tbody>
</table>

HPA ratio values:
- Preop US: 0.48
- 1st postop US: 0.72
- Last postop US: 0.02
Results

6 yo M with Lt UPJO

<table>
<thead>
<tr>
<th>Preop US</th>
<th>HPA ratio</th>
<th>0.57</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st postop US, 3 weeks after stent removal</td>
<td>HPA ratio</td>
<td>2.21</td>
</tr>
<tr>
<td>Last postop US</td>
<td>HPA ratio</td>
<td>0.43</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>HPA</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 1</td>
<td>0.36</td>
<td>0.89</td>
<td>0.68</td>
<td>0.68</td>
</tr>
<tr>
<td>&gt; 0.9</td>
<td>0.43</td>
<td>0.89</td>
<td>0.71</td>
<td>0.70</td>
</tr>
<tr>
<td>&gt; 0.8</td>
<td>0.52</td>
<td>0.89</td>
<td>0.75</td>
<td>0.74</td>
</tr>
<tr>
<td>&gt; 0.7</td>
<td>0.61</td>
<td>0.86</td>
<td>0.74</td>
<td>0.77</td>
</tr>
<tr>
<td>&gt; 0.6</td>
<td>0.71</td>
<td>0.86</td>
<td>0.77</td>
<td>0.82</td>
</tr>
<tr>
<td>&gt; 0.55*</td>
<td>0.72</td>
<td>0.85</td>
<td>0.76</td>
<td>0.82</td>
</tr>
<tr>
<td>&gt; 0.5</td>
<td>0.76</td>
<td>0.81</td>
<td>0.72</td>
<td>0.84</td>
</tr>
<tr>
<td>&gt; 0.45</td>
<td>0.80</td>
<td>0.76</td>
<td>0.68</td>
<td>0.85</td>
</tr>
<tr>
<td>&gt; 0.4</td>
<td>0.81</td>
<td>0.73</td>
<td>0.66</td>
<td>0.86</td>
</tr>
<tr>
<td>&gt; 0.35</td>
<td>0.88</td>
<td>0.70</td>
<td>0.65</td>
<td>0.90</td>
</tr>
</tbody>
</table>

*AUC: 0.85, CI 95%: 0.79 - 0.90; p < 0.001*
Conclusion

- The HPA ratio is a very good tool to objectively assess hydronephrosis in children who underwent RALP.
- It can aid in tailoring which patient may need a postop MAG3.
- It can be used to predict surgical success.
Thank you.