Detecting Overuse of Renal Ultrasound to Diagnose Obstructive AKI
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Aim
Determine if renal ultrasound is overused to diagnose obstructive AKI and reduce usage if so.

Background
Studies at other institutions [1-3] have found that renal ultrasound (RUS) is used unnecessarily on patients at low risk of having obstructive cause of AKI.

Project Design
We retrospectively review charts to analyze use of renal ultrasound for patients admitted to the Mount Sinai hospitalist service.

We identify patients who:
• (1) Were admitted to hospitalist service
• (2) Experienced AKI (Cr rise > 0.3)
• (3) Had RUS ordered

→281 charts were identified with admission dates between 6/9/2013 and 10/24/2014.

Following Licurse (Arch Int Med, 2010), we use 7 criteria to measure risk for obstructive AKI by assigning points:
1. History of hydronephrosis (4 points)
2. History of Recurrent UTI (1 point)
3. Diagnosis consistent with possible obstruction – abdominal/pelvic mass, BPH, pelvic surgery, neurogenic bladder (1 point)
4. Nonblack race (1 point)
5. Absence of exposure to nephrotoxic medications – aspirin > 81 mg, diuretics, ACEI, vancomycin (1 point)
6. Absence of history of CHF (1 point)
7. Absence of pressor use and sepsis (1 point)

High risk patient: 4 points or more
Medium risk patient: 3 points
Low risk patient: 2 points or less

Results

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Total cases</th>
<th>Hydro</th>
<th>% Hydro</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-risk</td>
<td>111</td>
<td>30</td>
<td>27%</td>
</tr>
<tr>
<td>Medium-risk</td>
<td>76</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Low-risk</td>
<td>94</td>
<td>4</td>
<td>4%</td>
</tr>
</tbody>
</table>

Pre-ultrasound risk stratification effectively separates patients at high risk of experiencing hydronephrosis

Table 2

<table>
<thead>
<tr>
<th>Factor</th>
<th>Count</th>
<th>r</th>
<th>p-value of corr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of hydronephrosis</td>
<td>30</td>
<td>0.50</td>
<td>0.0000</td>
</tr>
<tr>
<td>Recurrent UTI</td>
<td>23</td>
<td>0.32</td>
<td>0.0000</td>
</tr>
<tr>
<td>Dx consistent with obstruction</td>
<td>127</td>
<td>0.20</td>
<td>0.0008</td>
</tr>
<tr>
<td>Nonblack race</td>
<td>175</td>
<td>0.03</td>
<td>0.6553</td>
</tr>
<tr>
<td>Absence of exposure to nephrotoxic agents</td>
<td>114</td>
<td>0.15</td>
<td>0.0122</td>
</tr>
<tr>
<td>Absence of CHF</td>
<td>208</td>
<td>0.15</td>
<td>0.0120</td>
</tr>
<tr>
<td>Absence of prerenal AKI</td>
<td>185</td>
<td>(0.09)</td>
<td>0.1245</td>
</tr>
</tbody>
</table>

Performance of Licurse’s factors: 5/7 factors were significantly predictive on the Mount Sinai population

Incidental findings for low risk patients may create risk of patient harm on followup

Limitations
• We assume the primary use of RUS on a patient with AKI is to identify hydronephrosis. If there are other valid uses, they will be inappropriately considered misuse in our analysis.

Conclusion and Next Steps
• A majority of RUS were ordered on medium or low risk patients. Only 3% of these patients had hydronephrosis.

• There is opportunity to reduce usage of RUS on these patients, reducing resource utilization and potentially reducing patient harm from incidental findings.

• We are in the process of designing an intervention to reduce usage of RUS in this context.

References