Comparative Effectiveness of a Pilot Patient-Centered Ultrasound Report for Hydronephrosis Management

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Cultural shifts in medical communication

• Shared decision-making\textsuperscript{1,2}
• HITECH (2009) “Meaningful Use” criteria

• Comprehension barriers higher with radiologic studies than other areas of PHR\textsuperscript{3}
• Patients request imaging reports most\textsuperscript{3}

1. Truog et al. *NEJM* 2012
Accessibility of radiology reports

- Focus on clarity, accuracy, standardization\(^1\)
- Structured reporting\(^1\)

- Patients prefer lay language explanations for abnormal CT and MRI reports\(^2\)

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3. Arnold *J Am Med Inform Assn* 2013
Ultrasonography in pediatric urology

- Most common imaging modality

- Parental anxiety and distress from fetal abnormality on US, even mild ANH, is high\textsuperscript{1,2}
Developing a patient-centered US report

Expert panel
1. Review existing reports
2. Identify clinically important elements

Patient Advisory Board
1. Review existing reports
2. Review clinically important elements
3. Generate candidate reports with patient-centered language

Urology clinic
1. Prospective pilot
2. Patients received standard + PC radiology report
3. Outcomes relevant to PC radiology reports
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Urology clinic

Seattle Children's

UW Medicine
School of Medicine
ANH expert prioritization of renal US report elements (n=18)

Most important  Least important

Severity
Uni vs. bilaterality
Parenchymal thickness
Parenchymal echogenicity
Ureteral dilation
Renal size
Bladder appearance
Renal position
Laterality
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CLINICAL HISTORY: Assess for hydronephrosis
EXAMINATION: US Renal Sonogram Complete.
DATE: 04/21/2014.
TECHNIQUE: Grayscale sonographic image acquisition was performed of the kidneys and bladder.

FINDINGS:
Expected renal length for age is 4.9 +/- 1.6 cm for two standard deviations.
The right kidney measures 7.4 cm in length compared with 7.1 cm on the prior study. No calculi. No masses. Compared to 3/28/2014 similar appearance to severe hydronephrosis and cortical thinning (SFU grade 4), with interval increase in layering echogenic collecting system debris.
The left kidney measures 6.5 cm in length compared with 6.3 cm on the prior study. No calculi. No masses. Compared to 3/28/2014 similar appearance to severe hydronephrosis and cortical thinning (SFU grade 4), with interval increase in layering echogenic collecting system debris.
There is bilateral hydroureter, with interval increase in layering echogenic debris.
No definite urinary bladder is seen.

IMPRESSION:
Compared to 3/28/2014:
1. Similar appearance to severely dilated bilateral collecting systems consistent with SFU grade 4.
2. Interval increase in layering echogenic collecting system debris.
3. No definite urinary bladder is seen.
Kidney Ultrasound Report for:

Date: ___________________________

Last ultrasound date: ___________________________

**Left Kidney**
- Size is: normal
- Urinary tract swelling: mild
- The working portion of the kidney that creates urine is: normal

**Right Kidney**
- Size is: large
- Urinary tract swelling: severe
- The working portion of the kidney that creates urine is: slightly thinned

Bladder looks: thick-walled

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**How severe is my child’s urinary tract dilation (hydronephrosis)?**

*The working portion of the kidney is called the parenchyma. This portion makes urine. It is bright on ultrasound.*

*The collecting system holds urine. It is dark on ultrasound. This area can become dilated, or develop hydronephrosis.*

**MILD**
- Kidney function may be only slightly affected. The condition often resolves itself. This is sometimes considered normal.

**MODERATE**
- Kidney function is affected in some children. The condition will be closely monitored.

**SEVERE**
- Kidney function is likely affected.

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**Growth over time is an important marker of kidney health.**

**Left Kidney**
- Kidney length (cm)
- Years Age
- Average kidney length
- 95 out of 100 patients are within this range

**Right Kidney**
- Kidney length (cm)
- Years Age
- Average kidney length
- 95 out of 100 patients are within this range

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Parent accuracy in reporting US elements

- **Unilateral vs. Bilateral**: 45% (Standard, n=20) vs. 67% (Patient-Centered, n=24)
- **Parenchymal abnormalities**: 70% (Standard, n=20) vs. 75% (Patient-Centered, n=24)
- **Bladder appearance**: 85% (Standard, n=20) vs. 88% (Patient-Centered, n=24)
Reported utility of standard vs. PCRR

<table>
<thead>
<tr>
<th>Percent of respondents</th>
<th>Standard (n=20)</th>
<th>Patient-Centered (n=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read more than half</td>
<td>90%</td>
<td>79%</td>
</tr>
<tr>
<td>Confident in understanding</td>
<td>*92%</td>
<td>60%</td>
</tr>
<tr>
<td>Report is useful</td>
<td>80%</td>
<td>92%</td>
</tr>
</tbody>
</table>

* Significant difference
Applying the patient-centered report

- Improving pilot PCRR
- Assessing accuracy of auto-generated document
- Integration into CIS
- VCUG
- Prenatal studies
References


