Structured Reporting for Diuresis Renography in Children

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Approved by the Pediatric Task Group of the EANM
Reason for referral and additional information

1. Summarize in a few lines the relevant clinical information.

Example: antenatal diagnosis of left hydronephrosis; recent antero-post diameter of pyelum: 25 mm. MCUG negative. no UTI infection. conservative approach. plasma creatinine: 0.6 mg%

All this information should be available in the referring letter, but having this basic information in the report might be useful at the next patient's visit.

2. Gender: Weight: Height:

essential for clearance correction for body surface for the calculation of the administered dose
Procedure

For details, refer to EANM pediatric guidelines  www.eanm.org

4. State radiopharmaceutical and dose administered.

5. State if furosemide was given, at which dose, at what time (F+20, F0, F-15 …)

6. State if post-erect and postmicturition (PM) images were performed and at which time
   (should be standardized around 50 to 60 min after tracer injection)

7. If a blood sample clearance was performed simultaneously, state method
   (single sample, 2 or more samples)

8. State if bladder catheter or nephrostomy drainage was present.

9. State if IV intravenous hydration was performed and at which amount
   (not recommended in the EANM pediatric guidelines)
10. Comment on the quality of the study; describe any problem
(for instance, “patient’s disturbing movements starting
from the 10th minute of the renogram”)

11. State the relative uptake of the two kidneys rounded to the nearest percent
using Integral method or Patlak-Rutland method
(similar results with both methods is a criterion of quality)
12. State the **overall plasma clearance** if available.
   *(for instance: Cr EDTA clearance: 60 ml/min/1.73 m²)*

13. State the **single kidney clearance** if available,
    by combining Cr EDTA plasma clearance with MAG3 split function.
    *(For instance: left: 60 x 0.53 = 31 ml/min/1.73 m²).*

**Gamma camera based absolute function estimate is less precise and is not encouraged**
14. Describe, on the **early sum image**, the relative size and shape of the kidneys, as well as any detectable regional abnormality

*(defects, ....)*
15. Images and curves

All images (including PM) should be examined using the same scaling.

Check for the presence of a sudden increase of activity (reflux episode?) (for instance during spontaneous micturition).

Check for the persistence of a high ureteral activity

Describe the existence of a double kinetics in a pathological duplex

   (for instance, upper moiety: poor uptake and poor emptying
   lower moiety: good uptake and good emptying)
RESULTS

State some quantitative parameters of drainage.
(essentially those obtained on the postmicturition acquisition):

16. Time to peak (Tmax):
   empirical parameter separating grossly good, less good and bad drainage.
   (generally sufficient for deciding about performing or not a F+20 test.)

17. T1/2 of the furosemide curve:
   (this is no longer a valid parameter)

18. Normalized residual activity (NORA)
   (calculated essentially on the late PM image)

19. Output efficiency
   (calculated essentially on the late PM image)

20. Alternatively, one can estimate the emptying on PM data
    using the ratio of counts: end of diuretic renogram / PM acquisition
RESULTS

21. State whether an extreme cortical transit delay exists,

(for instance, a persistent cortical ring without any calyceal activity during several minutes)
22. Give a concise interpretation of the results

for instance:

* GFR: normal for age

* Single kidney function  L: decreased  R: functional compensation

* Transit under Lasix  L: pronounced renal stasis  R: normal

* Postmict views  L: partial renal emptying  R: almost complete emptying
23. Make conclusions about obstruction being unlikely

\textit{(when good or almost good drainage after micturition)}

24. Do not make any statement about the existence or not of obstruction.

\textit{(poor drainage can be simply due to an enlarged collecting system)}
25. Summarize the preoccupying elements:

- poor split function
- poor drainage after micturition
- important cortical transit delay

If all elements present, this might indicate:

- a high risk of function deterioration in case of conservative approach
- a high probability of function improvement after pyeloplasty

(Still to be confirmed)
Compare

26. Compare the results to those of previous renograms
Illustrations

27. Add to the written report

* the sequential images (in particular the 1-2 min image)
* the background subtracted kidney curves
* a table with the quantitative data.
### Time Activity

<table>
<thead>
<tr>
<th>counts in ROI</th>
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<tbody>
<tr>
<td>6000</td>
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<tr>
<td>0</td>
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#### Relative Function
- DRF (Area): Left 69 %, Right 31 %
- DRF (Patlak): Left 67 %, Right 33 %

#### Transit Parameter
- Tmax (minutes): Left 2.7, Right 19.0
- OE 20 min.: Left 95 %, Right 41 %
- OE PM: Left 99 %, Right 83 %
- NORA 20 min.: Left 0.21, Right 2.54
- NORA PM: Left 0.04, Right 0.77

<table>
<thead>
<tr>
<th>0-1 minute</th>
<th>1-2 minutes</th>
<th>9-10 minutes</th>
<th>19-20 minutes</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
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**Post-Measurement Image**