A Study on Voiding Pattern in Term and Preterm Newborns

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Hypothesis / aims of study

How to diagnose the bladder dysfunction in newborns is challenging, not only due to the practical difficult in manipulation of the newborns, but also the normal voiding pattern in newborns is still unclear. The aim of present study was to investigate the difference of voiding patterns between term and preterm newborns.
Study design, materials and methods

- A total of 26 hospitalized newborn aged 3 to 7 days at The First Affiliated Hospital of Zhengzhou University from Mar to May 2010 were included in this study. Twelve of them were term newborns (38.3±1.1 weeks of gestation) with weight (3.1±0.4) kg, another 14 preterm newborns (32.5±1.6 weeks of gestation) with weight (1.7±0.4) kg.

- The voided volume, post void residual(PVR) volume, state of consciousness at voiding, voiding time, voiding frequency per 12 hours, and meanwhile, the quantity of intake milk, liquid within the same time schedule for 12 hours from 9AM to 9PM were recorded. The liquid intake was given according to standards protocol. The diaper weight difference before and after voiding was defined as voided volume.
Ultrasound and Balance

The PVR volume was measured by using ultrasound.

The diaper weight was measured by using balance.
Observation

PVR volume was recorded by same experienced investigators.
Observation

Voiding was observed by detecting diapper per minute.
Results

Comparing term with preterm newborns, voided volume and consciousness voiding rate was significant higher [(19.8 ± 10.9) ml vs (11.1 ± 7.5) ml and (43.5 ± 26.8) % vs (24.7 ± 19.1) %, (P<0.05), respectively], whereas PVR volume and voiding frequency were significant lower [(1.55 ± 1.01) ml vs (1.82 ± 0.88) ml, (P<0.05) and (7.2 ± 1.9) times vs (9.6 ± 2.5) times per 12 hours, (P<0.05), respectively].
Results

<table>
<thead>
<tr>
<th>Group</th>
<th>Voided volume (ml)</th>
<th>PVR volume (ml)</th>
<th>Consciousness voiding rate (%)</th>
<th>Voiding time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term newborn</td>
<td>19.8±10.9</td>
<td>1.55±1.01</td>
<td>43.5±26.8</td>
<td>7.2±1.9</td>
</tr>
<tr>
<td>Preterm newborn</td>
<td>11.1±7.5</td>
<td>1.82±0.88</td>
<td>24.7±19.1</td>
<td>9.6±2.5</td>
</tr>
<tr>
<td>t value</td>
<td>7.012</td>
<td>2.095</td>
<td>2.205</td>
<td>2.717</td>
</tr>
<tr>
<td>p value</td>
<td>&lt;0.0001</td>
<td>0.0373</td>
<td>0.0373</td>
<td>0.0120</td>
</tr>
</tbody>
</table>

PVR = post void residual
Results

Fig. 1 – Comparison of voided volume between term and preterm newborns

Fig. 2 – Comparison of PVR between term and preterm newborns

A = term newborn; B = preterm newborn; PVR = post void residual
Results

Fig. 3 – The observation result of voided volume in all newborns
Interpretation of results

- The difference of bladder function between term and preterm newborns is significant. The development of nerve system had a great impact on voiding.
Concluding message

- Both term and preterm newborns have shown a high PVR volume indicating the incomplete voiding pattern exists in newborns. The difference of voiding patterns between term and preterm newborns evidenced the different stages of bladder function development, more maturation of bladder function in term than those of preterm newborns.