A NEW METHOD FOR URETHRAL PRESSURE REFLECTOMETRY MEASUREMENTS DURING SQUEEZE

Hypothesis / aims of study.
Urethral Pressure Reflectometry (UPR) is used for simultaneous measurements of pressure and cross-sectional in the urethra (1). A very thin and highly flexible polyurethane bag is placed in the urethra during the measurements, the pressure and thereby the cross-sectional area (CA) is changed by changing the air pressure inside the bag. The CA is measured with acoustic reflectometry for every mm along the length of the bag. The method has better reproducibility than conventional urethral pressure measurements and the method provides sound physiological parameters which describe the function of the urethra (1).

Aims of the study were:
A) Compare the parameters measured during squeeze by the modified technique with measurements made by the conventional technique. B) Measure the reproducibility of the modified technique.

Study design, materials and methods
Eight healthy women and 25 women with stress urinary incontinence were included in the study. All the measurements were made with the subjects in the supine position. The measurements with the conventional technique (called step method) were conducted before the measurements with the modified technique (called continuous method). Two measurements during squeeze were made with the step method while five measurements were made with the continuous method.

Results
The squeezing opening pressure was a little higher when using the continuous method but the difference was not significant (67 vs. 64 cmH₂O, P=0.07). The squeezing elastance was significantly higher with the continuous method compared to the step method (2.7 vs. 1.9 cmH₂O/mm², p<0.001).

Table I shows the variability of the continuous method.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>CV %</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Squeezing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opening pressure</td>
<td>67</td>
<td>4.4</td>
<td>6.5 %</td>
<td>2.0</td>
</tr>
<tr>
<td>Elastance</td>
<td>2.7</td>
<td>0.4</td>
<td>14.8%</td>
<td>0.2</td>
</tr>
</tbody>
</table>

SD: Standard Deviation, CV coefficient of variation, SEM: Standard error of mean
Interpretation of results
The two methods differ widely regarding the measuring technique. The step method demands about 12 squeezes while only one squeeze is needed per measurement with the continuous method. Regardless of the differences between the methods there was no statistical difference between the mean opening pressure during squeeze measured with the two methods. However, the elastance was significantly higher with the new method. The reproducibility of the squeezing opening pressure measured with the continuous method was very good (CV: 6.5%), while the elastance had acceptable reproducibility (CV: 14.8%). With the continuous method it is possible to perform many squeeze measurements without fatiguing the subject, thus increasing the precision of the mean value. With five repetitions in this study the SEM of the squeezing opening pressure was 2 cmH\textsubscript{2}O and the SEM of the elastance was 0.2 cmH\textsubscript{2}O/mm\textsuperscript{2}.

Concluding message
A new method for performing UPR measurements during squeeze and strain has been described. With the new method a UPR measurement can be conducted in about 7 seconds, thus the examination can be made during one squeeze or one strain. The squeezing opening pressure is the same with the new method as with the conventional method while the opening elastance is significantly higher with the new method.

References

Disclosures
Funding: t Clinical Trial: Yes Public Registry: No RCT: No Subjects: HUMAN Ethics Committee: u Helsinki: Yes Informed Consent: Yes