

## IS THERE AN ASSOCIATION BETWEEN A HISTORY OF HYSTERECTOMY AND URETHRAL PRESSURES?

### Hypothesis / aims of study

While an association between hysterectomy and the development of stress urinary incontinence (SUI) has been suggested by various studies [1], studies of the effect of hysterectomy on urethral pressure profile have had conflicting results. In a study of 26 women who underwent vaginal or abdominal hysterectomy, there were no significant differences in urethral pressure profile findings pre- and post-operatively [2], whereas a study of 45 women who underwent laparoscopic hysterectomy found a significant increase in maximal urethral pressure following surgery [3].

The aim of this study is to examine the possible association between a previous history of hysterectomy and the urodynamic findings on urethral pressure profilometry.

### Study design, materials and methods

Records of urodynamics tests performed on women aged 18 to 80 between 1985 and 2006 were reviewed. Only patients with urethral pressure profile data were included in the study. Those with neurological symptoms, complications during delivery (or caesarean delivery) or previous surgery (other than hysterectomy for benign reasons) were excluded.

Urethral pressure measurements included maximum urethral pressure (MUP), maximum urethral closure pressure (MUCP) and pressure increment on pelvic floor squeeze. We studied the relationship between previous history of hysterectomy and urethral pressures after correcting for age, BMI, parity and hormonal status. Comparisons of MUP, MUCP and increment on pelvic floor squeeze were made between the hysterectomy group and non-hysterectomy group.

All data was analysed using statistical software (STATA). MUP data was transformed by a natural log scale and MUCP data by a square root scale. A two-sample t-test was used to analyse the differences in MUP and MUCP between the two groups. MUP data was further analysed using multivariate regression model to correct for the effects of age, BMI, parity and hormonal status. Increment on pelvic floor squeeze was not normally distributed and therefore was converted to categories using thresholds based on the quartiles of the continuous distribution. The relationship between previous history of hysterectomy and the increment on pelvic floor squeeze was analysed using the score test for trend.

### Results

There were 16,213 female patients who had urodynamics during the 21 year period. Exclusion included 4,624 patients who had recorded complications of delivery or had caesarean delivery; 3,023 patients who had previous surgery other than hysterectomy; 3,777 patients had neurological symptoms or signs. This left 4,789 urodynamics records which were complete and fulfilled the above inclusion criteria. Of these patients 1634 (34%) had a history of hysterectomy for benign causes. The demographics and presenting symptoms of the hysterectomy and non-hysterectomy groups can be seen in table 1:

There was statistically significant difference in both MUP and MUCP between the two groups (Table 2). This difference was still significant ( $p < 0.001$ ) after correcting for age, BMI, parity and hormonal status. Patients in the hysterectomy group were more likely to have lower increment on squeeze ( $p < 0.01$ ) than patients in the non-hysterectomy group.

**Table 1: Demographics and presenting symptoms of the two groups**

	<b>Hysterectomy group 1634</b>	<b>Non-Hysterectomy group 3155</b>
<b>Age (Mean <math>\pm</math> SD)</b>	56 $\pm$ 11	49 $\pm$ 15
<b>BMI (Mean <math>\pm</math> SD)</b>	27.6 $\pm$ 4.8	27.0 $\pm$ 5.0
<b>Frequency (Mean <math>\pm</math> SD)</b>	8.2 $\pm$ 3.0	8.0 $\pm$ 3.0
<b>Nocturia (Mean <math>\pm</math> SD)</b>	1.3 $\pm$ 1.1	1.0 $\pm$ 1.1
<b>History of stress urinary incontinence</b>	1306 (80%)	2319 (74%)
<b>History of urgency with or without urgency incontinence</b>	1184 (72%)	2058 (65%)
<b>Feeling of incomplete emptying</b>	449 (27%)	665 (21%)

**Table 2: Two-sample t-test for MUP and MUCP**

	<b>Hysterectomy (Mean <math>\pm</math> SD)</b>	<b>Non-Hysterectomy (Mean <math>\pm</math> SD)</b>	<b>Significance</b>
<b>MUP (cmH<sub>2</sub>O)</b>	62.5 $\pm$ 20.5	70.8 $\pm$ 19.9	< 0.0001
<b>MUCP (cmH<sub>2</sub>O)</b>	47.8 $\pm$ 19.6	56.2 $\pm$ 19.5	< 0.0001

#### Interpretation of results

The results indicate that there is an association between a previous history of hysterectomy on the one hand and lower MUP and MUCP on the other. This could be due to the hysterectomy procedure predisposing patients to having lower urethral pressures possibly through damage to the pelvic floor, endo-pelvic fascia, vascular or nervous supply to the urethral sphincter. An alternative explanation would be a common aetiology which causes low urethral pressures as well as predisposes the patient for a hysterectomy. An analysis of the reasons for hysterectomy might be important, unfortunately that data was not available.

#### Concluding message

There is a statistically significant association between a previous hysterectomy and lower urethral pressures, but its clinical significance and causative nature needs further investigation.

#### References

- 1 Lancet 2000: 356(9229):535-539.
- 2 Obstet Gynecol 1989: 74(2):205-207.
- 3 Kaohsiung J Med Sci 2001: 17(11):564-569.

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**HUMAN SUBJECTS:** This study did not need ethical approval because no direct involvement of human subjects. and did not follow the Declaration of Helsinki - with approval by the ethics committee - in the sense that no direct involvement of human subjects Informed consent was not obtained from the patients.