

## IS LEVATOR AVULSION A RISK FACTOR FOR RECURRENCE AFTER ANTERIOR COLPORRHAPHY?

### Hypothesis / aims of study

Major morphological abnormalities of the puborectalis muscle ('avulsion') are likely to be an etiological factor in the development of female pelvic organ prolapse, especially cystocele and uterine prolapse (1). Defects of the insertion of the puborectalis on the os pubis may also be a risk factor for prolapse recurrence. We undertook a long- term audit of Anterior Colporrhaphy at a single tertiary unit in order to define recurrence rates in women with and without avulsion.

### Study design, materials and methods

Over a period of 4 years (1.1.2002- 31.12.2005) a total of 242 Anterior Colporrhaphy procedures without mesh augmentation had been undertaken at our institution. We invited patients for a follow-up appointment including a structured interview, clinical examination using the ICS POP-Q assessment, and 4D translabial ultrasound (US) using a Voluson 730 expert system with RAB 8-4 Mhz transducer, as previously described; see Figure 1 (2). All patients had given written informed consent, and formal ethics approval had been obtained. US volume data was stored and subsequently analysed, blinded against clinical data. For organ descent and hiatal dimensions we used volumes obtained on maximum Valsalva (non- standardised), for levator trauma we assessed volumes obtained on maximum pelvic floor muscle contraction or, if that was not possible (n=3), at rest. An avulsion was diagnosed on tomographic ultrasound imaging (TUI) as previously described (3), if at least 2 out of three slices obtained at the level of the plane of minimal hiatal dimensions and immediately above were abnormal on one side. Overall diagnosis and TUI score as explanatory parameters were tested against the outcome parameters of a) symptoms of prolapse, b) significant cystocele  $\geq$  Grade 2 on ICS POP-Q, and c) significant cystocele on US (leading edge of the bladder  $\geq$  10 mm below the symphysis pubis on maximal Valsalva).

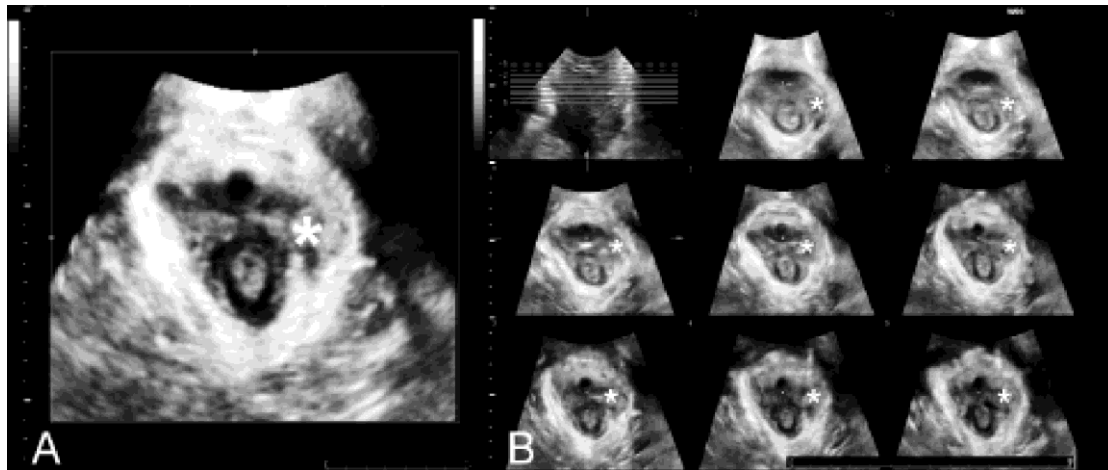


Fig 1: Left- sided avulsion of the puborectalis muscle in rendered volume (left) and on tomographic ultrasound (right) in a patient with symptomatic recurrent cystocele 6 years after vaginal hysterectomy and anterior colporrhaphy.

### Results

Of 242 eligible patients we were able to contact 171 women (71%), of whom 91 agreed to attend for an interview and assessment (53%). At the time of the assessment it became clear that a total of eight patients were not eligible to participate due to later surgery affecting the anterior vaginal wall (n=5) or because they had not in fact undergone an anterior colporrhaphy. One other patient suffering from an incidentally discovered urethral diverticulum was also excluded, leaving 83 assessments. All subsequent analysis relates to this dataset.

Mean age at assessment was 61 (range, 34-86), mean follow-up interval was 4.5 (3-6.4) years. Thirty- five women had undergone a concomitant vaginal hysterectomy, 41 a posterior repair, and 12 a suburethral sling. Mean body mass index was 28.4 (range, 18-45). Median vaginal parity was 3 (1-9), and 24 (29%) reported a previous hysterectomy. In 6 cases (7%) the anterior colporrhaphy was a repeat procedure. Of 83 women, 54 (65%) were satisfied with the outcome of their procedure, and 59 (71%) felt improved or cured. Twenty- four (29%) reported symptoms of recurrent prolapse. On clinical examination the mean for point Ba was -1 (range, -3 to 6). In 33 cases (40%) we diagnosed a recurrent cystocele (ICS POP-Q stage 2 or higher). There was one uterine prolapse (Stage 2+), three enteroceles and 22 rectoceles (27%). In total, we found a prolapse of stage 2 or higher in 45 women (54%).

On US, mean bladder neck descent was 29.2 (2.8-60.7) mm, and maximal descent of the bladder was a mean of 7.8 mm below the symphysis pubis (range, 30.3 above to 43.7 below). In total, 34 (41%) women were found to have a significant cystocele on US (leading edge  $\geq$  10 mm below the symphysis pubis). In the axial plane, the levator hiatus measured 30.3 (17.9-58.3) cm<sup>2</sup> on average. Levator avulsion was detected in 28 women (34%). It was more commonly found on the right (n=24) than the left (n=15), was unilateral in 17 (21%) and bilateral in 11 (13%). The median TUI score was 2 (range, 0-16). There was no association between recurrent symptoms of prolapse, patient satisfaction or subjective cure/ improvement and objective prolapse (P= 0.34, P= 0.59 and P= 0.64).

	Clinical cystocele	Cystocele to $\geq$ 10 mm below the symphysis on US
	Stage 2+ ICS POP-Q	
No avulsion	1	1
Unilat. avulsion (n=17)	RR 2.9 (1.7-4.4)	RR 3.8 (2.1- 5.5)
Bilat. avulsion (n=12)	RR 2.8 (1.4-4.3)	RR 4.1 (2.2-5.4)

Table 1: Relative risks (Confidence Intervals) for clinical and sonographic recurrence of significant cystocele in women with avulsion. US= translabial ultrasound

A significant cystocele was detected on US in 23 out of 29 women with avulsion (79%), and in 11/54 (20%) of those without ( $P < 0.001$ ). This equates to a relative risk of 3.9 (CI 2.4-5.8). Similar figures were obtained on clinical examination: of 54 women without avulsion, 13 (24%) had a cystocele Stage 2 or higher, whereas this was the case for 69% of those with avulsion (20/29),  $P < 0.001$ , giving a relative risk of 2.9 (CI 1.7-4.5). Table 1 shows relative risks for clinical and sonographic recurrence separately for unilateral and bilateral avulsion. When TUI scores were tested against clinical cystocele recurrence and US measures of bladder descent, there again was a highly significant relationship. TUI scores were higher in women with a significant cystocele seen on US (7.7 vs. 2.5,  $P < 0.001$ ) or on clinical examination (3 vs. 7,  $P = 0.002$ ), but there was no association between prolapse symptoms and avulsion.

#### Interpretation of results

Cystocele recurrence after traditional Anterior Colporrhaphy is common at follow-up after 3-6 years. In this series we detected a recurrent cystocele in 40% on clinical examination, and in 41% on ultrasound. Recurrence was strongly associated with levator trauma. The relative risk of prolapse recurrence in women with avulsion was 3.9 (CI 2.4-5.8) when ultrasound criteria of recurrent cystocele were used, and 2.9 (CI 1.7-4.5) when using the criterion of a Stage 2+ cystocele on ICS POP-Q assessment. Patient satisfaction was relatively low at 65%, even though recurrent prolapse often was asymptomatic.

#### Concluding message

Levator avulsion conveys a relative risk of 3-4 for cystocele recurrence after Anterior Colporrhaphy. Levator assessment can identify patients at high risk of recurrence and may be useful as a selection criterion prior to mesh implantation.

#### References

1. Br J Obstet Gynaecol 2008; 115: 979-984
2. Ultrasound Obstet Gynecol 2004; 23: 80-92
3. Ultrasound Obstet Gynecol 2007; 29(3): 329- 334

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<b>What were the subjects in the study?</b>	HUMAN
<b>Was this study approved by an ethics committee?</b>	Yes
<b>Specify Name of Ethics Committee</b>	SWAHS HREC
<b>Was the Declaration of Helsinki followed?</b>	Yes
<b>Was informed consent obtained from the patients?</b>	Yes