

## RECURRENCE AFTER PROLAPSE SURGERY: DOES PARTIAL AVULSION OF THE LEVATOR ANI MUSCLE MATTER?

### Hypothesis / aims of study

Prolapse recurrence after surgical treatment is common. A number of risk factors of prolapse recurrence have been identified including: age, family history of prolapse, advanced prolapse stage preoperatively and complete avulsion of the levator ani muscle(1). Our objective was to determine whether partial avulsion of the levator ani muscle is a risk factor for prolapse recurrence in a large cohort of patients who underwent PFD surgery.

### Study design, materials and methods

This study utilizes data obtained in a prospective surgical trial and 5 IRB- approved clinical audit projects on recurrence after prolapse surgery. All subjects underwent a standardised interview, ICS POP-Q examination and 4D translabial pelvic floor ultrasound (US). Subjective recurrence was defined as symptoms of prolapse. Objective recurrence was defined as a) ICS POP-Q stage 2+, b) prolapse to the hymen or beyond, c) cystocele recurrence to 10 mm or more below the SP. US post-processing was performed using proprietary software, blinded against all clinical data. Partial avulsion of the puborectalis muscle was defined as an abnormal levator ani insertion visible on at least one axial plane slice at or above the level of minimal hiatal dimensions, but not meeting the criteria for complete avulsion on either side.

We tested potential predictors of recurrence (age, BMI, follow- up interval, previous hysterectomy and previous prolapse surgery, history of vaginal delivery, Forceps, age at first delivery, anchored anterior compartment mesh use, partial and complete avulsion and hiatal area on Valsalva) against subjective and objective recurrence as defined above, both using univariate statistics and logistic regression modelling with SPSS V 16.

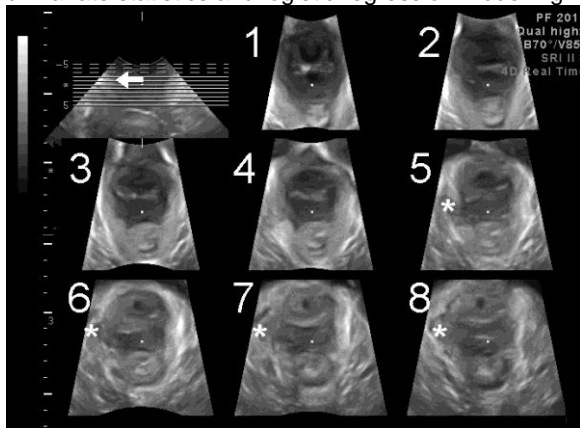


Figure 1: Partial avulsion on translabial tomographic (3D/4D) US. A partial defect is visible in slices 5-8 (\*) and also in the coronal plane reference slice (left top corner), indicated by arrow.

### Results

Within the inclusion periods of the component projects, 792 women underwent prolapse surgery at participating units, and 545 women (69%) were seen for postoperative follow- up visits on average 2.3 years (3 months – 6.9 years) after their index procedure between March 2006 and Dec 2012. The mean age of study participants was 63 (28.1-90), mean BMI was 27.9 (16.7-48.7) with mean parity of 3 (0-10). 98% of women were vaginally parous and 31.3% reported history of forceps delivery. 230 (42%) had had a previous hysterectomy, and 145 (26.6%) reported a previous prolapse repair.

Of those 545 women, 174 (31.9%) underwent hysterectomy, 187 (34.3%) had a vault suspension: a laparoscopic sacrocolpopexy in 95 and a sacrospinous ligament fixation in 92. 282 (51.7%) women had had anterior compartment anchored mesh. More specifically there were 169 Perigee's, 67 anterior Prolifts, 42 anterior Elevates and 4 Uphold procedures. There were 173 native tissue anterior repairs (31.7%) and 23 laparoscopic colposuspensions (4.2%). 277 women (50.8%) underwent a posterior colporrhaphy. Of those, 197 (36%) were native tissue repairs. Posterior compartment mesh procedures included 50 Prolift, 26 Apogee and 4 Elevate procedures.

Postoperatively 477 (88.3%) of women considered themselves cured or improved. 429 (79.2%) were satisfied with the outcome of their procedure. 145 (26.6%) reported prolapse symptoms, and 390 (71.7%) had ICS POPQ stage 2+ descent on clinical examination. Mean Ba was -1.3 (range, -3 to +3), mean C was -5.2 (-9.5 to +7), mean Bp was -1.7 (-3 to +3). On US, mean hiatal area on Valsalva was 32.9 (range, 14.9 - 60.9) cm<sup>2</sup>. A complete levator ani avulsion was found in 259 (49.3%) women with 128 (24.4%) women having bilateral avulsion. A partial avulsion was found in 87 women (16.6%). A cystocele recurrence on ultrasound was diagnosed in 205 (37.6%), with the lowest position of the bladder on average at 6.1 mm below (30.3 above to 55 below) the symphysis pubis. Table 1 shows univariate and multivariate analysis for potential predictors of prolapse recurrence.

Predictors	Symptomatic prolapse (y/n)	ICS stage more (y/n)	Any POPQ compartment 2 or 0 or lower (y/n)	at Cystocele on US ( $\geq 10$ mm below SP) (y/n)
Follow-up (years)*	ns	ns	ns	ns
Age (years)*	P=0.017 (-ve)	ns	ns	ns
BMI*	ns	ns	P= 0.015	ns
Forceps+	ns	ns	ns	ns
Prev. hysterectomy+	ns	ns	ns	ns
Previous prolapse surgery+	P=0.022	ns	ns	P=0.056
Anchored anterior mesh+	ns	P=0.001 (-ve)	P=0.001 (-ve)	P=0.008 (-ve)
Avulsion+	ns	ns	P=0.05	P=0.001
Partial avulsion ++	ns	ns	P=0.17 (-ve)	P=0.027 (-ve)
Abnormal slices (n) **	ns	ns	ns	P=0.09
Hiatal area (cm2)*	P=0.003	P=<0.001	P=<0.001	P=<0.001

Table 1: Univariate predictors of recurrence.\* t-test; +X2 tests; ++ without full avulsions;\*\*X2 after categorization (0, 1-2, 3-5, 6+). All associations are positive unless stated otherwise.

We then built a multivariate logistic regression model for significant cystocele on ultrasound for variables that were found to be predictors at a P value of <0.1 (previous prolapse surgery, mesh use, hiatal area, partial and complete avulsion). This model confirmed a marginal protective effect of partial avulsion at an odds ratio of 0.518 (CI 0.276- 0.975).

#### Interpretation of results

It has recently been shown by several groups that major levator trauma (avulsion) is a strong predictor of recurrence after prolapse surgery(1), and it has been claimed that avulsion could serve to provide an indication for anterior compartment mesh use(2). However, in a substantial minority of patients there is levator damage that does not meet the criteria for a full avulsion(2). In this study, partial avulsion of the levator ani muscle was not associated with an increased risk of prolapse recurrence after surgery based on recurrent prolapse symptoms, ICS POP-Q examination or US. This is consistent with the observation that minor forms of levator trauma do not seem to be associated with pelvic organ prolapse(3). The marginal protective effect of partial avulsion is puzzling and most likely due to unrecognised confounders.

#### Concluding message

The likelihood of a significant negative effect of partial avulsion on the success of prolapse surgery seems to be very low.

#### References

1. Ultrasound Obstet Gynecol 2012; 40: 495–503
2. Aust NZ J Obstet Gynaecol 2012; 52: 313–315
3. Int Urogynecol J 2011; 22: 699-704

#### Disclosures

**Funding:** Authors have no disclosures **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Townsville (84-04) Greenslopes Private Hospital, Brisbane, 10-09 Nepean (SWAHS HREC 07-063) Victoria (10310Q) St George Usyd HREC 15216 Nepean (NBMLHD HREC 10-03) **Helsinki:** Yes **Informed Consent:** Yes