

IS LEVATOR HIATAL AREA A PREDICTOR OF PELVIC ORGAN PROLAPSE RECURRENCE AFTER SURGERY?

Hypothesis / aims of study

The levator hiatus is the largest hernial portal in the human body, and female pelvic organ prolapse (FPOP) is a herniation through this portal. Levator hiatal area had been shown to be an independent predictor of FPOP [1]. Whether an enlarged hiatal area can result from prolapse rather than be its cause remains unclear. In this study, we aimed to determine the association between levator hiatal area on Valsalva and FPOP before and after prolapse surgery.

Study design, materials and methods

This is a retrospective analysis of ultrasound (US) volume datasets obtained before and after prolapse surgery between May 2005 and June 2014 at a tertiary urogynecological centre. Assessments included a standardised clinical interview, prolapse assessment by ICS-POPQ and 4D translabial US (TLUS). Clinical data were obtained from the patients' hospital records and pre-operative as well as the latest post-operative assessments were used for analysis. US volume datasets were analysed for preoperative and post-operative hiatal area on Valsalva (1) at a later date on a desktop PC, using proprietary software, by the first author, blinded against all other data, including measurements obtained in the same patient at other time points. Hiatal area was measured at maximum Valsalva in the plane of minimal dimensions (Figure 1). "Clinically significant prolapse" was defined as ICS-POPQ \geq stage 2 in the anterior and posterior compartment and \geq Stage 1 in the central compartment (2). "Significant prolapse on TLUS" was defined as a bladder and rectal ampulla descent of at least 10mm and 15mm below the symphysis pubis (SP), respectively, uterine descent of \leq 15mm below and enterocele descent to the level of SP and below. Primary and secondary outcome measures were subjective and objective FPOP recurrence, i.e. presence of FPOP symptoms (vaginal lump / dragging sensation) and signs (clinical and on US) at the last post-operative visit. Means were compared using Student's T test.

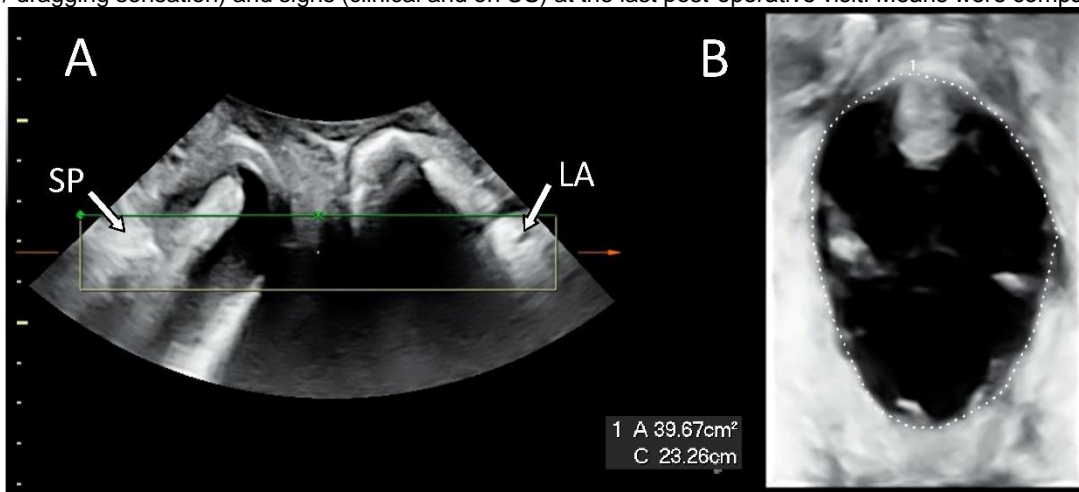


Figure 1: Determination of hiatal area. Image A demonstrates the plane of minimal hiatal dimensions (arrows) between the symphysis pubis (SP) and the levator ani (LA) in the midsagittal plane in a volume obtained on maximal Valsalva. A 1-2 cm rendered volume is placed at this level and hiatal area is measured in the axial plane as shown in Image B. Hiatal area in this image is 39.67cm².

Results

254 women underwent FPOP surgery during the study period. 96 were excluded having had procedures likely to affect hiatal area such as levatorplasty (9) and the puborectalis sling (84), missing US volume in 2 and missing data on index surgery in 1, leaving 158, to whom these results pertain. Mean age was 59 (33-83) years with a mean BMI of 29 (18-44) kg/m². Median parity was 3 (0-9) with 98.7% (n=156) being vaginally parous. Mean age at first delivery was 23 (16-39) years. 34.2% (n=54) and 41.1% (n=65) gave a history of instrumental delivery and hysterectomy. 14.6% (n=23) and 24.7% (n=39) gave a history of incontinence surgery and prolapse surgery respectively.

Preoperatively, 77.8% (n=123) and 69% (n=109) had symptoms of FPOP and obstructed defaecation, respectively. Mean Ba, C and Bp were 0 (SD 1.95, range -3 to 6) cm, -4 (SD 2.98, range -9 to 8) and 0 (SD 1.58, range -3 to 3) cm, respectively. 23% (N=37) had an anterior repair, 26% (n=41) a vault suspension (sacrospinous colpopexy), 63% (n=100) hysterectomy, 82% (n=129) a defect specific posterior repair and 32% (n=50) a vault suspension (sacrospinous colpopexy). Post-operatively, women were seen at a mean interval of 17 (2-69) months. 20.8% (n=33) had recurrent FPOP symptoms ie; a vaginal lump or dragging sensation. 62.6% (n=99) had a clinical recurrence as defined above: 43% (n=68) anterior compartment, 14.6% (n=23) central compartment (8.2% uterine and 6.3% vault prolapse) and 24.7% (n=39) had a posterior compartment recurrence. Mean Ba, C and Bp at the last visit were -1 (SD 1.33, range -3 to 3) cm, -5 (SD 2.34, range -9 to 4) and -2 (SD 1.09, range -3 to 2) cm, respectively. On imaging, 41.1% (n=65) had sonographically significant pelvic organ descent: a cystocele in 19% (n=30), uterine descent in 13.3% (n=21), enterocele in 7.6% (n=12), rectal ampulla descent in 16.5% (n=26). On univariate analysis, there was a reduction in hiatal area postoperatively, from 30.4 (SD 9.1) cm² to 27.8 (SD 8.1) cm². P<0.001, and this reduction was associated with subjective cure (absence of prolapse symptoms; OR 1.08 (1.02 – 1.13) per cm², P= 0.006). Preoperative levator hiatal area showed a trend

towards association with central compartment recurrence clinically (P=0.07) and sonographically (P=0.07). Post-operative hiatal area was associated with all forms of recurrence (see Table 1), although this did not always reach significance. On multivariate analysis controlling for potential confounders (determined on univariate analysis against all 3 forms of recurrence) such as FPOP stage preoperatively, levator avulsion, vault suspension, follow-up interval and prior history of POP surgery, the association between hiatal area and subjective as well as sonographic recurrence remained significant.

	Pre-op HA Mean (SD)	OR (95% CI)	P	Post-op HA Mean (SD)	OR (95% CI)	P
Subjective recurrence (n=33)	31.52 (9.3) vs 30.15 (9.02)	1.02 (0.98- 1.06)	0.45	32.52 (8.98) vs 26.55 (7.42)	1.10 (1.04-1.16)	0.001
Clinical recurrence (n=99)	31.45 (8.79) vs 28.54 (9.34)	1.03 (1.00- 1.07)	0.14	29.09 (7.58) vs 25.38 (8.59)	1.06 (1.01- 1.11)	0.01
Clinical Anterior (n=68)	31.57 (8.84) vs 29.58 (9.19)	1.03 (0.99- 1.06)	0.17	29.67 (6.96) vs 27.36 (8.33)	1.03 (0.99 -1.07)	0.12
Clinical Central (n=23)	34.22 (8.64) vs 28.98 (8.84)	1.04 (1.02- 1.09)	0.07	31.14 (8.75) vs 26.51 (7.51)	1.05 (1.00- 1.10)	0.09
Clinical Posterior (n=39)	30.96 (7.79) vs 30.28(9.245)	1.01 (0.97- 1.05)	0.66	29.44 (7.69) vs 27.29 (8.21)	1.03 (0.99- 1.08)	0.15
Sonographic recurrence (n=65)	31.26 (9.24) vs 29.86(8.95)	1.02 (0.98- 1.05)	0.34	30.10 (7.67) vs 26.18 (8.07)	1.07 (1.02- 1.11)	0.004
US Anterior (n=30)	31.16 (9.15) vs 30.27 (9.07)	1.01 (0.97- 1.06)	0.63	29.67 (6.96) vs 27.36 (8.33)	1.04 (0.99- 1.09)	0.12
US Central (n=21)	30.61 (7.83) vs 26.58 (8.14)	1.07 (0.99- 1.14)	0.07	27.81 (7.13) vs 23.79 (6.69)	1.09 (1.00- 1.18)	0.04
US Posterior (n=32)	32.3 (9.05) vs 30.0 (9.04)	1.03 (0.99- 1.07)	0.18	31.5 (8.1) vs 26.8 (7.9)	1.08 (1.03- 1.13)	0.004

Table: Association between hiatal area (pre- and post operatively) and symptoms and signs of FPOP. Means compared using Student's T test.

Interpretation of results

Post-operative hiatal area is more strongly associated with recurrence than the preoperative measurement. Prolapse surgery reduced hiatal area by less than 10%, and this reduction was associated with surgical success. This suggests a passive component to hiatal distensibility. Hiatal over- distension may partly be effect rather than cause of FPOP.

Concluding message

Prolapse surgery seems to have a relatively minor effect on levator hiatal dimensions. Levator hiatal area on Valsalva determined pre-operatively does not seem to be a strong predictor of prolapse recurrence. Postoperative hiatal area may be of limited utility as a proxy for preoperative hiatal dimensions.

References

1. ANZJOG 2011; 51: 540-543
2. IUGJ 2014; 25(4):451-5

Disclosures

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