209

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CYSTOCELE RECURRENCE FOLLOWING LAPAROSCOPIC SACROCOLPOPEXY: HOW LOW DOES THE MESH GO?

Hypothesis / aims of study

Laparoscopic sacrocolpopexy has become widely accepted as an alternative to abdominal sacrocolpopexy, and outcomes seem to be comparable (1). The primary goal is to provide apical support, but the high prevalence of cystocele in patients requiring vault suspension commonly prompts surgeons to extend sacrocolpopexy mesh more distally along the anterior vaginal wall, even if caudad dissection is limited by poor tissue plane separation and bleeding. Consequently, it is not surprising that the majority of failures following sacrocolpopexy occur in the anterior compartment (2). The aim of our study was to document postoperative anterior mesh position after laparoscopic sacrocolpopexy and to investigate any relationship between mesh location and anterior compartment support.

Study design, materials and methods

This is an external audit of 231 patients who underwent laparoscopic sacrocolpopexy by an experienced endoscopic surgeon at a tertiary centre between Jan 2005 – June 2012. The audit was conducted by an independent clinician, not involved in the primary surgical care, between October 2012 and February 2013. All patients had a standardised Urogynaecological interview, a clinical ICS POPQ assessment and a transperineal ultrasound (TPUS) with GE Voluson 730 Expert or S6 systems. TPUS was performed supine at rest, on maximum pelvic floor muscle contraction and on maximum valsalva, after bladder emptying, to assess pelvic organ descent and levator morphobiometry as previously described (3). Recurrence was defined as: 1.) recurrent symptoms of prolapse, 2.) Ba ≥ -1 or 3.) bladder descent ≥ 10mm below symphysis pubis on TPUS. Offline analysis of ultrasound data was performed using proprietary software (4D View, Version 10) blinded against all clinical data. Mesh was identified as a highly echogenic structure in all three orthogonal planes (mid-sagittal, coronal and axial – Figure 1) at rest and on maximum valsalva. Lowest mesh position was identified in relation to the inferior symphyseal margin. Mesh mobility was assessed using the formula $\sqrt{([X_{valsalva}-X_{rest}]^2 + [Y_{valsalva} - Y_{rest}]^2)}$ from rest to maximum valsalva. (*X*=horizontal distance between mesh and inferior symphyseal margin, *Y*=vertical distance between mesh and inferior symphyseal margin). Where mesh was not visible along the anterior vaginal wall, the location of the vaginal apex was used to measure co-ordinates. The distance of the mesh from lowest mesh position to the bladder neck was also determined at rest and maximum valsalva. Statistical analysis was performed with SAS Version 9.2 (Cary CR:SAS Institute INC, USA) and SPSS Version 20 (Chicago IL, USA).

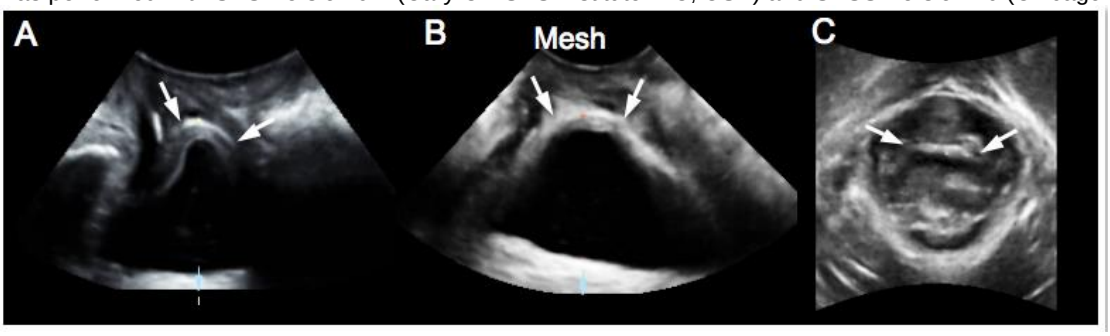

Figure 1: Mesh location as imaged in the midsagittal (A), coronal (B) and axial (C) plane on maximum valsalva. Mesh as indicated by the arrows.

Results

Of 231 patients operated during the inclusion period, 114 (49%) were seen at a mean follow-up of 3.06 years (0.13 – 6.87). Fourteen ultrasound volumes were excluded due to technical error with volume acquisition, leaving 100. All subsequent results refer to this data set. Mean age was 61 years (40 – 77), mean BMI 26.7(18.6 - 39.5), mean parity 3 (0 - 8).

Twenty-seven patients had previous vaginal hysterectomy ± pelvic organ prolapse repair, and seven a previous anti-incontinence procedure, predominantly Burch colposuspensions. Pre-operatively, all patients operated on had ≥ Stage 2 prolapse: 66 a ≥ Stage 3 anterior compartment, 88 a ≥ Stage 2 apical compartment, 33 a ≥ Stage 3 posterior compartment prolapse. Concurrent procedures performed were: 69 total laparoscopic hysterectomies, one subtotal hysterectomy, 50 paravaginal repairs, 24 laparoscopic colposuspensions and 34 posterior colporrhaphies.

Eighty-six patients were satisfied with their procedure, and 88 considered themselves overall cured/improved. Recurrent prolapse symptoms were reported in 31%. Clinical prolapse recurrence (ICS POPQ stage ≥ 2) was diagnosed in 84 patients; 60 affected the anterior compartment, 47 the posterior compartment, but none the apical compartment. None of the patients had been re-operated for prolapse in the interval. On ultrasound, there were 73 patients with sonographic prolapse recurrence; 50 in the anterior compartment, 49 in the posterior compartment and 10 in the apical compartment. Mean bladder neck descent was 25.8mm (SD 12.1), mean cystocele descent was 10 mm below symphysis pubis (18.7 to -52.3) with a negative value representing below the level of symphysis pubis. Levator avulsion was diagnosed in 42 patients on tomographic ultrasound imaging with a mean hiatal area on valsalva of 32.41cm^2.

Mesh in the anterior compartment could be identified in 60 patients, with the mesh located on average 24 mm (SD 11) dorsoventral and 38 mm (SD 11) craniocaudal from the symphysis pubis at rest; the respective figures on Valsalva were 35mm (SD 12) and 24 mm (SD 17). On average, the mesh descended 20mm (SD 11) on Valsalva. The lowermost point of the mesh was located on average 26 mm (SD 13) from the bladder neck at rest and 48 mm (SD 25) from the bladder neck on Valsalva. On univariate analysis, the lowest mesh position on valsalva and mesh mobility on Valsalva were significantly associated with

recurrent cystocele on clinical assessment as well as on ultrasound (see Table 1). For every mm the mesh is located further from the bladder neck on Valsalva, the likelihood of cystocele recurrence is increased by 6-7%.

Mesh parameters	**Recurrent prolapse symptoms** OR (95% CI)	**Recurrent cystocele on clinical exam** OR (95% CI)	**Recurrent cystocele on ultrasound** OR (95% CI)
Lowest mesh position	0.99 (0.97 - 1.02) *ns*	0.94 (0.91 - 0.97) *p = 0.001*	0.93 (0.90- 0.96) *p = 0.001*
Mesh mobility	1.00 (0.96 - 1.03) *ns*	1.05 (1.01 - 1.09) *p = 0.013*	1.05 (1.01 - 1.09) *p = 0.012*

Table 1: Association between recurrent prolapse symptoms, recurrent cystocele on clinical and on sonographic examination (n=100). Odds ratios are per mm of mesh position/ mobility.

Interpretation of results

At an average follow-up of 3 years, laparoscopic sacrocolpopexy was highly effectice for apical support, but cystocele recurrence was common despite an emphasis on anterior mesh extension. Mesh was visible in the anterior compartment in 60% of all women, although it rarely reached the bladder neck. On average, mesh was 4.8 cm dorsocranial to the bladder neck on valsalva. The larger this distance, the higher was the likelihood of cystocele recurrence. Higher mesh mobility was also associated with anterior compartment recurrence.

Concluding message

Cystocele recurrence following laparoscopic sacrocolpopexy is common, and it seems that such recurrence is related to mesh position and mobility. The lower the mesh reaches towards the bladder neck, the lower is the likelihood of anterior compartment recurrence. This suggests that it may be beneficial to develop techniques that reliably extend and anchor sacrocolpopexy mesh to the bladder base. This may provide for more effective Level II support for the anterior compartment**.**

References

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