

## DOES OBSTRUCTED LABOUR LEAD TO ATROPHY OF THE LEVATOR ANI MUSCLE?

### Hypothesis / aims of study

There is ample evidence that vaginal childbirth leads to direct trauma to the insertion of the levator ani muscle in 10-30% of women delivering vaginally (1), which is an aetiological factor in the development of female pelvic organ prolapse. The role of delivery-related neuropathy, long postulated as a primary cause of pelvic floor dysfunction(2) is less well defined. We undertook an audit of patients after obstetric fistula suffered as the consequence of obstructed labour. We assumed that such patients would show evidence of abnormal levator function (eg due to denervation) and a high rate of levator trauma (avulsion).

### Study design, materials and methods

In an external audit conducted at a tertiary fistula hospital, 103 patients were seen for 4D translabial ultrasound(1) using a Voluson I portable system with RAB 8-4 Mhz transducer. They were unselected women attending this centre of excellence. A basic history was obtained by a local nurse. After obtaining verbal consent for ultrasound and vaginal digital examination, patients were examined supine and after voiding. Volume datasets were obtained on coughing, on maximal Valsalva and on maximal pelvic floor muscle (PFM) contraction. Approval was obtained from the local ethics committee. We did not perform formal power calculations due to an absence of pilot data in the literature.

### Results

Results are given for 95 women who were seen prior to (n=22) or after repair of a vesicovaginal fistula (VVF, n=73). The mean age was 29.5 (16-65), mean parity was 2.7 (range, 0-11). Two patients had only delivered by C/S. On clinical examination, 20 patients showed an obliterated vagina, and in another 13 the examination was incomplete due to scarring. Only 2 patients had a significant cystocele (stage 2+), three a uterine prolapse  $\geq$ stage 2, and 13 a rectocele stage 2. All except one patient were asymptomatic for prolapse. Levator muscle strength (modified Oxford grading, MOS) was palpated in 71 women (mean, 1.9 [range, 0-4] on the right and 2.0 [range, 0-4] on the left), with 6/71 (8%) having no palpable contraction. In 60 women it was possible to palpate the puborectalis muscle for resting tone, which was 2.3 (range, 0-4) on the right and 2.4 (range 0-4.5) on the left. Significant fasciculations were detected on palpation in one patient. In 61 women we were able to assess for levator trauma (avulsion) which was detected in 10/61 (16%). All ten were on the left, and five women had bilateral trauma. However, assessment was often difficult due to scarring.

On ultrasound, bladder neck descent (BND) could be determined in 91/95 women. In two cases the patient was unable to perform a Valsalva, and in two others there was no identifiable urethra. Mean BND was 8.4 (range, 0.7- 38.8) mm. Only three patients were hypermobile ( $\geq$  25 mm of BND), two of them had a positive clinical stress test, and in both cases the leakage was not per urethram. All hypermobile patients had minimal or no scarring and high, small VVF.

Hiatal dimensions on 4D pelvic floor ultrasound were obtained in 92/95 women. Two were unable to perform a Valsalva, and one Valsalva volume was not recorded. Mean hiatal area on Valsalva was 18.8 cm<sup>2</sup> (range, 7.7- 45.9), and only 6/92 (7%) fulfilled the criteria for ballooning (hiatal distension of over 25 cm<sup>2</sup>). Levator avulsion on tomographic ultrasound could be assessed in all 95 cases. A levator avulsion as defined on tomographic ultrasound(3) was diagnosed in 27 cases (28%), of which 11 were bilateral. No side was over-represented (18 right, 20 left). There was a reflex contraction of the levator ani observed on coughing in all but two patients.

### Interpretation of results

In this series of patients after vesicovaginal fistula due to obstructed labour, changes suggestive of major neuropathy were uncommon. While vaginal palpation was sometimes difficult or impossible due to scarring, only 6/71 women were unable to contract the puborectalis muscle, and there was no marked asymmetry, except in women with levator tears (avulsion). Strength as determined by modified Oxford grading was slightly lower than expected, resting tone was no different from symptomatic women seen in the developed world. The rate of avulsion was not unusually high for parous women in populations without vesicovaginal fistula. The prevalence of hiatal ballooning, i.e., excessive distensibility of the puborectalis, was unexpectedly low, and reflex levator activation on coughing was observed in all but two women.

### Concluding message

Permanent significant denervation of the levator ani is unlikely to be common, even in women with a history of severe and protracted obstructed labour.

### References

1. Fetal and Maternal Medicine Review. 2009;20:49-66.
2. Br J Surg. 1990;77(12):1358-60.
3. Ultrasound Obstet Gynecol. 2007;29:329-34.

<b>Specify source of funding or grant</b>	Nil
<b>Is this a clinical trial?</b>	No
<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>	Hamlin Fistula Hospital Ethics Committee, Addis Ababa, Ethiopia

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<i>Was the Declaration of Helsinki followed?</i>	<b>Yes</b>
<i>Was informed consent obtained from the patients?</i>	<b>Yes</b>

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