

A COMPARISON OF FUNCTIONAL PELVIC FLOOR ANATOMY IN WHITE AND BLACK SOUTH AFRICAN WOMEN WITH SYMPTOMATIC PELVIC ORGAN PROLAPSE

Hypothesis / aims of study

Architectural distortion of the levator muscle complex as a consequence of childbirth and its association with pelvic floor disorders is well documented in caucasian females (1). Comparative data in diverse ethnic groups with pelvic organ prolapse is lacking. There might be substantial differences in pelvic floor functional anatomy between ethnic groups. The aim of this study was to compare detrusor wall thickness, pelvic organ neck descent, hiatal dimensions and the prevalence of levator avulsion in symptomatic white and black South African women presenting with symptoms of pelvic organ prolapse.

Study design, materials and methods

In a prospective observational study we assessed 121 consecutive women referred for pelvic organ prolapse at a tertiary urogynaecological clinic. After a detailed history, clinical examination and completion of the ICIQ-VS questionnaire, a 4D translabial ultrasound in the supine position, and after bladder emptying was performed. A GE Voluson i ultrasound system with RAB 4-8Mz transducer was used to capture volume data at rest, on pelvic floor muscle contraction (PFMC) and Valsalva (2). Detrusor wall thickness (DWT), bladder neck descent, pelvic organ descent and hiatal dimensions at rest, on Valsalva and PFMC were determined as previously described (3), during the examination or later using postprocessing software (4D view v10). Levator avulsion was diagnosed in rendered axial plane volumes if there was an obvious detachment of the pubovisceral muscle from the pelvic side wall on PFMC. Pelvic organ descent was measured on maximum Valsalva maneuver relative to the inferoposterior margin of the pubic bone (3). Statistical analysis was performed using SPSS v22 and statpages.org. We did not perform power calculations due to the absence of pilot data in the literature; hence, this is a pilot study.

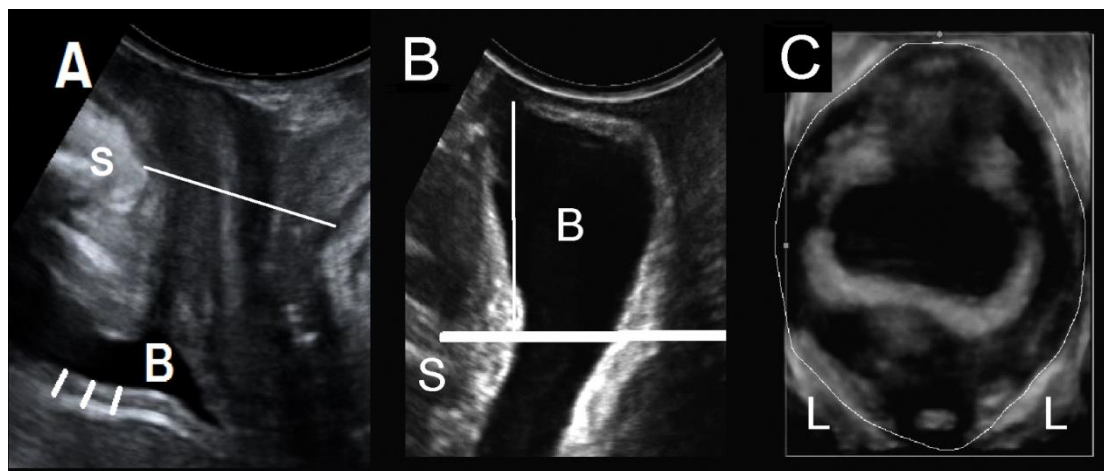


Figure 1: Mid-sagittal translabial pelvic floor ultrasound (A) showing DWT measurement; (B) cystocele descent on Valsalva; and (C) hiatal area measurement on Valsalva (axial plane) of 44.11cm². S= symphysis pubis, B= bladder, L= levator ani.

Results

Eight datasets were excluded due to incomplete clinical data and/ or poor imaging quality, leaving 113 women, of whom 40 were black, and 73 identified as white Caucasian. The mean age was 60.7 (\pm 10.9) (28-86) years, and mean vaginal parity was 3.66 \pm 1.87 (0-9). Overall 14.2% reported an assisted delivery, and 16.3% had a history of previous prolapse surgery. 108 responded positive to question 5a of the ICIQ-VS questionnaire ("Are you aware of a lump or bulge coming down in your vagina?"). 5 patients did not complete the questionnaire but verbally confirmed symptoms of prolapse. Demographic characteristics are presented in Table 1. Black women reported a higher number of vaginal births ($p < 0.001$). Previous prolapse surgery and hysterectomy were more often reported in Caucasian women ($p = 0.04$ and 0.001 respectively).

	Caucasian/White (n=73)	Black (n=40)	P value
Age (years)	61.7 (11.5)	58.7 (10.4)	0.15
Vaginal parity	3.2 (1.5)	4.5 (2.2)	<0.001
Assisted delivery	12 (16%)	4 (10%)	0.41
Previous prolapse operation	17 (23%)	3 (8%)	0.04
Previous hysterectomy	22 (30%)	2 (5%)	0.001

Table1: Demographic characteristics of sample (n=113). Age and vaginal parity are represented as mean (SD), assisted delivery and previous prolapse operation, hysterectomy as number (%); Fisher's exact test or t test.

Imaging findings such as detrusor wall thickness, bladder neck descent, hiatal diameters, pelvic organ descent, hiatal area and avulsion are reported in Table 2. Black women showed a higher DWT ($p=0.01$). There were no significant differences in hiatal dimensions and bladder neck descent at rest, on PFMC and Valsalva. Central compartment descent on Valsalva was significantly higher in Caucasian females ($p=0.05$).

Defects of the pubovisceral muscle were found in 26% (29/113) of patients; in Caucasians the percentage was 30% (22/73), in Blacks 18% (7/40) ($p=0.18$ on Fisher's exact test). There were highly significant associations between prolapse stage on the one hand and hiatal area on Valsalva and avulsion on the other hand (all $P=0.001$ or lower), both in Caucasians and in Blacks.

	Caucasian (n=73)	Black (n=40)	P value
Detrusor wall thickness (mm)	2.5 (0.9)	3 (1.1)	0.01
Bladder neck descent on Valsalva (mm)	-26.24 (14.54)	-24.75 (12.34)	0.58
Bladder descent (mm)	-27.35 (11.48)	-28.27 (13.55)	0.75
Uterine descent (mm)*	-27.09 (6.64)	-20.25 (9.58)	0.05
Rectal descent (mm)	-21.51 (8.54)	-18.23 (10.57)	0.38
Hiatal area at rest (cm ²)	25.6 (6.3)	25.8 (6)	0.86
Hiatal area on PFMC (cm ²)	20.7 (6)	20.9 (5.2)	0.89
Hiatal area on Valsalva (cm ²)	36.2 (7.2)	36.1 (7.7)	0.93
Avulsion	22 (30%)	7 (18%)	0.18

Table 2: Ultrasound measures of pelvic floor functional anatomy in white and black women with symptomatic prolapse. Values are mean (SD). *uterine descent measured in 51 Caucasians and 38 Blacks. T-test or Fisher's exact test.

Interpretation of results

In this pilot study in black Africans and Caucasians presenting with symptoms of prolapse, we found no significant differences in ultrasound biometric measurements apart from a higher DWT in Blacks and greater uterine descent on Valsalva in Caucasian women. Avulsion of the pubovisceral muscle and abnormal hiatal distensibility are common in this urogynaecological population, both in Caucasians and in Blacks.

Concluding message

There were no substantial differences in pelvic floor biometry, except for detrusor wall thickness and uterine descent. Avulsion and abnormal hiatal biometry seem common both in Blacks and Caucasians presenting with prolapse symptoms.

References

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Disclosures

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