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PELVIC FLOOR DISORDERS, SYMPTOMS AND QUALITY OF LIFE AFTER CAESAREAN VERSUS VAGINAL DELIVERY: A PROSPECTIVE STUDY OF PRIMIPAROUS WOMEN USING MRI AND VALIDATED ASSESSMENT TOOLS.

Hypothesis / aims of study
Vaginal delivery (VD) is a major risk factor for pelvic floor dysfunction (PFD) (1). Despite its debatable protective effect, prevention of PFD is a major reason for of the steadily increasing incidence of caesarean section (CS) on maternal request (2).

This is the first study to evaluate pelvic floor (PF) outcomes with a combination of validated instruments and magnetic resonance imaging (MRI) after either type of delivery in the same patient population.

We aimed to prospectively investigate the impact of mode of delivery on PF structure, function, symptoms and quality of life (QoL) in nulliparous women using MRI and validated assessment tools before and after childbirth. We also aimed to determine whether delivery by CS could prevent PF injury and subsequent development of PFD.

Study design, materials and methods
In this prospective cohort observational study, continent primiparae aged ≥18 yrs with singleton pregnancy were invited to participate in the third trimester. Women with previous anti-incontinence/prolapse surgery and medical disorders including diabetes/collagen disorders were excluded.

We recruited 240 women and performed the following investigations antepartum: stress test, perineometry, pelvic organ prolapse quantification system (POP-Q), translated/ validated Arabic language versions of the International Consultation on Incontinence Questionnaire-Urinary Incontinence (ICIQ-UI SF) and Pelvic Floor Distress Inventory (PFDI-20).

We excluded 55 (23%) women postpartum and 27 of the remaining 185 (14.6%) dropped-out. Exclusion criteria for VD were instrumental delivery, prolonged second stage and 3rd/4th degree tears. Caesarean sections were either elective or emergency in the 1st stage before pushing, a participant was otherwise excluded. All investigations, in addition to PF MRI, were repeated 12 months postpartum. Investigators and radiologists were blinded to mode of delivery. Preliminary data of 98 participants were accepted as a poster at ICS 2014.

Results
A total of 158 (65.8%) women were assessed postpartum; 118 (74.7%) delivered vaginally and 40 (25.3%) by CS. Women were analyzed within and between their delivery groups.

At the one-year assessment, mean changes in all POP-Q component points were statistically significant after VD and CS. However, mean differences comparisons of both delivery groups showed significant objective worsening in all component points (apart from C, D and TVL) after VD (table 1). Perineometry at one-year showed significant reduction in PF muscle strength and endurance after VD but not after CS ($P < 0.001$).

MRI data were available for 117 women; all abnormalities in urethral and vaginal support were after VD. No abnormalities in iliococcygeus muscle or anal sphincters were detected after both types of delivery (table 2).

The relationships between injuries in puborectalis (PR) muscle, fascia level III, POP stage ≥2 and positive stress test were statically significant.
Mean changes were statistically significant for PFDI-20 summary score and its subscales after CS and VD. However, mean differences comparisons of both delivery groups showed significant increase in subjective worsening and greater symptom distress after VD in all of QoL measurements apart from Colon Rectal Anal Distress Inventory (table 3).

The risk of having POP ≥stage 2, positive stress test and moderate/severe urinary incontinence, respectively, was 12.7, 6.2 and 5.6 times more after VD as compared to CS.

Interpretation of results
Our data show that VD causes injuries to the PF musculature and fascia. It is significantly associated with PF muscle weakness, POP, SUI and have negative impact on symptoms and QoL.The mechanism of development of SUI and POP is probably related to PR muscle and fascial injuries.

Concluding message
Despite the potential increase in morbidity and mortality, CS (elective/1st stage before pushing) appears to be protective to the PF and the subsequent development of PFD in primiparous women. The results of our study could help in providing women who decide to expose themselves to the potential risks of CS in order to protect their PF with balanced discussion and better evidence.

Table 1. POP-Q component points after VD and CS

	VD		CS		Mean Differences ± SD		Diff[b]	P-value[a]
	Pre	Post	Pre	Post				
	Mean ±SD	Mean ± SD	Mean ± SD	Mean ± SD	VD	CS		
Aa	-2.79 ± 0.1	-2.66 ± 0.2	-2.74 ± 0.1	-2.67 ± 0.1	-0.12 ± 0.2	-0.07 ± 0.1	-.06	0.003
Ba	-2.67 ± 0.1	-2.55 ± 0.2	-2.64 ± 0.1	-2.58 ± 0.1	-0.12 ± 0.2	-0.06 ± 0.1	-.06	0.025
Ap	-2.83 ± 0.1	-2.80 ± 0.1	-2.80 ± 0.1	-2.78 ± 0.1	-0.03 ± 0.0	-0.02 ± 0.0	-.01	0.034
Bp	-2.78 ± 0.1	-2.75 ± 0.1	-2.80 ± 0.1	-2.78 ± 0.1	-0.03 ± 0.0	-0.02 ± 0.0	-.01	0.02
C	-7.35 ± 0.2	-6.87 ± 0.2	-7.36 ± 0.2	-6.84 ± 0.2	-0.48 ± 0.1	-0.52 ± 0.1	.03	0.108
d	-9.84 ± 0.1	-9.39 ± 0.1	-9.86 ± 0.1	-9.42 ± 0.1	-0.44 ± 0.1	-0.44 ± 0.1	-.00	0.896
TVL	9.82 ± 0.1	9.42 ± 0.2	9.86 ± 0.1	9.46 ± 0.1	0.41 ± 0.1	0.40 ± 0.1	0	0.876
GH	1.87 ± 0.2	2.39 ± 0.2	2.24 ± 0.2	2.37 ± 0.1	-0.52 ± 0.1	-0.13 ± 0.1	0.4	<.001
PB	3.97 ± 0.2	2.99 ± 0.2	4.00 ± 0.3	3.95 ± 0.3	0.98 ± 0.1	0.05 ± 0.0	0.94	<.001

[a]-Paired t-test [b]-Difference between VD and CS

Table 2. MRI findings after VD and CS

			Total N	Delivery mode[a]		p-value[b]
				VD	CS	
N (%)			117	79(67.5)	38(32.5)	
Urethral support	Ligament n (%)	Abnormal	24	24(100.0)	0(0.0)	<0.001
	Fascia level III N (%)	Abnormal	27	27(100.0)	0(0.0)	<0.001
	PR[c] muscle N (%)	Abnormal	21	21(100.0)	0(0.0)	<0.001
Vaginal support	Fascia level I/II N (%)	Abnormal	25	25(100.0)	0(0.0)	<0.001

[a]-Row Percentage [b]-Chi-Square test [c]-Puborectalis muscle

Table 3. PFDI-20 after VD and CS

PFDI-20	Mean Diff ± SD		Diff	P-value[a]
	VD	CS		
UDI-6 [b]	-4.34 ± 3.1	-1.70 ± 1.4	-2.64	<.001
CRADI-8 [c]	-2.03 ± 1.0	-1.78 ± 1.1	-.26	.160
POPDI-6 [d]	-11.39 ± 4.1	-9.23 ± 2.4	-2.16	<.001
Summary	-17.76 ± 5.5	-12.70 ± 3.0	-5.06	<.001

[a]-Independent t-test assuming normal distribution. Otherwise, Welch's t-test [b]-Urinary Distress Inventory [c]-Colon Rectal Anal Distress Inventory [d]-Pelvic Organ Prolapse Distress Inventory

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