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DOES PREGNANCY AND DELIVERY AFFECT PELVIC ORGAN SUPPORT? PREGNANCY AND PROLAPSE ASSESSMENT [PAPA] STUDY

Hypothesis / aims of study

Women with a normal life expectancy have an 11% chance of requiring at least one operation for pelvic organ prolapse (POP) or incontinence during their lifetime (1). Pregnancy (2) and childbirth (3) have been incriminated as the major aetiological factor, but there is a lack of validated objective longitudinal data for POP during pregnancy and after delivery. The only two available studies using validated staging of prolapse during and after pregnancy show inconsistent results (2,3). The aim of our study was to prospectively evaluate the impact of pregnancy and delivery on pelvic organ support and POP-symptoms using validated measurement tools.

Study design, materials and methods

All pregnant women attending the ultrasound scan clinic at 20 weeks (between April 2005 and July 2006) were invited to participate in the PAPA study. POP was assessed using the validated International Continence Society staging method (POP-Q) during the 2nd and 3rd trimester and 14 weeks after delivery. The validated Sheffield prolapse questionnaire was completed at each visit. Vaginal pressures were assessed at each visit using the validated *ECL ELITE*- perineometer measuring maximum resting pressure (MRP), the strongest of 3 voluntary pelvic floor contractions as the maximum squeeze pressure (MSP) and squeeze pressure increment (MSP-MRP = ΔP). Joint mobility (elbow, digit V, thumb) was measured with a goniometer. Bladder neck mobility was assessed (maximum valsalva) by transperineal ultrasound (B&K Denmark, 2400 Viking and a 6 MHz curvilinear probe). All tests have been performed in the same order at each visit by one examiner to maintain consistency.
Statistical evaluation was performed using Kendall's taub correlation for POPQ stage with continuous data, independent t-test and paired t-test for normal distributed data and the Mann Whitney U test, Kruskal Wallis test and the Wilcoxon matched pairs test for data that was not normal distributed and for ordinal data. Risk factors haven been calculated using the χ^2-test.

Results

Questionnaires were completed and POP-Q was performed in the antenatal period in 391 women at 22, 326 at 36 weeks and in 272 women at 14 weeks after delivery. In all women prolapse score increased significantly after delivery when compared to the 2nd trimester [3.5 (7.42) vs 5.25 (10.45) p=0.004] but not when compared to the 3rd trimester [4.19 (8.41) p=0.072]. In all women the POP-Q stage increased significantly after delivery [1.24 (0.58)] when compared to the antenatal period [0.82 (0.66) p<0.000 at 22/40 and 0.83 (0.65) p<0.000 36/40] but not during pregnancy (p=0.490). Individual POP-Q points of all women are shown in Table 1.

Table 1: Individual POP-Q-points in all women

POP-Q	22/40 mean SD	36/40 mean SD	14 weeks postnatal mean SD	P*	P**	P***
Aa	-2.40 (0.66)	-2.89 (0.38)	-2.22 (0.64)	0.006	0.000	0.000
Ba	-2.31 (0.72)	-2.31 (0.71)	-1.89 (0.82)	0.831	0.000	0.000
Ap	-2.71 (0.49)	-2.76 (0.48)	-2.73 (0.46)	0.088	0.836	0.527
Bp	-2.71 (0.50)	-2.74 (0.51)	-2.69 (0.53)	0.358	0.498	0.387
C	7.26 (1.54)	7.50 (1.24)	5.70 (1.44)	0.147	0.000	0.000
D	9.68 (0.81)	9.89 (0.75)	9.42 (0.80)	0.000	0.000	0.000
TVL	9.67 (0.81)	9.89 (0.75)	9.43 (0.81)	0.000	0.000	0.000
GH	2.66 (0.73)	2.82 (0.63)	2.66 (0.76)	0.000	0.445	0.003
PB	3.88 (0.81)	4.16 (0.,72)	3.73 (0.82)	0.000	0.049	0.000

*=p value 22/40 vs 36/40, **=p value 22/40 vs 14 weeks postnatal, ***=p value 36/40 vs 14 weeks postnatal

No significant correlation was found between POP-Q stage with MRP (p=0.143), MSP (p=0.843) and ΔP (p=0.062) at 14 weeks after delivery. There was a positive correlation between POP-Q stage after delivery and parity (p=0.047) but not with age (p=0.239) or BMI (p=0.603). Compared to women with normal joint mobility, the POPQ-stage in women with joint hypermobility was not different [0.89 vs 0.81 p=0.454 at 22/40, 0.70 (0.6) vs 0.83 (0.66) p=0.424 at 36/40 and 1.09 (0.54) vs 1.24 (0.58) p=0.378 at 14 weeks after delivery]. There was a significant correlation between POP-Q stage and bladder neck mobility during 2nd (p<0.000) and 3rd (p<0.000) trimester and 14 weeks after delivery (p<0.000) in all women. Ethnicity did not affect the stage of POP at any visit [p=0.611 at 22/40, p=0.642 at 36/40, p=0.715 at 14 weeks after delivery]. After vaginal delivery, POP-Q stage in all women was not affected by episiotomy [1.22 (0.64) vs 1.25 (0.56) p=0.993], epidural [1.21 (0.59) vs 1.25 (0.58) p=0.639], or breastfeeding [breast 1.33 (0.61), bottle 1.15 (0.57), mixed 1.18 (0.55), p=0.053]. There was no significant relationship between POP symptoms and episiotomy [4.17 (7.30) vs 6.79 (11.46) p=0.543], epidural [5.90 (9.02) vs 6.26 (10.94) p=0.743] or breastfeeding [breast 6.61 (11.78), bottle 6.19 (11.55), mixed 6.85 (11.58), p=0.797]. The prolapse score (Sheffield questionnaire) was significantly higher in primips after vaginal delivery (VD) [4.12 (7.83) vs 0.88 (3.31) p=0.003] but not in multips [8.2601 (13.21) vs 2.08 (3.77) p=0.101] when compared to caesarean section (CS). After vaginal delivery (VD) (n=216) the POP-Q-stage increased significantly in primips [1.12 (0.59) vs 1.02 (0.52) p=0.047; n=147], but not in multips [1.30 (0.61) vs 1.42 (0.51) p=0.403; n=125] when compared to the CS group (n=56). Multiparous women were older [32.67 years ± 5.2years vs 30.32 years ± 5.6years p<0.001], had a shorter second stage of labour [27.10min ± 46min vs

75.59 min ± 80min p<0.001], delivered bigger babies [3521g ± 514g vs 3305g ± 571 p=0.002] with a larger head circumference [342mm ± 32mm vs 329mm ± 60mm p=0.034] than primiparous women.
Subgroup analysis have identified vaginal delivery as risk factor for primiparous women (p=0.044) to develop stage II prolapse but not for multips (p=0.544).

Interpretation of results

This is the largest prospective study using validated techniques demonstrating that pelvic organ support weakens significantly after the first vaginal delivery but not during pregnancy. Postnatal vaginal pressures (pelvic floor muscle strength) did not correlate with the postnatal stage of prolapse suggesting that prolapse is not due to pelvic floor muscle weakness. As there was no correlation with joint hypermobility, a plausible explanation could be that the prolapse is related to stretching of the supporting ligaments. CS does not appear to confer any benefit to multips in terms of prolapse and pelvic floor strength. However prolapse symptoms were increased in primips and multips after vaginal delivery when compared to CS. The level of significance was reached in primips only, probably due to small numbers in the CS (n=13) group in multips and the high standard deviation.

Concluding message

The first vaginal delivery but not the pregnancy has a weakening effect on pelvic organ support. CS does not appear to confer any benefit to multiparous women. Although elective CS in primiparae is an alternative to protect the pelvic floor, it is associated with a higher maternal morbidity and mortality and therefore, this should be taken into consideration when counselling women who demand CS.

References

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