

UR-CHOICE: can we provide mothers-to-be with information about the risk of future pelvic floor dysfunction?

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Abstract Vaginal childbirth is probably the most important factor in the aetiology of pelvic floor dysfunction (PFD) and results in the combination of some or all of the following conditions: urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP). Up until now, it has been difficult to counsel women antenatally regarding risk factors for subsequent PFD, as there has been little good-quality, long-term information available. We now have moderately robust epidemiological data at 12 and 20 years after delivery and objective pathophysiological data (pudendal nerve trauma and levator defects/avulsion). In this commentary, we propose a scoring system (UR-CHOICE) to predict the risk of future PFD based on several major risk factors (UI before pregnancy, ethnicity, age at birth of first child, body mass index, family history (mother and sister) of PFD and baby's weight and maternal height (if <160 cm and baby >4 kg) that have been identified for subsequent PFD risk. This scoring system will help with counselling for women regarding PFD prevention.

Keywords Pelvic floor dysfunction · Urinary incontinence · Faecal incontinence · Pelvic organ prolapse · Vaginal delivery · Caesarean section · Prediction

Introduction

We participated in a most interesting debate at the 38th Annual International Urogynecological Association (IUGA) meeting in Dublin, Ireland. The motion before the house was that “Instrumental delivery should be abandoned in favour of Caesarean section”. Much debate was generated at the time, and indeed since, amongst the delegates. We believe that we should further continue this dialogue.

Childbirth in the majority of cases is a wonderful and natural process that is mostly beneficial to all involved. However, a number of women exit this physiological event physically damaged in the short, medium and long term by the very process itself. Even if the majority of women do not experience significant long-term pelvic floor dysfunction (PFD), we suggest that by trying to identify those mothers least susceptible to birth injury, we cannot only reassure the majority of mothers who are unlikely to encounter problems but also inform many mothers who are considering elective Caesarean delivery for no obvious obstetric cause that they are highly unlikely to come to any physical harm if they proceed to a natural birth.

Vaginal childbirth is probably the most important factor in the aetiology of PFD [1] and results in the combination of some or all of the following conditions: urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP). PFD is very common, with >46 % [2] of women acknowledging having some form. Lifetime risk of such problems is even higher and reaches almost “epidemic proportions in later life” and is a common indication for surgery [2].

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Evidence presented, revealed and suggested that many pertinent factors have indeed changed over recent decades and which we as a profession surely must be obliged to address. There is now a definite trend in the developed world for women to be older when they have their first baby, babies are heavier and mother's body mass index (BMI) is greater. Women are also having fewer babies. Data from the United Nations show that total fertility rates (TFR) are rapidly declining globally and the predicted TFR in the middle of this century is predicted to be <2.0 children/woman; in many developed countries, the TFR is already between 1.0 and 1.5.

The Incidence of Obstetric Anal Sphincter Injury (OASIS), a major risk factor for anal and faecal incontinence, has increased three fold in England in the past 10 years [3], and there is good evidence that while not unique to forceps deliveries, these instruments are most frequently implicated as aetiological factors. The diagnosis of OASIS is increasingly common. When so-called "occult" injuries detected by endoanal ultrasound is considered, the number for unselected primipars is 29.2% [4].

During recent decades, there has been a parallel increase in the number of babies born by Caesarean section and PFD. It is now evident to many that the accoucheurs and accoucheuses in our labour wards are in great need of guidance to help them identify which mothers are at low risk of incurring physical damage to their sphincters and pelvic floors during the birthing process and which ones are at particularly high risk. Many women, particularly those who want to achieve as natural a birth as possible, require and deserve advice as to what their chances of success are without producing serious long-term pelvic floor damage, before commencement of the labour process.

Risk factors for pelvic floor dysfunction

Prevention of PFD should be discussed with every pregnant woman as part of her routine antenatal care. This should include pelvic floor muscle training (PFMT) [5] which has also been recommended by the International Consultation on Incontinence and the recent joint statement on pelvic floor muscle exercise from the Royal College of Midwives and the Chartered Society of Physiotherapy (UK), as well as modifiable risk factors (avoid smoking and constipation; maintain normal BMI) [5]. For women at greatly increased risk of PFD, possible elective Caesarean section should also be discussed. Up until now, it has been difficult to counsel women on the risk factors for subsequent PFD, as few good-quality, long-term data are available. We now have moderately robust epidemiological data at 12 [6, 7] and 20 years after delivery (primiparous women) [8–10] and objective pathophysiological data (pudendal nerve trauma and levator defects/avulsion) [11]. Major risk factors for subsequent pelvic dysfunction are

UI before pregnancy [1], ethnicity [1], age at birth of the first child [1, 6–10], BMI [1, 8–10], family history (mother and sister) of PFD [1], baby's weight [1, 8–10] and maternal height (if <160 cm and baby >4 kg) [8–10].

Caesarean section has been shown to provide partial protection for POP and, to a lesser degree, UI. Exclusive Caesarean section is associated with a reduced risk of objectively measured signs of POP 12 years after delivery [vaginal delivery 29% vs. Caesarian 5%, odds ratio (OR) 0.11; 95% confidence interval (CI) 0.03–0.38] [7] and (in women who only have one child) symptoms of prolapse 20 years after delivery (vaginal delivery 14.6% vs. Caesarean 6.3%, OR 2.55; 95% CI 1.98–3.28) [9]. There is also a significant increase in prolapse surgery with vaginal delivery in comparison with Caesarean section [hazard ratio (HR) 9.2; 95% CI 7.0–12.1] and a dramatically increased risk with forceps (HR 20.9; 95% CI 5.5–79.9) in comparison with a Caesarean delivery [12].

Regarding UI, there is less protection by Caesarean in comparison with POP. At 12 years after delivery, women who deliver exclusively by Caesarean section were less likely to have UI in comparison with women delivered vaginally (vaginal delivery 55% vs. Caesarean 40%, OR 0.46; 95% CI 0.37–0.58) [6]. A similar reduction is seen at 20 years after delivery in primiparous women (vaginal delivery 40.3% vs. Caesarian 28.8%, OR 1.67; 95% CI 1.45–1.92) [8]. However, delivery exclusively by Caesarean has not as yet been shown to be protective for FI in comparison with vaginal delivery [1], whereas forceps delivery appears to be a significant risk factor for FI 6 and 12 years after delivery [6].

Women who request a Caesarean, either as a primary indication or associated with a previous need for such surgery, deserve good evidence with which to bolster that request, as does the midwifery provider. Since the Department of Health (UK) publication "Changing Childbirth", women are increasingly involved in the decision-making process regarding pregnancy and delivery care. This evidence should be both general and personalised: general in terms of providing the prospective mother with evidence-based information on the potential risks and benefits of the surgical approach (Childbirth Connection 2004), and personalised by addressing the effects of the factors identified above in relation to the mother's current pregnancy. However, in this respect, it is important to note that there are potential risks associated with repeat Caesarean section, e.g., placenta praevia and accreta [13]. In addition, concerns have been expressed about potential long-term risks of asthma and diabetes in children born by Caesarean section, but the evidence for a cause-and-effect relationship is unproven [14].

Construction of a score

We believe that the physical features above of the mother and the baby can be scored and may be considered along with the

woman's informed choice regarding her preferred route of delivery and the number of children she wishes. This idea is, however, not new, and has been previously proposed and evaluated by colleagues at the Cleveland Clinic [15]. However, we suggest that these independent factors can be given numerical values that, when added together, provide an antenatal pelvic floor trauma predictive score for use by midwives, obstetricians and mothers so that all could be informed of realistic expected outcomes before the onset of labour. We believe that this information would reassure the majority of mothers who desire a natural birth, provide much food for thought for those who might be considering a nonclinically indicated elective Caesarean section and help with counselling regarding PFD prevention.

At the IUGA in Dublin, there was much enthusiasm voiced for a score predictive of future PFD following childbirth, and after intensive deliberation, we suggest that factors encompassed in the acronym UR-CHOICE could be used:

UR-CHOICE

- U UI before pregnancy
- R Race/ethnicity
- C Child bearing started at what age?
- H Height (mother's height)
- O Overweight (weight of mother, BMI)
- I Inheritance (family history)
- C Children (number of children desired)
- E Estimated fetal weight

Regarding construction of the score, we plan to use our ProLong (PROlapse and incontinence LONG-term research) 12-year database involving just fewer than 4,000 women, and our SWEPOP (SWEdish Pregnancy, Obesity, and Pelvic floor) 20-year database of slightly fewer than 5,000 women. A series of multiple regression models will be fitted to each of data set independently as was done by Jelovsek et al. [15]. Each model will use a binary variable for one of UI, FI and POP as the outcome and will use the risk factors of ethnicity, antenatal UI, age at first childbirth, maternal height, family history (mother and sisters) of PFD, BMI and baby's weight. The result of the logistic regression equation is the predicted probability for each condition given particular values of predictor variables. This can be used as the predictive score for the possibility of developing that condition. In addition, validation will take place both internally and externally by comparing the models created using the two data sets.

The number of children desired will not be included in the logistic regression modelling and final score but will be used in counselling women (particularly those with a high score) who are considering an elective Caesarean section. For such women, the benefits of elective Caesarean section need to be balanced against the potential risks associated with repeat Caesarean sections, in particular, with complications of placenta praevia and accreta. The risk of these conditions arises

infrequently following one or two Caesarean sections (incidence of accreta 0.1– 0.25 %) [13]. However, if a woman is desirous of three or more children, then these increased risks of repeat Caesarean sections (incidence of accreta >1.5 %) may be considered to outweigh any benefits for reduction of PFD.

We believe that the UR-CHOICE score should be estimated for every pregnant woman antenatally between 37 and 38 weeks to help with the prevention of PFD. A low UR-CHOICE score would be associated with the lowest risk of PFD:

- It would reassure mothers who desire a natural birth.
- It would inform mothers considering a nonclinically indicated elective Caesarean section.
- Pelvic floor contractility would be assessed at the postnatal check and instruction given on long-term PFMT.

UR-CHOICE score in the mid range would be associated with an intermediate risk of PFD:

- It would be appropriate for these women to be referred to a physiotherapist or continence advisor both antenatally and postpartum (depending on resources) to ensure she is properly taught to do PFMT.
- It may help with motivation to adhere to PFMT and modifiable risk factors (avoid smoking and constipation, maintaining a normal BMI).

UR-CHOICE score in the highest range is associated with the highest risk of subsequent PFD:

- It would be appropriate for these women to be seen by a physiotherapist or continence advisor both antenatally and postpartum and (if resources permit) to be seen annually for booster PFMT sessions.
- Depending on the woman's attitude to Caesarean section and number of children desired, she may well choose an elective Caesarean, or alternatively, Caesarean section early in labour might be recommended should there be signs of obstruction, e.g. in short-statured women. That might be preferable than putting such women at risk of prolonged labour and instrumental delivery.

We will be validating and estimating weighting for the UR-CHOICE score in the coming months and will report soon from data already in our possession. It may well be that our UR-CHOICE score will also be related to the outcome of labour, predict risk of intervention and help with motivation to adhere to PFMT and modifiable risk factors, which are also being investigated. Caesarean section and assisted-delivery rates show extraordinary variation throughout the world, both resourced and underresourced. This suggests that appropriate scientific methods are not generally and scientifically being

used in order to correctly predict the likely route and method required before expediting delivery. It could be argued that mothers antenatally are perhaps not always being appropriately prepared for the likelihood or otherwise of PFD. The majority of women have a good childbirth experience with minimal or reversible pelvic floor damage during the process. It is important that this majority of women is informed that they are unlikely to risk irreversible pelvic floor problems following giving birth. Women need to know the real risks and likely outcomes before embarking on this—mostly—very natural process, which usually has good outcomes for all but can be associated with medium- to long-term pelvic floor damage.

Conclusion

We conclude that application of the UR-CHOICE scoring system could help provide women with evidence-based prelabour advice such that, following appropriate counselling with their proposed birth attendant, decisions and choices can be made regarding PFD prevention and thus avoid unnecessarily high incidences of UI, FI and POP requiring future surgery. Used routinely and honestly, we anticipate that an increasing number of women would be empowered to embark on the labour process assured of minimising the chance of long-term PFD.

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