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ORIGINAL ARTICLE

Results of a nationwide survey on practice patterns of Canadian obstetricians and gynaecologists regarding the mode of delivery after pelvic floor surgery

Ola Malabarey[1] · **Lucia Farisello**[2] · **Lauren Gazzard**[2] · **Jens-Erik Walter**[1]

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Abstract It is not uncommon to be challenged with the dilemma of deciding the best mode of delivery in a patient with a history of previous pelvic floor surgery. We hypothesized that the trend would be a predilection towards cesarean section delivery in the context of a previous pelvic floor surgery, especially amongst Urogynaecologists. A nation-wide survey was sent through the Society of Obstetrics and Gynaecology of Canada to all physician members to assess the practice patterns regarding the preferred mode of delivery after pelvic floor surgery. A hundred and three members replied. Forty-seven percent would recommend a cesarean section (CS) when pregnant after a previous midurethral sling (MUS), 27.2 % would allow vaginal delivery, 10.7 % would not be affected in their decision by the MUS, 9.7 % would strongly advise against pregnancy and 4.9 % would suggest a cesarean section with a sterilization procedure. With a history of previous pelvic organ prolapse surgery (POP), 54.4 % would suggest a CS when pregnant, 21.4 % would strongly advise against pregnancy and only 15.5 % would allow the patient to deliver vaginally. Urogynaecologists are significantly more likely to strongly advise a patient with a previous MUS against pregnancy, compared to their peers practicing general obstetrics and gynaecology (OBGYN) ($p = 0.04$) or maternal fetal medicine (MFM) ($p = 0.05$). Larger studies and clear guidelines advising physicians to the optimum mode of delivery following a history of previous pelvic floor surgery are strongly needed.

Keywords Tension-free vaginal tape · Pelvic organ prolapse · Pregnancy · Stress incontinence · Cesarean section

Introduction

Childbirth is known to be a risk factor for pelvic floor disorders [1]. Pregnancy itself may also carry a risk for future pelvic floor disorders, regardless of the mode of delivery [2]. There are no clear guidelines as to the appropriate mode of delivery in a patient who has undergone previous pelvic organ prolapse (POP) surgery or a midurethral sling (MUS). In an attempt to get a sense of the current practice in Canada, a nationwide survey was sent to Obstetricians and Gynaecologists of all subspecialties. We hypothesized that the trend would be a predilection towards cesarean section delivery in the context of a previous pelvic floor surgery, especially amongst Urogynaecologists. We also hypothesized that the choice of mode of delivery following a previous POP surgery or MUS would differ according to physicians' years of experience, where more experienced physicians would be more comfortable with a vaginal delivery. This is likely due to the fact that they have become more familiar with similar scenarios during their practice, and might also be more aware of the current available literature regarding this topic. To the best of our knowledge, no similar paper has been published.

✉ Ola Malabarey
ola.malabarey@gmail.com

[1] McGill University Health Centre, F8.46, 687 Pine Ave W, Women's Pavilion, Royal Victoria Hospital, Montreal, QC H3Y 2S1, Canada

[2] Concordia University, Montreal, QC, Canada

Materials and methods

Through the Society of Obstetrics and Gynaecology of Canada, the survey was sent via email to all registered physician members (Fig. 1.). The survey was sent to practicing or retired attending staff only, not to residents in training. Two weeks after the first email, a reminder email was sent out. Once all responses had been accrued, the survey was closed and data were analyzed. The responses were then stratified to subspecialty and years of experience. A Pearson's chi-square test was used to detect differences in response between different subspecialties. Given the small sample size, the Fisher's exact test was used when applicable. Assuming Urogynaecologists have wider knowledge in pelvic floor function and physiology, responses to certain questions from different specialties were compared to those of Urogynaecologists, using a chi-square test (correction with Fisher's exact test where applicable). SPSS software version 22 was used. This study was approved by the institutional review board committee at McGill University Health Centre, with the approval code 14–268-SDR.

Results

One hundred and three physicians replied, rendering a response rate of 16.8 %. Figure 2 illustrates the responses by specialty. Fifty five (55.3 %) percent of responders had more than 10 years of experience, and 70.9 % practiced in a university affiliated academic center.

In a patient of childbearing age with a previous history of MUS, 47.6 % would recommend a cesarean section (CS) when pregnant, 27.2 % would allow vaginal delivery, 10.7 % would not be affected in their decision by the MUS, 9.7 % would strongly advise against pregnancy and 4.9 % would suggest a cesarean section with a sterilization procedure. These responses changed when the question was directed towards patients with a previous history of POP surgery. Furthermore, 54.4 % would suggest a CS when pregnant, 21.4 % would strongly advise against pregnancy and only 15.5 % would allow the patient to deliver vaginally. Moreover, 32.4 % of responders felt that a previous MUS is a contraindication to vaginal birth, whereas 44.7 % felt that previous POP surgery is a contraindication to vaginal birth.

A chi-square test of independence was calculated comparing frequencies of responses between the doctors' subspecialties. Stratifying the data and analyzing it per subspecialty, the responses of general obstetrician and gynaecologists (OBGYN) and maternal fetal medicine (MFM) specialists were compared to those of Urogynaecologists. Even though the results might have some clinically significant implications that cannot be ignored, most of the values did not reach statistical significance (Table 1).

With regards to patients with a history of previous MUS, doctors' subspecialty was not associated with a difference in the suggestion for a cesarean (χ^2 (2) = 2.241, p = 0.33). More specifically, 30.8 % of Urogynaecologists would suggest a CS when pregnant, compared to 49.2 % of general OBGYNs and 56.5 % of MFM specialists. These differences did not reach statistical significance (Table 1), but again are felt to be clinically significant. In the situation of that patient presenting prior to pregnancy, there was an association of subspecialty and the advisory against pregnancy for patients with MUS (χ^2 (2) = 7.28, p = 0.03); where 30.8 % of Urogynaecologists would strongly advise against pregnancy compared to 7.9 % of general OBGYNs (χ^2 (1) = 5.381, p = 0.04), and 4.35 % of MFM physicians (χ^2 (1) = 4.848, p = 0.05). These results show that Urogynaecologists are significantly more likely to strongly advise a patient with a previous MUS against pregnancy, compared to their peers practicing general OBGYN or MFM.

With a history of previous POP surgery, there was no association between subspecialty and the different rates of suggestion of a cesarean (χ^2 (2) = 1.85, p = 0.4), such that 69.2 % of Urogynaecologists would suggest a CS, compared to 56.5 % of MFM's and 49.2 % of general OBGYN's. There was no association between subspecialty and viewing a MUS as a contraindication to a vaginal birth (χ^2 (2) = 2.245, p = 0.33). Only 15.4 % of Urogynaecologists viewed a previous MUS as a contraindication to vaginal birth, compared to 36.5 % of general OBGYN's and 36.5 % of MFM's. Although the difference is not statistically significant, it is important to note that on the contrary, 53.9 % of Urogynaecologists viewed previous POP surgery as a greater contraindication to vaginal birth, as did 44.4 % of general OBGYN's and 39.1 % of MFM's (χ^2 (2) = .728, p = 0.7).

The majority of responders in all subspecialties felt that pregnancy after a MUS or POP surgery would result in recurrent stress urinary incontinence (SUI) (χ^2 (2) = .528, p = 0.77) or recurrent POP (χ^2 (2) = 1.166, p = 0.56), respectively (Figs. 3 and 4).

Although responders who had more than 10 years of experience were somewhat less likely to perform a CS in a patient with a history of previous POP surgery compared to responders who had 0–10 years of experience (χ^2 (1) = 1.416, p = 0.32), that difference did not reach statistical significance (49.1 vs. 60.9 %, respectively). Similarly, there was no significant difference when it came to a patient with a history of previous MUS (49.1 vs. 45.7 %, χ^2 (1) = .123, p = 0.84).

Discussion

In our survey, and in opposition to our hypothesis, only 15.4 % of Urogynaecologists viewed a previous MUS as a contraindication to vaginal birth and 30.8 % would suggest a

1- Are you a(n):
- ☐ General obstetrician & gynaecologist
- ☐ MFM
- ☐ Oncologist
- ☐ REI
- ☐ Urogynaecologist
- ☐ MIS
- ☐ Other

2- Have you been in practice:
- ☐ Less than 5 years
- ☐ 5-10 years
- ☐ More than 10 years

3- Is your current practice based in a university aff iliated academic centre:
- ☐ Yes
- ☐ No

4- If a patient of child bearing age had a previous midurethral sling, will you:
- ☐ Strongly advise against pregnancy
- ☐ When pregnant, suggest a cesarean section
- ☐ When pregnant, suggest a cesarean section with a ster ilization procedure
- ☐ When pregnant, allow to deliver vaginally
- ☐ Having a previous midurethral sling will not influence your counselling in terms of pregnancy and delivery

5- In your opinion:
- ☐ Pregnancy after a midurethral sling will result in a n increased risk of recurrent stress urinary incontinence
- ☐ Pregnancy after a midurethral sling will not increase the risk of recurrent stress urinary incontinence

6- In your opinion, is a previous midurethral sling considered a contraindica tion to vaginal birth:
- ☐ Yes
- ☐ No

7- If a patient of child-bearing age had a previous pelvic organ prolapse surgery, will you:
- ☐ Strongly advise against pregnancy
- ☐ When pregnant, suggest a cesarean section
- ☐ When pregnant, suggest a cesarean section wi th a sterilization procedure
- ☐ When pregnant, allow to deliver vaginally
- ☐ Having a previous pelvic organ prolapse surgery will not influence your counselling in terms of pregnancy and delivery

8- In your opinion:
- ☐ Pregnancy after a pelvic organ prolapse surgery will result in an increased risk of recurrent prolapse
- ☐ Pregnancy after a pelvic organ prolapse surgery will not increase the risk of recurrent prolapse

9- In your opinion, is a previous pelvic organ prolapse surgery considered a contraind ication to vaginal birth:
- ☐ Yes
- ☐ No

Fig. 1 To deliver or not to deliver: the survey. *MFM* maternal fetal medicine, *REI* reproductive endocrinology and infertility, *MIS* minimal invasive surgery

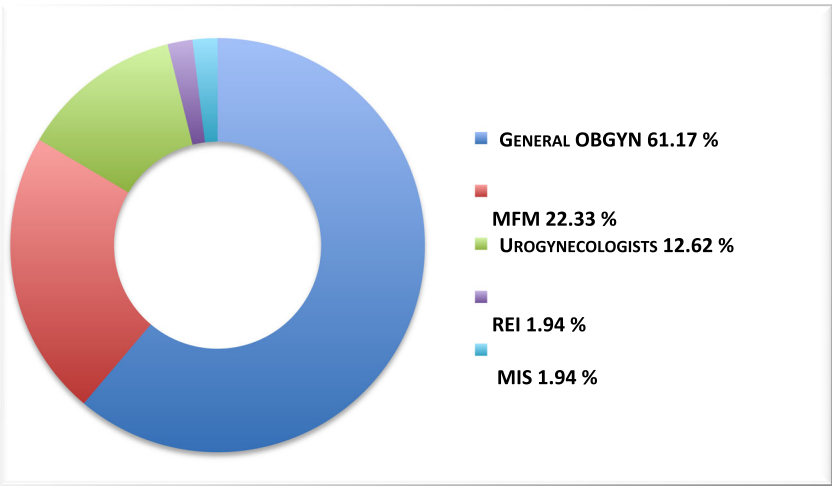

Fig. 2 The total responses categorized by specialty. *OBGYN* Obstetricians and Gynecologists, *MFM* maternal fetal medicine, *REI* reproductive endocrinology and infertility, *MIS* minimally invasive surgeons

Table 1 Comparison of survey results between different subspecialties

	UROGYN $n = 13$	OBGYN $n = 63$	MFM $n = 23$	X^2	p
	Frequency (%)				
For a patient with previous MUS					
Strongly advise against pregnancy	4 (30.8)	5 (7.9)	1 (4.3)	7.28	0.03
Suggest a CS	4 (30.8)	31 (49.2)	13 (56.5)	2.24	0.33
Allow to deliver vaginally	3 (23.1)	16 (25.4)	6 (26.1)	0.04	0.98
MUS will result in increase risk of SUI	11 (84.6)	54 (85.7)	21 (91.3)	0.53	0.77
Contraindication to vaginal birth	2 (15.4)	23 (36.5)	8 (36.4)	2.24	0.32
For a patient with previous POP					
Strongly advise against pregnancy	4 (30.8)	16 (25.4)	2 (8.7)	3.35	0.19
Suggest a CS	9 (69.2)	31 (49.2)	13 (56.5)	1.85	0.40
Allow to deliver vaginally	0 (0)	10 (15.9)	5 (21.7)	3.12	0.21
POP will result in increase risk of POP	13 (100.0)	61 (96.8)	23 (100)	1.17	0.56
Contraindication to vaginal birth	7 (53.8)	28 (44.4)	9 (39.1)	0.73	0.69

Note. Frequencies of "Yes" responses ($d = 2$)

MUS midurethral sling, *CS* cesarean section, *POP* pelvic organ prolapse, *SUI* stress urinary incontinence, *UROGYN* urogynaecologists, *OBGYN* obstetricians and gynaecologists, *MFM* maternal fetal medicine

CS, compared to 36.5 and 49.2 % of general OBGYN's and 36.5 and 56.5 % of MFM's, respectively. This may be explained by Urogynaecologists awareness of previously published papers that questioned the indication of CS delivery in the context of a previous MUS. Due to the very low response from the other subspecialties, they were excluded in the comparison. Most of these differences, however, did not reach statistical significance (Table 1). This is most likely due to the discrepancy between the numbers of other subspecialties responding compared to those of Urogynaecologists (only 13). That low number was expected, given the fact that the number of Urogynaecologists is much lower compared to general OBGYNs or MFMs. Even if results did not reach statistical significance, the differences in responses cannot be ignored.

However, if such a patient presented prior to pregnancy, our survey showed that Urogynaecologists were more likely to strongly advise the patient against pregnancy.

The prevalence of urinary incontinence in women older than 20 years of age is 25 %, and 36 to 50 % of those have SUI [3, 4]. The proportion of women intentionally delaying pregnancy after the age of 35 has increased greatly in the past few decades [5]. Given the fact that urinary incontinence increases with age, it is not uncommon to encounter a patient contemplating pregnancy with a history of previous pelvic floor surgery. Several studies have consistently shown vaginal birth to be a significant risk factor for both POP and SUI [6, 7]. Pregnancy itself was also associated with pelvic floor disorders [2], but there is a paucity of data when it comes to recommendations for counseling pregnant patients with a

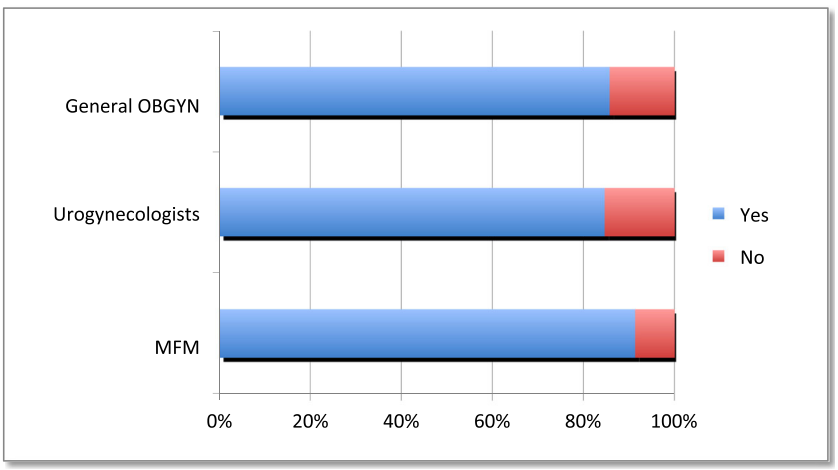

Fig. 3 The percentage in each subspecialty that responded "yes", pregnancy after a MUS will result in recurrent SUI: *MUS* midurethral sling, *SUI* stress urinary incontinence, *OBGYN* Obstetricians and Gynecologists, *MFM* maternal fetal medicine

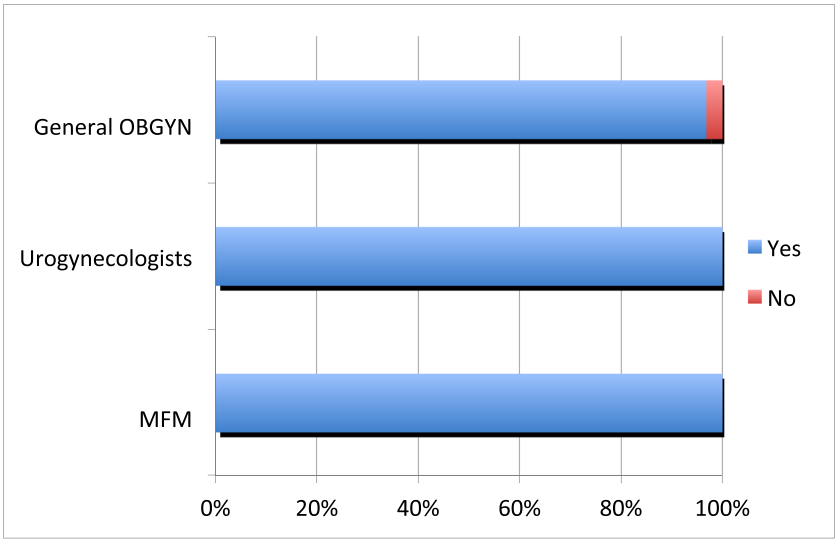

Fig. 4 The percentage in each subspecialty that responded "yes", pregnancy after a POP surgery will result in recurrent prolapse: *POP* pelvic organ prolapse, *OBGYN* Obstetricians and Gynecologists, *MFM* maternal fetal medicine

previous MUS or POP surgery for the appropriate mode of delivery.

In a retrospective survey of pregnant women after a MUS, Panel et al. reported a recurrent SUI rate of 15 % during pregnancy and 16.7 % after delivery. Vaginal delivery did not increase the risk of SUI [8]. In 2015, Cavkaytar et al. showed similar results, where the risk of postpartum SUI after a MUS was independent of the mode of delivery [9]. Furthermore, transperineal ultrasound revealed correct placement of the tape in a patient who remained continent following a vaginal delivery [10], which makes the general recommendation of delivery by CS following a MUS questionable.

The literature is sparser when it comes to pregnancy and delivery with a previous history of POP surgery. In 2001, Maher reported a series of 43 women who underwent a laparoscopic hysteropexy. The follow up ranged between 6 and 32 months. Two patients subsequently became pregnant and delivered by CS. There was no recurrent POP at last visits [11]. Rahmanou et al. reported another case of pregnancy post hysteropexy. The patient delivered by CS at 38 weeks, and had good apical support but a recurrent anterior compartment prolapse at her 3-month postpartum follow up [12]. Search of the literature failed to reveal any reported cases of vaginal delivery following a hysteropexy, or an anterior or posterior vaginal repair. Our survey results revealed an obvious trend towards CS delivery following a POP repair.

The major limitation of our study was the low response rate. A pilot survey was sent out prior to ensure that all the questions were understood, and the time spent in taking the survey was between 1 and 2 min. A reminder email was sent out 2 weeks after. Despite that, we were not able to achieve a better response rate. One of the limitations of our survey was it being a web survey. Despite the multiple advantages of web surveys, it is estimated that on average, the response rate is 11 % less than that of other survey modes [13]. Our response rate of 16.8 % makes interpretation of the results very limited, and may lead to biased results. No significant conclusions could be made in regards to our results.

Conclusion

With midurethral slings being safe and effective options in the management of SUI, more and more younger patients are undergoing this minimally invasive procedure. It is not unusual to also be faced with a pregnant patient, or a patient seeking pregnancy, with a history of previous POP surgery. Our results demonstrated that Urogynaecologists are more likely to strongly advice a patient with a previous MUS against pregnancy compared to their peers from other subspecialties. The small numbers of responders limits interpretation of our survey results. We strongly urge physicians to participate more in future similar surveys. Clear guidelines indicating the optimum mode of delivery following a previous MUS or a POP repair surgery are strongly needed.

Author's contribution O Malabarey contributed to project development, data collection, data analysis, and manuscript writing. L Farisello contributed to data/statistical analysis and manuscript editing. L Gazzard contributed to data/statistical analysis. JE Walter contributed to project development and manuscript editing.

Compliance with ethical standards This article does not contain any studies with human participants or animals performed by any of the authors.

Conflict of interest Ola Malabarey declares that she has no conflict of interest.

Lucia Farisello declares that she has no conflict of interest.

Lauren Gazzard declares that she has no conflict of interest.

Jens-Erik Walter is a consultant for Boston Scientific and sometimes accepts paid travel expenses and honoraria from the company.

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