International Urogynecology Journal (2022) 33:3365–3369
https://doi.org/10.1007/s00192-022-05294-3

ORIGINAL ARTICLE

Mode of delivery following obstetric anal sphincter injury: a 7-year retrospective review and follow-up cohort survey

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Received: 8 May 2022 / Accepted: 27 June 2022 / Published online: 18 July 2022

Abstract

Introduction and hypothesis Limited evidence exists regarding long-term outcomes following birth after prior obstetric anal sphincter injury (OASI). This article set out to describe outcomes following birth after OASI by reviewing the grades of tear, endoanal ultrasound (EAUS) findings, subsequent delivery outcomes and long-term symptoms.

Methods This study was conducted in two parts. The first involved a retrospective review of all OASI at a tertiary hospital in Australia over 7 years (2013–2019 inclusive) where the patient underwent a subsequent delivery. Following this, a retrospective cohort survey of this group was performed.

Results There were 27,284 vaginal births and 828 OASIs (3.03%); 247 (29.8%) had at least one subsequent birth by January 2021. Vaginal delivery occurred in 68%; recurrence of OASI was 5.4%. There were 90 responses (36.4%) to the follow-up survey. EAUS had been performed in 87.5%; none demonstrated a defect. Vaginal birth was the preferred mode for 77.8%; this occurred in 64%. The majority had high levels of satisfaction, this related to communication rather than the mode of delivery itself. Ongoing faecal or flatal incontinence was reported by 12%. There was no statistically significant difference in St Mark's incontinence scores between modes of birth.

Conclusions In our unit most women who sustain OASI will have a subsequent vaginal delivery in future pregnancies. The majority remain asymptomatic at long-term follow-up with no statistically significant difference in incontinence scores regardless of mode of delivery. The rate of recurrent OASI was 5.4%.

Keywords Endoanal ultrasound · OASI · Subsequent birth

Introduction

Obstetric anal sphincter injuries (OASI) occur in approximately 3% of women during a vaginal delivery in Australia and 5% of women during their first vaginal birth [1]. This can result in long-term complications such as anal incontinence, perineal pain, dyspareunia and psychological sequelae [2]. Most women will be asymptomatic of anal incontinence at the time of a subsequent pregnancy [3]. Currently local protocols regarding subsequent mode of delivery advice are based on the Royal College of Obstetricians and Gynaecologists (RCOG) guideline. This recommends counselling regarding the options of vaginal birth or caesarean section and consideration of elective caesarean for those who are symptomatic or have an abnormal endoanal ultrasound and/or manometry.

A recent prospective cohort study by Webb et al. which utilised this guideline for counselling found there was no significant change in bowel symptoms or quality of life scores at 6 months in 125 women, regardless of type of delivery [4]. The EPIC trial, an RCT of women with asymptomatic sphincter lesions on ultrasound, also found no difference in Vaizey scores of anal incontinence at 6 months when participants were randomised to vaginal birth or caesarean section [5]. It should be noted that those with a previous fourth-degree tear were excluded from this trial. Jangö et al. found that on follow-up at least 5 years after a second delivery there was an increased risk of anal incontinence for all participants and that this was not significantly affected by mode of delivery for subsequent birth [6].

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At the tertiary hospital this study was based at, the majority of deliveries are performed by midwives, with trainee or consultant obstetricians undertaking instrumental births. An assessment of perineal trauma is performed by the accoucheur. All clinicians responsible for assessment of perineal trauma have training in OASI identification and classification. All midwives are instructed on the hospitals standardised perineal guarding technique by a midwifery educator as part of their induction and instructed on how to examine for OASI, which includes a rectal examination [7]. Any suspected OASI are then checked by a more senior clinician. OASI repairs are performed where possible in the operating theatre by registrars (trainees) or consultant obstetricians, depending on their level of experience and the severity of trauma. All trainees attend a perineal/OASI repair workshop and a credentialling process is in place to ensure that clinicians have received adequate training prior to being responsible for OASI repairs. All women are referred for endoanal ultrasound following OASI, with hospital guidelines recommending vaginal birth for those without a persistent defect who are also asymptomatic and standardisation of counselling based on this at the time of their endoanal ultrasound by a single clinician.

This study retrospectively evaluated whether women were counselled in line with our local guidelines, their subsequent birth outcomes and OASI recurrence. A cohort survey was then performed. We aimed to examine long-term outcomes as well as satisfaction with mode of delivery.

Materials and methods

Approval was obtained by the Human Research Ethics Committee at WSLHD (HREC 2020/ETH00467). Two stages were undertaken. The first involved a retrospective review of all cases of OASI at a tertiary hospital in Australia over a 7-year period (2013–2019 inclusive). This time frame was used because of the availability of electronic records and when the endoanal ultrasound clinic was set up. All cases where the patient underwent a documented subsequent delivery were identified. Notes were reviewed to classify the severity of the index tear, results of follow-up endoanal ultrasound, St Marks incontinence score at the time of ultrasound, the management plan made during subsequent pregnancies and factors that may have influenced mode of delivery (e.g., labour prior to booked caesarean section, caesarean because of foetal distress/SGA/breech). Endoanal ultrasound was offered routinely during this period to all women identified as having an obstetric anal sphincter injury in our unit. These were performed by a single operator (ST), with persistent defects defined as those of an angle $\geq 30°$ [8].

Following this we undertook a retrospective cohort survey, inviting 247 women who had a subsequent delivery within our catchment area to participate. Those eligible were initially contacted via post to their last known address, with information provided along with the ability to return a paper-based survey or completion online. Following this they were recontacted and invited by phone. Participants were provided with a unique identification number available only to the research team and returned surveys were otherwise anonymous. The survey asked participants their recollection of whether counselling occurred and their level of satisfaction with it. It asked their planned as well as preferred mode of delivery, satisfaction with the subsequent delivery and reasons for this. Finally, participants were asked if they had anal incontinence prior to and since their last delivery and to complete a St Mark's incontinence score.

Results

Of 27,284 vaginal births between 2013–2019 there were 828 OASIs (3.03%), of which 86.6% had been nulliparous. Out the women who had OASI, 247 (29.8%) had at least one documented subsequent birth by January 2021. Twenty-nine (3.5%) had two to four subsequent deliveries; 189 women delivered at our unit (2 with private obstetricians), 52 at peripheral sites within our catchment area (for which full antenatal documentation was available) and 6 at private hospitals within our catchment with mode of delivery information available because of subsequent maternity care.

As part of follow-up of the index OASI, 81% of patients had an EAUS at our institution by a single operator, of which the majority had no defect on imaging (92.5%, 185/200). Those with a residual defect at EAUS were more likely to have a caesarean for all subsequent deliveries (8/15; 53%) than if EAUS was normal (44/185; 23.8%). Four patients with residual defects who had planned to deliver by caesarean section presented in labour and proceeded to vaginal delivery. A persistent defect was more likely following 3C/4th degree tears (6/25; 24%) than after 3A/B tears (9/171; 5.3%). A breakdown by types of tears is found in Table 1.

A St Mark's incontinence score was performed and documented in the notes of most women at the time of follow-up EAUS (194, 97% available). Most women were asymptomatic with a score of 0 (176/194, 90.7%) and these women were more likely to have a subsequent vaginal delivery (132/176, 75%). Of the 18 women with a St Mark's incontinence score > 0, 55% (10/18) had a subsequent vaginal birth. Four women had a score > 4; only one of these had a subsequent vaginal birth (and has had four vaginal births since OASI).

For all cases of OASI the episiotomy rate was 48.4% (401/828). Episiotomy was performed in 61.1% at the time of initial OASI for those who then went on to have a

Table 1 Characteristics of the cohort by severity of tear

OASI severity	Total (%)	Follow-up EAUS performed (%)	Persistent defect on EAUS (%)	Subsequent vaginal birth (%)
3A	92 (37.2)	79 (85.9)	2 (2.5)	78 (84.8)
3B	100 (40.4)	92 (92)	7 (7.6)	69 (69)
3C	22 (8.9)	18 (81.8)	3 (16.7)	10 (45.5)
4th	14 (5.7)	7 (50)	3 (42.8)	2 (14.3)
Unknown	19 (7.7)	4 (21)	0 (0)	9 (47.4)
All	247 (100)	200 (81)	15 (7.5)	168 (68)

subsequent delivery (151/247). This compares to an overall episiotomy rate at vaginal birth of 31.4% (8572/27,284). At subsequent vaginal delivery following OASI the episiotomy rate increased to 64.3% (108/168). The rate of recurrent OASI was 5.4% (9 patients), with episiotomies in 33.3% (3/9). Instrumental deliveries occurred in 2.4% (4/168) of subsequent vaginal births.

Regarding implementation of local guidelines, of those with a normal EAUS who subsequently delivered at our unit (177) 43 caesarean sections were performed. Of those 16 were due to other obstetric indications (foetal distress, twins, LGA, breech, prior LSCS) and 11 due to symptoms of anal incontinence, perineal pain or a prior 4th degree tear. Only 14 had an elective caesarean section because of patient preference. One patient was recommended to have a caesarean section due to a 3C tear and for one no antenatal notes were available.

There were 90 discrete responses (36.4% response rate) to the follow-up survey; 88 responses could be linked with information from the patient notes, as two participants did not enter the unique participant identification code in their online response. Of the 247 invited to participate, 15 declined, 9 reported minimal English, 12 were not contactable by follow-up phone call, and there was no response after invitation by 121. Most who responded (81/88) delivered at our unit whilst receiving public care and 68% had vaginal births for all subsequent deliveries. Most respondents were born overseas, with 26.1% born in Australia. Those born in Australia were more likely to complete the survey; they accounted for only 18.2% of the cohort invited to participate. The median follow-up period was 83 months from time of OASI to survey completion. Characteristics of those who responded based on subsequent mode of delivery are given in Table 2.

From those who returned the follow-up survey an EAUS had been performed in 87.5%; none demonstrated a persistent defect. Only 34% recalled being counselled on future deliveries at the time of OASI and 63% recalled counselling during their subsequent pregnancy. Vaginal delivery was the preferred mode of delivery for 77.8%. Most had high levels of satisfaction with the mode of delivery that occurred (75.6% scoring ≥ 8 on a Likert scale of 0–10 and only 4.4% scoring ≤ 4). Satisfaction was slightly higher in the caesarean than vaginal delivery group (82% scoring 8–10 vs. 71.7%). Participants were asked to comment on reasons for their levels of satisfaction. Responses indicated that this corresponded more with the communication that was received and how supported/listened to women felt rather than the mode of delivery itself. This was specifically mentioned by 32/90 women regarding both high and low satisfaction scores.

Anal incontinence was reported in 17.8% after the index delivery, 12% since their subsequent birth. Of those who had only vaginal births 10% reported symptoms after the index delivery, 15% since. For those who had only caesarean sections since OASI, 29.6% reported anal incontinence prior to their last delivery and 7.4% since.

A St Mark's incontinence score was performed, with results in Table 3. There was no statistically significant difference between scores for those having had vaginal deliveries vs. caesarean sections compared with a two-tailed *t*-test ($p = 0.59$). One participant in the follow-up cohort had a recurrent OASI (3A followed by 3C tear), however reported being asymptomatic with a St Mark's incontinence score of 1. Of those surveyed 7/88 participants had sustained a 3C or 4th degree tear; of these only one had a subsequent vaginal delivery and none reported symptoms of anal incontinence.

Discussion

This study found that there was no significant difference in incontinence scores between women who have a subsequent caesarean delivery compared to vaginal birth following OASI. It also demonstrated high levels of satisfaction with birth following anal sphincter trauma, regardless of mode of delivery. This supports the finding of Edwards et al., who found low levels of regret following subsequent vaginal birth [9]. Use of follow-up endoanal ultrasound influenced subsequent mode of delivery, with those found to have a persistent defect more likely to elect for a caesarean section. A small number of women who were asymptomatic with a

Table 2 Characteristics of survey respondents

	Subsequent vaginal deliveries ($n = 61$)	Subsequent caesarean sections ($n = 27$)
Age at OASI, mean (years)	29.6	28.9
Country of birth, *n* (%)		
Australia	17 (27.9%)	10 (37%)
India	12 (19.7%)	10 (37%)
Asia (other)	15 (24.6%)	7 (25.9%)
Middle East	10 (16.4%)	
Other	7 (11.5%)	
Parity at OASI, *n* (%)		
P0	54 (88.5%)	25 (92.6%)
P1	5 (8.2%)	2 (7.4%)
P2	2 (3.3%)	
Labour onset/progress, *n* (%)		
Spontaneous	24 (39.3%)	10 (37%)
Augmented	10 (16.4%)	8 (29.6%)
Induction	27 (44.3%)	9 (33.3%)
Epidural block at OASI, *n* (%)	32 (52.5%)	16 (59.2%)
MOD with OASI, *n* (%)		
SVD	40 (65.6%)	13 (48.1%)
Vacuum	5 (8.2%)	4 (14.8%)
Forceps	16 (26.2%)	10 (37%)
Shoulder dystocia, *n* (%)	9 (14.8%)	4 (14.8%)
Severity of OASI, *n* (%)		
3A	29 (47.5%)	5 (8.1%)
3B	28 (45.9%)	13 (21.3%)
3C	1 (1.6%)	2 (3.3%)
4^{th}	0 (0%)	4 (6.6%)
Undocumented	3 (4.9%)	3 (4.9%)
Analgesia for OASI repair, *n* (%)		
Local anaesthetic	26 (42.6%)	5 (8.2%)
Pudendal block	2 (3.3%)	0 (0%)
Epidural block	25 (41%)	14 (23%)
Spinal	7 (11.5%)	5 (8.2%)
General anaesthetic	1 (1.6%)	3 (3.7%)
Episiotomy, *n* (%)	36 (59%)	20 (74%)
Birthweight at OASI, mean (g)	3476	3513
Neonatal head circumference, mean (cm)	34.5	34.6

Table 3 St Mark's incontinence scores at time of follow-up survey

St Mark's Incontinence Score	Overall % (*n*)	Vaginal deliveries only % (*n*)	Subsequent LSCS only % (*n*)
0–4	57.8 (52)	63.3 (38)	48.1 (13)
5–8	25.6 (23)	20 (12)	40.7 (11)
> 8	16.7 (15)	16.7 (10)	7.4 (2)

normal EAUS underwent elective caesarean section due to patient request (14/148; 9.5%). The rate of recurrent OASI at 5.4% was comparable to that in the existing literature [10].

This study highlights the important role that counselling has in patient care. The level of satisfaction is related to how well women felt they were listened to during their pregnancy and the communication provided. Although most recalled counselling at the time of a subsequent pregnancy, the proportion that remembered this occurring at the time of OASI was low. This likely reflects recall bias and demonstrates the importance of follow-up after the initial postpartum period to discuss the extent of trauma and enable decision-making regarding future pregnancies.

This study had several limitations. Despite the retrospective nature and long time frame, due to the low incidence of OASI at 3% only 247 had a known subsequent delivery. Some of those with OASI sustained at our unit

will have delivered at other locations and therefore could not be included.

There was a low response rate to the follow-up survey of 36.4%, with only 88 linked responses. This was likely due to the time frame since OASI (median of 83 months), personal nature of the survey and a high population of non-English-speaking patients within our demographic. Results may have been influenced by a higher proportion of Australian-born participants than was reflected in the original cohort. Most who completed the survey had 3A/3B tears, and none that responded had a residual defect on EAUS.

Despite these challenges, this study provides a descriptive analysis of outcomes for subsequent births after OASI in a large tertiary unit in Australia and evidence that most women would prefer to have a vaginal delivery. We found a low rate of persistent sphincter defects when endoanal ultrasound was implemented routinely and that these results influenced decision-making in future pregnancies. The low rate of persistent defects in this cohort likely reflects the implementation of routine teaching in OASI repairs within the unit, with all trainees attending a repair course at least twice within their early training. In addition, cases demonstrating a persistent defect are reviewed by the senior urogynaecologist and discussed with the clinician who undertook the repair as a way of improving practice.

In our unit, most women who sustain OASI will go on to have a subsequent vaginal delivery in future pregnancies. Overall, this was their preferred mode; however, those who were surveyed that underwent caesarean section also had high satisfaction rates. The majority remain asymptomatic at long-term follow-up. There were no statistically significant differences in incontinence scores between women who had vaginal deliveries compared to those having only caesarean sections for subsequent births.

Author's participation in the manuscript

- Rebecca Young: Project development, data collection, data analysis, manuscript writing and editing
- Lucy Bates: Project development, data collection, manuscript editing
- Stephanie The: Data collection, manuscript editing
- Jennifer King: Project development, manuscript editing

Declarations

Conflict of interest Lucy Bates is a board member for the Urogynaecological Society of Australasia. Jennifer King is a board member of the Continence Foundation of Australia.

Financial disclaimer There are no financial disclaimers.

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