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A five year follow-up of women with obstetric anal sphincter rupture at their first delivery

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ABSTRACT

Objectives: Obstetric anal sphincter rupture (OASR) is considered a risk factor for subsequent fecal incontinence and suspected to be a risk factor for urinary incontinence and sexual dysfunction. The aims of this study were to assess risk factors for the different grades of OASR and to evaluate the clinical outcome five years after birth using validated questionnaires.

Study design: A five year follow-up study was performed on 82 women with OASR during their first delivery in 2009. Case records were reviewed for known risk factors for OASR. Three questionnaires were mailed to the women: The St. Marks fecal incontinence score, The Danish anal sphincter rupture questionnaire (DASRQ) and a short supplemental questionnaire. The data were analyzed using Wilcoxon rank sum test, Fisher's exact test and Kruskal–Wallis test.

Results: Fifty percent had an OASR 3a, 32% an OASR 3b, and 18% OASR 4. None of the investigated risk factors showed statistically significant difference according to the degree of rupture. Seventy-four percent of the women had some degree of fecal incontinence with a significantly higher frequency of fecal incontinence in rupture group 4 than in 3a. Forty-four percent had urinary incontinence and 50% had some sort of sexual dysfunction with no significant differences between the rupture groups.

Conclusion: None of the investigated risk factors increased the incidence of more severe grades of rupture. Ninety-one percent of women with OASR at their first delivery had some degree of fecal or urinary incontinence or sexual dysfunction five years after. The symptoms of fecal incontinence showed a tendency to be more severe in women with more advanced sphincter rupture.

Introduction

Obstetric anal sphincter rupture (OASR) is a serious complication to vaginal delivery with a reported frequency of 0.5–17.7% [1,2]. It is often considered an important risk factor for fecal incontinence (FI). Several obstetric risk factors have been correlated with an increased risk of both OASR and FI [1–5].

While the connection between OASR and FI is widely accepted [1–3,6], the relationship between OASR and urinary incontinence (UI) and sexual dysfunction (SD) is not so well explored. Up to date, only few studies have investigated the incidence of UI or SD after OASR with contradicting results [3,6–9].

The aims of this study were to assess risk factors for the different grades of OASR in women with an OASR at their first delivery and to evaluate the clinical outcome five years after OASR according to FI, UI and SD using validated questionnaires.

Materials and methods

From January 1st to December 31st 2009, a total of 3488 women gave birth to one or more children at the Department of Gynecology and Obstetrics, Aalborg University Hospital, Denmark. All cesarean sections were excluded (722/21%) resulting in 2766 vaginal deliveries. According to diagnostic codes, 124 women (4.5% of all vaginal deliveries) were identified as having obtained a third or fourth degree OASR. All the multiparous women were excluded (40) giving a total of 84 primiparous women with OASR (Fig. 1).

OASR was classified according to Royal College of Obstetricians and Gynaecologists' (RCOG) guidelines [10]. In our department however, grade 3b and 3c were combined and classified as a 3b, as done in most obstetric departments in Denmark.

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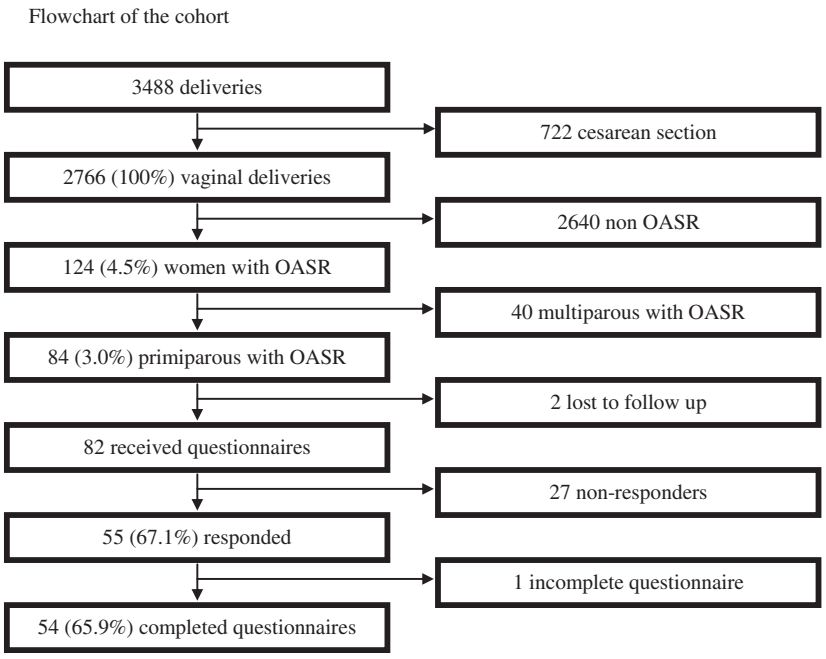

Fig. 1. Flowchart of the cohort.

According to hospital policy, all women suffering a third or fourth degree OASR undergo anal sphincteroplasty by a gynecologist or obstetrician immediately after the obstetric trauma. Primary repair was performed by either a junior doctor under supervision or a senior doctor. The external anal sphincter muscle is sutured using an end-to-end technique according to department policy. All case records were reviewed by a senior obstetrician to ensure that all patients were diagnosed correctly for this study.

Two of the women had moved abroad and no address could be found. Eighty-two women received three questionnaires by mail: The St. Mark's fecal incontinence score, The Danish anal sphincter rupture questionnaire (DASRQ) and a short supplemental questionnaire.

The St. Marks fecal incontinence score was published by Vaizey in 1999 [11], and is in some literature referred to as the Vaizey score [7]. With the St. Marks score, the patient rates how often they are incontinent for solid stool, liquid stool and gas, and alteration on lifestyle from never to daily. They also answer yes or no to wearing a pad or plug, using constipating medicines and whether they lack the ability to defer defecation for 15 min. The Danish version of the St. Marks questionnaire was translated into Danish but was not validated. The DASRQ was developed in 1996 and validated in 2008 [12]. It contains 33 questions for women who had an OASR; 1 regarding how they gave birth, 12 regarding FI, 10 regarding UI, 3 regarding pelvic floor exercises, 6 regarding their sexual life and 1 regarding whether or not they want or previously have sought treatment for their problems.

In the supplemental questionnaire, the women were asked whether they had received secondary surgery after the primary repair of their OASR. They were also asked about subsequent deliveries and new incidences of OASR.

Four weeks after sending out the questionnaires, a reminder was sent out to all non-responders.

Potential maternal, obstetric and fetal risk factors for OASR were recorded from the diagnostic codes, a review of hospital records and the supplemental questionnaire. The investigated risk factors were selected after previous studies had found them to be a risk factor for either OASR, FI, UI or SD [1–9]. Possible risk factors are seen in Table 1.

In this study, FI was defined as present if the women in question 6 in DASRQ: "Have you had problems holding back gas (farts) or feces after that delivery where you injured your anal sphincter muscle?" answered "yes, and I still have problems" or if they had a St. Marks score >0. This correlates with the RCOG guideline that defines anal incontinence as any involuntary loss of feces, flatus or urge incontinence that is adversely affecting a woman's quality of life [10].

UI was defined as present if the women in question 13 in DASQ: "Have you had any problems with urinary incontinence (leaking urine) after giving birth?" had answered "yes, and I still have problems".

Finally SD was defined as present if the women in question 26 in DASRQ: "Have you had intercourse after the delivery where you injured your anal sphincter muscle?" had answered "yes, I have tried having intercourse, but could not complete" or "no, I haven't yet tried to have intercourse", or in question 28 in DASRQ: "Do you have any problems in relation to having intercourse?" had answered "yes".

The data were analyzed using Wilcoxon rank sum test, Fisher's exact test and Kruskal–Wallis test. Results were considered statistically significant with p values <0.05.

The study was sent for approval at the regional Science Ethics Committee of the Northern Region.

Results

Fifty-four of the 82 women (66%) returned a completed questionnaire (responders). One woman declined participation and 27 women did not respond (non-responders). Apart from gestational age, there were no significant differences in the demographic and obstetric characteristics between the responders and non-responders (Table 1).

Of the 82 women who received a questionnaire, 41 women (50%) had an OASR 3a, while 26 women (32%) had an OASR 3b, and 15 women (18%) had an OASR 4. When comparing the risk factors for OASR between the three groups, there were no statistically

Table 1
Demographic and obstetric characteristics of the study population.

Characteristics	Responders ($n=54$)	Non-responders ($n=28$)	p
Age (median)	28	29	0.8985
BMI (median)			0.8487
<25	37 (69%)	16 (57%)	
25–29.9	13 (24%)	7 (25%)	
30≤	4 (7%)	5 (18%)	
Parity at follow-up			0.4442
Primiparous	14 (26%)	10 (36%)	
Multiparous	40 (74%)	18 (64%)	
Gestational age			0.0004
<40 weeks	9 (17%)	16 (57%)	
40–41 weeks	20 (37%)	7 (25%)	
>41 weeks	25 (46%)	5 (18%)	
Duration of second stage of labor			0.6106
≤60 min	34 (63%)	16 (57%)	
>60 min	20 (37%)	12 (43%)	
Mode of delivery[a]			0.6012
Sitting	30 (56%)	19 (68%)	
Semirecumbent	8 (15%)	5 (18%)	
Lateral recumbent	5 (9%)	3 (11%)	
Recumbent	5 (9%)	1 (4%)	
Other	4 (7%)	0 (0%)	
Fetal presentation			1.0000
Regular cephalic presentation	48 (89%)	26 (93%)	
Irregular presentation	3 (6%)	2 (7%)	
Birth weight			0.4200
≤4000 g	39 (72%)	23 (82%)	
>4000 g	15 (28%)	5 (18%)	
Gender			1.0000
Boy	36 (67%)	19 (68%)	
Girl	18 (33%)	9 (32%)	
Asphyxia			0.1910
No	28 (52%)	18 (64%)	
Yes	26 (48%)	10 (36%)	
Labor induction			0.6573
No	39 (72%)	22 (79%)	
Yes	15 (28%)	6 (21%)	
Use of oxytocin			0.2044
No	15 (28%)	11 (39%)	
Yes	39 (72%)	17 (61%)	
Vacuum extraction			0.1530
No	34 (63%)	21 (75%)	
Soft (low)	13 (24%)	7 (25%)	
Hard (high)	7 (13%)	0 (0%)	
Anesthesia			0.1232
No	42 (78%)	26 (93%)	
Epidural	12 (22%)	2 (7%)	
Episiotomy			1.0000
No	46 (85%)	24 (86%)	
Yes	8 (15%)	4 (14%)	
OASR degree			0.8654
3a	27 (50%)	14 (50%)	
3b	18 (33%)	8 (29%)	
4	9 (17%)	6 (21%)	

[a] Data missing on 2 women in the group of responders.

Table 2
Risk factors for different degrees of OASR.

Characteristics	OASR 3a ($n=41$)	OASR 3b ($n=26$)	OASR 4 ($n=15$)	p
Age	28	28.5	25	0.3217
BMI				0.8019
<25	26 (63%)	18 (69%)	9 (60%)	
25–29.9	8 (20%)	7 (27%)	5 (33%)	
30≤	7 (17%)	1 (4%)	1 (7%)	
Gestational age				0.5207
<40 weeks	11 (27%)	8 (31%)	6 (40%)	
40–41 weeks	13 (32%)	9 (35%)	5 (33%)	
>41 weeks	17 (41%)	9 (35%)	4 (27%)	
Duration of second stage of labor				0.4725
≤60 min	25 (61%)	14 (54%)	11 (73%)	
>60 min	16 (39%)	12 (46%)	4 (27%)	
Mode of delivery[a]				0.4140
Sitting	20 (49%)	17 (65%)	12 (80%)	
Semirecumbent	9 (22%)	3 (12%)	1 (7%)	
Lateral recumbent	6 (15%)	2 (8%)	0 (0%)	
Recumbent	2 (5%)	2 (8%)	2 (13%)	
Other	2 (5%)	2 (8%)	0 (0%)	
Fetal presentation				0.3233
Regular cephalic presentation	39 (95%)	22 (85%)	14 (93%)	
Irregular presentation	2 (5%)	3 (12%)	1 (7%)	
Birth weight				0.9433
≤4000 g	31 (76%)	19 (73%)	12 (80%)	
>4000 g	10 (24%)	7 (27%)	3 (20%)	
Gender				0.2099
Boy	25 (61%)	21 (81%)	9 (60%)	
Girl	16 (39%)	5 (19%)	6 (40%)	
Asphyxia				0.7309
No	21 (51%)	16 (62%)	9 (60%)	
Yes	20 (49%)	10 (38%)	6 (40%)	
Labor induction				0.1466
No	29 (71%)	21 (81%)	11 (73%)	
Yes	12 (29%)	5 (19%)	4 (27%)	
Use of oxytocin				0.3776
No	11 (27%)	8 (31%)	7 (47%)	
Yes	30 (73%)	18 (69%)	8 (53%)	
Vacuum extraction				0.9419
No	27 (66%)	18 (69%)	10 (67%)	
Soft (low)	11 (27%)	5 (19%)	4 (27%)	
Hard (high)	3 (7%)	3 (12%)	1 (7%)	
Anesthesia				0.7916
No	35 (85%)	21 (81%)	12 (80%)	
Epidural	6 (15%)	5 (19%)	3 (20%)	
Pudendal	0 (0%)	0 (0%)	0 (0%)	
Episiotomy				0.6525
No	34 (83%)	22 (85%)	14 (93%)	
Yes	7 (17%)	4 (15%)	1 (7%)	

[a] Data missing on 2 women in the OASR 3a group.

significant differences between the three groups in any of the investigated risk factors (Table 2).

Forty of the responders had subsequent deliveries, but none had a second OASR. Twelve of the subsequent deliveries were by caesarian section. No women had further surgery for OASR after their primary repair at the time of delivery. One woman had mid-urethral sling surgery for urinary incontinence.

Only five women (9%) did not have any complaints regarding fecal or urinary incontinence or sexual dysfunction. Of the 49 women (91%) with some sort of complaint, 14 women opted for treatment, and two women had previously sought treatment.

Forty women (74%) had some degree of FI, and in all three rupture groups, the majority of women had some degree of FI. When comparing the three rupture groups, using grade 3a group as reference, the relative risk for FI in the grade 3b group was 0.71 (95% CI: 0.45; 1.14) and in the grade 4 group 1.29 (95% CI: 1.05; 1.58) (Table 3).

The St. Marks score was divided into five groups, no FI (0), mild FI (1–6), severe FI (7–12), very severe FI (13–18) and worst FI (19–24). When comparing the St. Marks score of the three groups, although not significant, an OASR grade 4 gave more severe FI with a median St. Marks score of 3 compared to 1.5 in group 3b and 1 in group 3a (p-value 0.1683) (Table 4).

Twenty-four women (44%) had UI. When using 3a as the reference, the relative risk for UI in the 3b group was 1.50 (95% CI: 0.83; 2.71) while the relative risk for UI in the 4 degree group was 0.55 (95% CI: 0.15; 2.04) (Table 3).

Twenty-seven women (50%) had one or more complaints about their sexual function. All women had tried having intercourse. Again group 3a was used as reference giving a relative risk for SD in group 3b at 0.70 (95% CI: 0.36; 1.38) and a relative risk for SD in the 4 degree rupture group of 1.00 (95% CI: 0.51; 1.98).

Table 3
Association between OASR and FI, UI and SD.

	Yes	No	RR (95% CI)
Fecal incontinence			
3a	21	6	
3b	10	8	0.71 (0.45; 1.14)
4	9	0	1.29 (1.05; 1.58)
Urinary incontinence			
3a	11	16	
3b	11	7	1.50 (0.83; 2.71)
4	2	7	0.55 (0.15; 2.04)
Sexual dysfunction			
3a	15	12	
3b	7	11	0.70 (0.36; 1.38)
4	5	4	1.00 (0.51; 1.98)

Table 4
Association between OASR and St. Marks.

OASR							
St. Marks score	3a		3b		4		*p*
	n	%	*n*	%	*n*	%	
0	6	22	8	44	1	11	
1–6	18	67	7	39	4	44	
7–12	2	7	3	17	2	22	
13–18	1	4	0	0	2	22	
19–24	0	0	0	0	0	0	
Median score	1		1.5		3		0.1683

The only relative risk that was statistically significant was between OASR grade 3a and 4 concerning FI.

Comment

The only significant differences in the demographic and obstetric characteristics between the responders and non-responders were gestational age. This is most likely due to the small number of participants (Table 1).

In the present study, we found that 4.5% of all women giving birth suffered from some degree of OASR. This correlates well with earlier studies such as Handa et al. who found a frequency of anal sphincter laceration of 5.85% [13]. A Danish study [1] found a somewhat lower frequency of 0.5% but an American study [2] found a relatively higher frequency of 17.7%. The large difference in the incidence of OASR can be caused by several factors. Not all studies used the same OASR classification. In the Danish study, OASR was defined as a "complete anal sphincter rupture with or without involvement of the anal mucosa" leaving out all women with a partial rupture [1]. In our and most other studies [7,14], the RCOG classification was used and therefore partial sphincter rupture was included, giving a larger group of women with OASR.

No previous studies have investigated risk factors for different degrees of OASR. In this study regarding 14 different risk factors, we did not find an increased risk for a more severe OASR.

This study did not have a control group of women without OASR. The primary aim of the present study was to investigate the difference between the three most severe grades of OASR. Therefore the study was designed without a control group. Not having a control group however is a limitation of this study.

Gottvall et al. found that there was a greater risk of OASR giving birth sitting than in a recumbent, semirecumbent or lateral recumbent position [16]. Although not statistically significant, this study showed that the majority of women in the 4 degree group gave birth sitting compared to less than half in the 3a group indicating that the sitting position might affect the severity of the OASR. None of the women in the 4 degree group gave birth in a lateral recumbent position, while 15% of the women in group 3a used that mode of delivery indicating that it might have some protective effect on the degree of rupture. More studies concerning mode of delivery are needed in order to make conclusions concerning modes of delivery and degrees of OASR.

Our findings of 40 women (74%) with some degree of FI are higher than most previous studies where the prevalence has been reported up to 61% [7]. The relative high number of women with FI can be caused by the very broad definition of FI in this study. Laine et al. defined FI as being present with a St. Marks score of three or higher, without explaining the reason for this specific definition. No other studies have used a specific St. Marks score as a cut-off for having FI or not [17]. We used a score of one or more as a definition for FI.

Finally, the reason for the large percentage of women with FI in this study might be caused by the relatively small cohort. If all of the 28 non-responders were continent, our results would be more similar to that of earlier studies with just under half the women having FI. It is possible that women with problems concerning incontinence for flatus, feces and urine or some degree of sexual dysfunction are more prone to respond to a questionnaire. The small cohort could also be responsible for type two errors and the reason for not finding statistically significant results.

Although the women in group 3b did not have a higher incidence concerning FI than those in group 3a, the women in group 4 had a significantly higher frequency of FI. We did not find any factors that could explain the lower incidence of FI in group 3b. This correlates somewhat with the findings of de Leuw et al. where 21% of the women with a grade 3a rupture and 64% of the women with a grade 4 rupture have complaints about FI, but contrary to our findings they find that 31% of women with a grade 3b rupture have complaints about FI [16]. The two studies differ in cohort size, where de Leuw et al. have 125 women with OASR, more than twice the size of our cohort.

A previous study by Fenner et al. found that fourth degree ruptures affect anal incontinence to a greater degree than third degree ruptures in a cohort of 506 women [2]. The present study showed similar results with a higher median St. Marks score in rupture group 4, although not statistically significant, suggesting that a more severe OASR results in more severe FI.

No coherency was found in previous studies on OASR as a risk factor for UI [2,6,9,18]. Otero et al. found no difference in cases and controls 18 years after delivery regarding UI [9]. In our study, there was no correlation between a more severe OASR and a higher frequency of UI. The total of 24 women (44%) with UI correlates with previous findings from 19% to 60% [2,9].

With an incidence of 27 women (50%) having some degree of SD, the results correlates with previous findings where the incidence is reported from 38% to 59% [7,9]. There was no statistically significant difference in SD between the three groups and therefore no evidence that a higher degree of OASR causes more complaints concerning the women's sexual life. In contrary to these findings, Visscher et al. found that 75% of women with an OASR 3c had SD compared to 54% in the OASR 3a/3b group [7].

Borello-France et al. showed that women with OASR were twice as likely to report FI as women without OASR, but no difference concerning UI between the two groups. They also showed that cesarean delivery before labor did not entirely protect against FI and UI [19]. Mous et al. found similar results, showing that OASR is an important risk factor for both FI and SD [3].

Out of 54 responders, only 5 women did not have any complaints at all regarding FI, UI and SD, indicating that OASR might be a risk for long-term complications. With 14 women

wanting further treatment, and only two who previously had sought treatment, this study indicates that FI, UI and SD are delicate issues and women might not know that they can get help, or perhaps they are embarrassed to seek help. To our knowledge no previous studies have investigated why women do not seek treatment. Therefore, information given to the women after an OASR about possible complications and treatment options is of great importance.

In conclusion none of the investigated risk factors increased the incidence of more severe grades of rupture. More than 90% of primiparous women had some degree of fecal or urinary incontinence or sexual dysfunction five years after their OASR. The fecal incontinence was more severe in cases of more advanced sphincter rupture. This study did not find that more severe grades of OASR caused a higher frequency of UI or SD.

Conflict of interest

The authors report no conflicts of interest.

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