

## OBSTETRICS

# Recurrent obstetric anal sphincter injury and the risk of long-term anal incontinence



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**BACKGROUND:** Women with an obstetric anal sphincter injury are concerned about the risk of recurrent obstetric anal sphincter injury in their second pregnancy. Existing studies have failed to clarify whether the recurrence of obstetric anal sphincter injury affects the risk of anal and fecal incontinence at long-term follow-up.

**OBJECTIVE:** The objective of the study was to evaluate whether recurrent obstetric anal sphincter injury influenced the risk of anal and fecal incontinence more than 5 years after the second vaginal delivery.

**STUDY DESIGN:** We performed a secondary analysis of data from a postal questionnaire study in women with obstetric anal sphincter injury in the first delivery and 1 subsequent vaginal delivery. The questionnaire was sent to all Danish women who fulfilled inclusion criteria and had 2 vaginal deliveries 1997–2005. We performed uni- and multivariable analyses to assess how recurrent obstetric anal sphincter injury affects the risk of anal incontinence.

**RESULTS:** In 1490 women with a second vaginal delivery after a first delivery with obstetric anal sphincter injury, 106 had a recurrent obstetric anal sphincter injury. Of these, 50.0% ( $n = 53$ ) reported anal incontinence compared with 37.9% ( $n = 525$ ) of women without recurrent obstetric anal sphincter injury. Fecal incontinence was present in 23.6% ( $n = 25$ ) of women with recurrent obstetric anal sphincter injury and in 13.2% ( $n = 182$ ) of women without recurrent

obstetric anal sphincter injury. After adjustment for third- or fourth-degree obstetric anal sphincter injury in the first delivery, maternal age at answering the questionnaire, birthweight of the first and second child, years since first and second delivery, and whether anal incontinence was present before the second pregnancy, the risk of flatal and fecal incontinence was still increased in patients with recurrent obstetric anal sphincter injury (adjusted odds ratio, 1.68 [95% confidence interval, 1.05–2.70],  $P = .03$ , and adjusted odds ratio, 1.98 [95% confidence interval, 1.13–3.47],  $P = .02$ , respectively). More women with recurrent obstetric anal sphincter injury reported affected the quality of life because of anal incontinence (34.9%,  $n = 37$ ) compared with women without recurrent obstetric anal sphincter injury (24.2%,  $n = 335$ ), although this difference did not reach statistical significance after adjustment (adjusted odds ratio, 1.53 [95% confidence interval, 0.92–2.56]  $P = .10$ ).

**CONCLUSION:** Women opting for vaginal delivery after obstetric anal sphincter injury should be informed about the risk of recurrence, which is associated with an increased risk of long-term flatal and fecal incontinence.

**Key words:** anal incontinence, fecal incontinence, fecal urgency, obstetric anal sphincter injury, recurrent anal sphincter injury

Obstetric anal sphincter injury (OASIS) is a potential complication of vaginal delivery.<sup>1</sup> After an OASIS, a major concern is anal incontinence (AI). This is defined as involuntary loss of feces or flatus.<sup>2</sup> Of those with OASIS, as many as 50% experience AI long term.<sup>3,4</sup>

In subsequent pregnancies, women with OASIS are anxious about the risk of AI and the risk of further damage to the anal sphincter (ie a recurrent OASIS). Some studies have found that the risk of AI increases after a subsequent vaginal delivery.<sup>3,5-7</sup>

We have previously found that mode of delivery after an OASIS did not influence the risk of long-term AI after adjustment for relevant maternal and obstetric characteristics.<sup>8</sup> Nonetheless, in unadjusted analyses, we found that women with subsequent vaginal delivery had a higher increase in the risk of AI compared with women with a subsequent cesarean delivery.<sup>8</sup> Furthermore, the risk of OASIS in the second delivery is markedly increased when compared with women without OASIS in the first delivery.<sup>9</sup>

One study found that recurrent OASIS did not increase the risk or severity of AI; however, the study was too small to provide sufficient power to find a significant difference.<sup>10</sup> Most studies reporting on the risk of long-term AI after a delivery with OASIS are too small to assess the risk of long-term AI after the recurrence of OASIS.<sup>3,4,11</sup>

The aim of the present study was to determine the risk of long-term anal and fecal incontinence after recurrent OASIS compared with a single occurrence of OASIS in women with 2 vaginal deliveries.

## Materials and Methods

We performed a secondary analysis based on a questionnaire study, previously described in detail<sup>8</sup> and briefly described as follows.

The questionnaire was based on the previously validated questionnaire by Due and Ottesen.<sup>12</sup> The questionnaire included questions regarding AI and related symptoms. Some questions were simplified based on the validation process with interviews and test-retest.<sup>8</sup> The questionnaire consisted of 20 questions regarding AI.

All women in Denmark with 2 consecutive deliveries (January 1, 1997, to December 31, 2005), in which the

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first delivery was complicated by OASIS, were sent the postal questionnaire. A reminder was sent to non-respondents 1 month later. Questionnaires were sent between Sept. 15, 2010, and May 31, 2011.

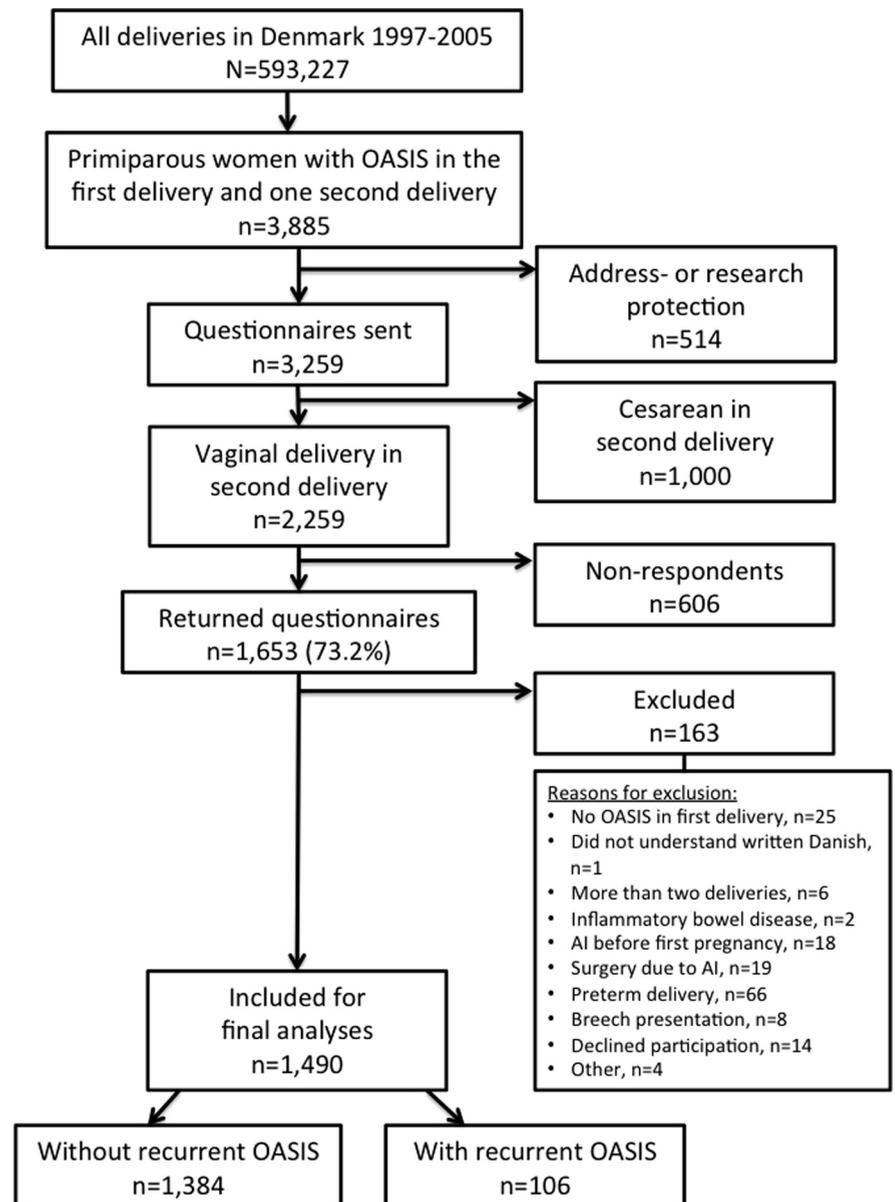
The Danish National Board of Health approved the study (J.nr. 7-505-29-1562) and all participants provided a written informed consent. Exclusion criteria were nonsingleton pregnancies, more than 2 deliveries, cesarean in the second delivery, breech delivery, anal incontinence prior to the first delivery, inflammatory bowel disease, surgery because of AI, and insufficient understanding of written Danish.

The main outcomes were AI and fecal incontinence (FI), defined as involuntary leakage of solid or liquid feces,<sup>2</sup> long term. Long term was defined as at least 5 years since the second delivery, after a first delivery with OASIS. This cutoff was chosen because prevalence of AI previously has been shown to be consistent from 5 to 10 years after delivery.<sup>13</sup>

AI was defined as a positive answer to the question, "Do you experience involuntary leakage of flatus and/or liquid or solid stool?" (yes/no). FI was defined by 2 questions; "do you experience involuntary leakage of liquid stool?" and "do you experience involuntary leakage of solid stool?" FI was defined as a positive answer to 1 or both of these questions. Secondary outcomes were answers to the other AI-related questions; fecal urgency (defined as an inability to defer defecation for 15 minutes), difficulty to wipe clean after defecation, ability to differentiate between gas and stool in the rectum, anal pain during or after defecation, and FI without noticing until afterward.

We also assessed whether the AI-related symptoms affected their quality of life ("does your flatal and/or fecal incontinence affect your quality of life?"; answers were dichotomized into 2 groups; yes, a lot, and yes, some were merged into yes, and not at all was kept as a negative answer, no).

**FIGURE 1**  
Selection of participants included for analysis



AI, anal incontinence; OASIS, obstetric anal sphincter injury.

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## Statistics

Data are presented as medians (interquartile range) or numbers (percentage). Differences between groups were evaluated using the Mann-Whitney test or the Fisher exact test as appropriate. We performed univariable and multivariable logistic regression analyses to quantify differences in the odds of long-term AI, FI, or the

secondary outcomes after recurrent OASIS. The multivariable analyses were adjusted for the degree of OASIS in the first delivery (grade 3 or grade 4 OASIS), maternal age at answering the questionnaire, birthweight of the first and second child, years since the first and second delivery, and whether AI before the second pregnancy was present. For the various outcomes, we

**TABLE 1**  
**Characteristics of women and their 2 vaginal deliveries by recurrence of OASIS<sup>a</sup>**

Variables	Missing	No recurrent OASIS (n = 1384)	Recurrent OASIS (n = 106)	Pvalue <sup>b</sup>
Age when answering questionnaire, y	0	40.4 (37.8–42.9)	40.0 (37.4–42.3)	.43
Time since OASIS in first delivery, y	0	11.8 (10.3–13.3)	11.4 (10.2–13.2)	.19
Time since second delivery, y	0	8.7 (7.3–10.3)	8.0 (6.7–9.5)	.001
Delivery interval	0	2.8 (2.2–3.4)	2.9 (2.4–4.1)	.005
Variables regarding first delivery				
Maternal age, y	0	28.6 (26.4–30.8)	28.8 (26.4–30.5)	.93
Birthweight, g	8	3740 (3440–4025)	3685 (3395–3965)	.11
Gestational age, d	0	284 (279–290)	283 (278–289)	.03
Head circumference, cm	33	36 (35–37)	36 (35–37)	.45
Length, cm	11	53 (52–54)	53 (51–54)	.40
Type of OASIS				
Third-degree OASIS	0	1296 (92.2)	93 (87.7)	.14 <sup>c</sup>
Fourth-degree OASIS		108 (7.8)	13 (12.3)	
Vacuum extraction	0	481 (34.8)	51 (48.1)	.008 <sup>c</sup>
Forceps	0	6 (0.4)	1 (0.9)	.40 <sup>c</sup>
Induction of labor	0	93 (6.7)	12 (11.3)	.08 <sup>c</sup>
Mediolateral episiotomy	0	322 (23.3)	25 (23.6)	.91 <sup>c</sup>
Occiput posterior	50	48 (3.5)	3 (2.8)	1.0 <sup>c</sup>
Oxytocin augmentation	0	203 (14.7)	23 (21.7)	.07 <sup>c</sup>
Shoulder dystocia	0	25 (1.8)	1 (0.9)	1.0 <sup>c</sup>
Variables regarding second delivery				
Maternal age, y	0	31.5 (29.3–33.8)	31.7 (30.0–34.1)	.37
Birthweight, g	3	3750 (3460–4060)	3918 (3592–4208)	.003
Gestational age,	0	282 (277–287)	283 (278–287)	.82
Head circumference, cm	20	36 (35–37)	36 (35–37)	.91
Length, cm	11	53 (51–54)	54 (52–55)	.01
Vacuum extraction	0	46 (3.3)	8 (7.5)	.05 <sup>c</sup>
Forceps	0	0	0	—
Induction of labor	0	133 (9.6)	10 (9.4)	1.0 <sup>c</sup>
Mediolateral episiotomy	0	183 (13.2)	8 (7.5)	.10 <sup>c</sup>
Occiput posterior	39	37 (2.7)	6 (5.7)	.12 <sup>c</sup>
Oxytocin augmentation	0	99 (7.2)	17 (16.0)	.004 <sup>c</sup>
Shoulder dystocia	0	12 (0.9)	4 (3.8)	.02 <sup>c</sup>

OASIS, obstetric anal sphincter injury.

<sup>a</sup> Data are presented as medians (interquartile range) or numbers (percentage); <sup>b</sup> Mann-Whitney test; <sup>c</sup> Fisher exact test.Jangö et al. Anal incontinence after recurrent OASIS. *Am J Obstet Gynecol* 2017.

tested for interactions between recurrent OASIS and AI before the second pregnancy.

Uni- and multivariable analyses were also performed to evaluate possible

explanatory variables for recurrent OASIS. The multivariable analyses were adjusted for the following variables: birthweight of the first and second child, vacuum extraction in the

first and second delivery, delivery interval, and grade of OASIS in the first delivery.

Values of  $P < .05$  were considered statistically significant. All statistical

**TABLE 2**  
**Questionnaire answers among women with and without recurrent OASIS<sup>a</sup>**

Outcome	Missing	No recurrent OASIS (n = 1384)	Recurrent OASIS (n = 106)	Pvalue <sup>b</sup>
<b>Symptoms before second pregnancy</b>				
AI	18	395 (28.5)	37 (34.9)	.18
<b>Type of AI</b>				
Flatus incontinence		256 (18.5)	26 (24.5)	
Liquid stool	25	107 (7.7)	7 (6.6)	.18
Solid stool		25 (1.8)	4 (3.8)	
<b>Duration of AI before second pregnancy</b>				
Transient	24	264 (19.1)	25 (23.6)	.38
Persistent		126 (9.1)	11 (10.4)	
Duration of transient flatus incontinence before second pregnancy, mo	10	6 (3–10)	6 (4–11)	.66 <sup>c</sup>
Duration of transient FI before second pregnancy, mo	2	4 (1–7)	4 (3–8)	.68 <sup>c</sup>
<b>Symptoms long term</b>				
AI	9	525 (37.9)	53 (50.0)	.02
FI	4	182 (13.2)	25 (23.6)	.005
Flatus incontinence	6	500 (36.1)	53 (50.0)	.006
Incontinence of liquid stool	4	165 (11.9)	24 (22.6)	.004
Incontinence of solid stool	4	62 (4.5)	8 (7.5)	.15
FI without noticing until later	14	45 (3.3)	9 (8.5)	.01
Fecal urgency <15 min	13	368 (26.6)	44 (41.5)	.002
Difficulties wiping clean after defecation	23	493 (35.6)	41 (38.7)	.60
Inability to differentiate between gas or stool in the rectum	18	139 (10.0)	14 (13.2)	.24
Anal pain during or after defecation	16	236 (17.1)	10 (9.4)	.04
Affected quality of life because of AI	5	335 (24.2)	37 (34.9)	.02

AI, anal incontinence; FI, fecal incontinence; OASIS, obstetric anal sphincter injury.

<sup>a</sup> Data are presented as medians (range) or numbers (percentage); <sup>b</sup> Fisher exact test; <sup>c</sup> Mann-Whitney test.

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analyses were performed using the statistical software R.<sup>14</sup>

## Results

In total, 1653 women with a second vaginal delivery after OASIS in the first delivery returned the questionnaire (response rate, 73.2%) (Figure). The response rate was higher in women with recurrent OASIS (81.8%) compared with women without recurrent OASIS (72.6%) ( $P = .02$ ). Similarly, respondents were more likely to have had recurrent OASIS (7.3%,  $n = 121$ ) than the nonrespondents (4.5%,  $n = 27$ )

( $P = .02$ ). After exclusion of participants who fulfilled the exclusion criteria, 1490 women remained for the final analyses. Of these, 7.1% ( $n = 106$ ) had a recurrent OASIS; 94 (88.7%) had a third-degree recurrent OASIS and 12 (11.3%) had a fourth-degree recurrent OASIS.

Characteristics of women and the 2 deliveries in those with and without recurrent OASIS are presented in Table 1. Women with recurrent OASIS had a slightly longer delivery interval and a slightly shorter time since the second delivery than those with no recurrent OASIS (Table 1). They were also more

likely to have vacuum-assisted delivery in the first delivery, and the birthweight of their second child was increased compared with women without recurrent OASIS (Table 1). However, the rate of fourth-degree OASIS in the first delivery was not significantly different between those with recurrent OASIS (12.3% [ $n = 13$ ]) and those without recurrent OASIS (7.8% [ $n = 108$ ];  $P = .14$ ).

Results of the questionnaire are shown in Table 2, and the uni- and multivariable analyses of primary and secondary outcomes are displayed in Table 3. In

TABLE 3

Crude and adjusted odds ratios from uni- and multivariable analyses showing the effect of recurrent OASIS (n = 106) vs no recurrent OASIS (n = 1490 [total])

Long-term outcome	Univariable analyses			Multivariable analyses <sup>a</sup>		
	cOR	95% CI	Pvalue	aOR	95% CI	Pvalue
AI	1.65	1.11–2.46	.010	1.59	0.98–2.59	.06
FI	2.03	1.26–3.27	.003	1.98	1.13–3.47	.02
Incontinence of flatus	1.76	1.18–2.61	.005	1.68	1.05–2.70	.03
Incontinence of liquid stool	2.16	1.33–3.49	.002	2.09	1.19–3.69	.01
Incontinence of solid stool	1.74	0.81–3.73	.16	1.54	0.69–3.53	.31
FI without noticing until later	2.76	1.31–5.82	.008	2.80	1.18–6.61	.02
Fecal urgency <15 minutes	1.93	1.29–2.90	.001	1.86	1.20–2.88	.006
Difficulties wiping clean after defecation	1.13	0.75–1.70	.56	1.09	0.71–1.68	.70
Inability to differentiate between gas or feces in the rectum	1.41	0.78–2.54	.26	1.37	0.72–2.56	.35
Anal pain during or after defecation	0.50	0.26–0.97	.04	0.44	0.22–0.86	.02
Affected quality of life because of AI	1.67	1.10–2.54	.02	1.53	0.92–2.56	.10

AI, anal incontinence; aOR, adjusted odds ratio; cOR, crude odds ratio; FI, fecal incontinence; OASIS, obstetric anal sphincter injury.

<sup>a</sup> The multivariable analyses were adjusted for degree of OASIS in the first delivery (grade 3 or 4), maternal age at answering the questionnaire, birthweight of the first and second child, years since the first and second delivery, and whether AI was present between the 2 deliveries (no/yes).

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women with recurrent OASIS, long-term AI was present in 50.0% (n = 53) compared with 37.9% (n = 525) of women without recurrent OASIS (P = .02). FI was present in 23.6% (n = 25) of women with recurrent OASIS and in 13.2% (n = 182) of women without recurrent OASIS (P = .05).

After adjustment for the degree of OASIS in the first delivery, maternal age at answering the questionnaire, birthweight of the first and second child, years since the first and second delivery, and whether AI before the second pregnancy was present, women with recurrent OASIS had an increased risk of flatus incontinence and FI (adjusted odds ratio [aOR], 1.68 [95% confidence interval [CI], 1.05–2.70], P = .03, and aOR, 1.98 [95% CI, 1.13–3.47], P = .03, respectively).

The risk of fecal urgency was also significantly higher in women with recurrent OASIS (41.5%, n = 44) compared with women without recurrent OASIS (26.6%, n = 368) (P = .002) (aOR, 1.86 [95% CI, 1.20–2.88], P = .006). Furthermore, a higher proportion of women with recurrent OASIS reported affected quality of life because

of AI (34.9%, n = 37) compared with women without recurrent OASIS (24.2%, n = 335) (P = .02), although this difference did not reach statistical significance after adjustment (aOR, 1.53 [95% CI, 0.92–2.56] P = .10).

We found a significant interaction only between recurrent OASIS and AI before the second pregnancy for fecal urgency (P = .04). Recurrent OASIS was associated with an increased risk of fecal urgency in women without AI before the second pregnancy (aOR, 2.58 [95% CI, 1.52–4.37], P < .001) but not in women with AI prior to the second pregnancy (aOR, 1.05 [95% CI, 0.53–2.11], P = .88).

When analyzing the effect of AI before the second pregnancy on the primary and secondary outcomes, this was associated with all the outcomes with highly significant P values (Supplemental Table).

Risk factors for recurrent OASIS in this population (Table 4) were vacuum extraction in first delivery (aOR, 1.82 [95% CI, 1.21–2.76], P = .005), birthweight of the second child (aOR, 2.89 per kilogram [95% CI, 1.78–4.69], P < .001) and delivery interval (aOR, 1.31 per year [95% CI, 1.11–1.56], P = .002).

However, a high birthweight of the first child seemed to be protective against recurrent OASIS in the adjusted analyses (aOR, 0.39 per kilogram [95% CI, 0.23–0.65], P < .001).

## Comment

This population-based questionnaire study found that recurrent OASIS was associated with an increased risk of flatal and fecal incontinence compared with women without recurrent OASIS. Also, recurrent OASIS was associated with an increased risk of fecal urgency.

Several studies have investigated whether a second vaginal delivery after a delivery with OASIS affects the risk of AI. Some of these have found that the risk of AI is increased after a second vaginal delivery,<sup>3,5-7,15</sup> but the studies are too small to assess the risk of recurrent OASIS.

One study by Sze<sup>10</sup> comprised 39 women with recurrent OASIS who were compared with an inhomogeneous group of women who had none, 1, or several subsequent vaginal deliveries. The author found that recurrent OASIS did not increase the risk of AI at long term but concluded that the study

**TABLE 4**  
**Risk factors of recurrent OASIS**

Explanatory variables	Univariable analyses			Multivariable analyses <sup>a</sup>		
	cOR	95% CI	Pvalue	aOR	95% CI	Pvalue
Birthweight of first child, per kg	1.00	1.00–1.00	.090	0.39	0.23–0.65	< .001
Vacuum extraction first delivery	1.74	1.17–2.59	.006	1.82	1.20–2.76	.005
Type of OASIS in first delivery						
Third degree	1.00			1.00		
Fourth degree	1.65	0.89–3.05	.110	1.72	0.90–3.28	.100
Birthweight of second child, per kg	1.00	1.00–1.00	.002	2.89	1.78–4.69	< .001
Vacuum extraction second delivery	2.43	1.11–5.30	.003	1.53	0.67–3.47	.310
Delivery interval, per y	1.31	1.11–1.54	.001	1.31	1.11–1.56	.002

aOR, adjusted odds ratio; cOR, crude odds ratio; OASIS, obstetric anal sphincter injury.

<sup>a</sup> The multivariable analyses were adjusted for all the other variables listed as explanatory factors in the table.

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was too small to find a significant difference.<sup>10</sup>

Also, a recent study of 11 patients with recurrent OASIS found that their risk of short-term AI was low, with none developing FI, and only 2 developed flatal incontinence that resolved with physiotherapy.<sup>16</sup> Another recent study of 20 patients with recurrent OASIS found no increased risk of AI at short-term follow-up.<sup>17</sup> Furthermore, a case-control study found no significant difference in AI when comparing 20 women with recurrent OASIS with 27 women with vaginal delivery without recurrent OASIS.<sup>18</sup> The authors concluded that the statistical power was limited because of the low number of participants in each group.<sup>18</sup>

The present study provides important new information to an area of limited evidence based on previous studies. Our study alone encompassed more women with recurrent OASIS than all of the previously published studies<sup>10,16–18</sup> combined. It seems reasonable to conclude that further damage to the anal sphincter at a recurrent OASIS could affect symptoms. Furthermore, our control group greatly outnumbered those previously used, and the controls were appropriately selected, thanks to validated national registers. However, we lack similar long-term follow-up for a large group of women with 2 vaginal

deliveries without OASIS, which would allow comparisons to better understand the effects of OASIS on the risk of AI.

There are some important limitations to our study. The study was not primarily designed to evaluate the risk of AI in women with recurrent OASIS, and thus, no sample size calculation on this subgroup analysis was performed. Risk factors of recurrent OASIS were evaluated; however, these have previously been assessed in the Danish population<sup>19</sup> and are not discussed further herein. Furthermore, we did not have prospectively gathered information on whether AI was present at short-term follow-up. We did not have information on whether the women had any conservative treatment (for example, pelvic floor muscle training), nor did we have information regarding medication that could affect their bowel function.

The Danish obstetric guideline on OASIS recommends that patients with persistent or transient AI/FI after an OASIS should be offered an elective caesarean delivery in the second delivery. We found that a considerable proportion of the women reported AI before the onset of the second pregnancy, and despite this possibility, they opted for a vaginal delivery. AI before the second pregnancy was reported several years after the second delivery, and thus, recall bias can be present for this variable.

The proportion of women reporting AI before the second pregnancy was equal in both groups (women with and without recurrent OASIS), and the type of AI before the second pregnancy in the 2 groups was also similar. Thus, the groups seemed comparable. Corresponding to our previous findings, AI before the second pregnancy highly influenced the long-term outcomes.<sup>8</sup>

We have previously shown that patients with OASIS in the first delivery have an increased risk of OASIS in the second delivery.<sup>19</sup> A recent review found that forceps and vacuum extraction are modifiable risk factors of recurrent OASIS.<sup>9</sup> In the present study, a minority of the women had vacuum-assisted delivery, and none had a forceps delivery in the second delivery. Furthermore, the review found that women with a fourth-degree OASIS in the first delivery are at an increased risk of recurrent OASIS.<sup>9</sup> In this study only 12.3% of women with a recurrent OASIS had a fourth-degree OASIS in the first delivery, which was comparable with those without recurrent OASIS ( $P = .14$ ). Thus, it is difficult to differentiate between those with and without a risk of recurrent OASIS based on our current knowledge on modifiable risk factors.

In conclusion, the evidence on the risk of AI after recurrent OASIS is limited and most studies in this field are small. This is the largest study to date, and until further large studies can reveal additional knowledge, our findings indicate that women opting for vaginal delivery should be informed that a recurrent OASIS seems to increase the risk of AI-related symptoms at long term. The increased risk of flatal and fecal incontinence should be weighed against the potential maternal and fetal risks at elective cesarean delivery. ■

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## SUPPLEMENTAL TABLE

**Multivariable analyses with adjusted odds ratio showing the effect of AI before second pregnancy (n = 432) vs no AI before second pregnancy (n = 1472 total)**

Long-term outcome	Multivariable analyses <sup>a</sup>		
	aOR	95% CI	Pvalue
AI	15.7	11.8–20.9	< .001
FI	10.2	7.2–14.4	< .001
Incontinence of flatus	12.1	9.2–15.9	< .001
Incontinence of liquid stool	10.1	7.0–14.6	< .001
Incontinence of solid stool	9.6	5.4–17.0	< .001
Affected quality of life because of AI	11.9	9.0–15.7	< .001
Fecal urgency <15 min	3.6	2.8–4.6	< .001
Inability to differentiate between gas or feces in the rectum	2.6	1.8–3.6	< .001
FI without noticing until later	7.4	3.9–14.2	< .001
Difficulties wiping clean after defecation	2.4	1.9–3.1	< .001
Anal pain during or after defecation	1.9	1.4–2.5	< .001

AI, anal incontinence; aOR, adjusted odds ratio; CI, confidence interval; FI, fecal incontinence; OASIS, obstetric anal sphincter injury.

<sup>a</sup> The multivariable analyses were adjusted for degree of OASIS in the first delivery (grade 3 or 4), recurrent OASIS, maternal age at answering the questionnaire, birthweight of the first and second child and years since the first and second delivery.

Jangö et al. Anal incontinence after recurrent OASIS. *Am J Obstet Gynecol* 2017.