

# Irritable bowel syndrome worsens faecal incontinence after primary repair of major obstetric anal sphincter injuries (OASIS): a prospective cohort study

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December 6, 2022

## Abstract

**Objective:** Obstetric anal sphincter injuries (OASIS) occur in approximately 3-6% of vaginal deliveries and are the leading risk factor for late onset faecal incontinence. We aimed to assess the effect of irritable bowel syndrome (IBS) on severity of faecal incontinence after immediate primary repair of major OASIS (Grade IIIb-IV). **Design:** Prospective cohort study **Setting:** Zaans Medisch Centrum, Zaandam, The Netherlands **Population:** Women who underwent a primary repair of major OASIS over a 2-year period (Group A), a control group consisting of primigravid women (Group B), and another control group who underwent elective Caesarean section (Group C). **Methods:** Participants were assessed with ultrasonography within 12 weeks, then a follow-up questionnaire after at least 12 months. **Main outcome:** Wexner faecal incontinence scores and presence of IBS based on Rome IV criteria. **Results:** There were 211 total patients included, and mean follow-up time was 26 months after sphincter repair. Ultrasonographic sphincter defects were detected in 37% but did not affect faecal incontinence score ( $p=0.16$ ). Patients with IBS had significantly worse faecal incontinence ( $p<0.001$ ), and interestingly in women with OASIS those without IBS had comparable symptoms to the control groups. Inability to defer defaecation for 15 minutes was also associated with worse faecal incontinence ( $p=0.003$ ). **Conclusion:** After OASIS repair faecal incontinence was significantly worsened by the presence of IBS, or in women with an inability to defer defaecation. Presence of ultrasonographic sphincter defects did not correlate to a clinical difference in faecal incontinence scores. **Funding:** Nil. **Keywords:** OASIS, sphincter, irritable bowel syndrome, incontinence

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**Shortened running title:** IBS worsens faecal incontinence after primary repair of OASIS

**Conflict of Interest:** None to declare

**Contribution to authorship:** All co-authors were involved in the planning, carrying, analysing, and writing of this manuscript and accept responsibility for this study

### ABSTRACT

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### FUNDING

Nil

### INTRODUCTION

Obstetric anal sphincter injuries (OASIS) occur in approximately 3-6% of vaginal deliveries and are considered a significant risk factor for late onset faecal incontinence. [1] Continence is a complex multi-factorial mechanism which relies crucially on intact anal sphincters, as well as rectal compliance, rectal sensation, stool consistency and neural coordination. Primiparity, large birth weight, instrumental deliveries, parietal or vertex presentation, and a prolonged second stage of labour (which may lead to denervation of the pelvic floor) are obstetric factors which increase the risk of a sphincter injury, graded as third or fourth degree perineal tears in the widely accepted standardised classification. [2-4]

Late post-partum faecal incontinence is an underdiagnosed pathology which affects almost one in three women following OASIS and dramatically reduces quality of life. [5] Impaired sphincter and neurological function after OASIS repair is a likely contributor, in combination with a diminishing trophic effect of oestrogen on pelvic floor function as patients age and menopause approaches. In recent years, irritable bowel syndrome (IBS) which affects 10-15% of the population has been shown to double the risk of faecal incontinence after OASIS in the early post-partum period. [6, 7] In this population however, it is not known how repair of OASIS, remaining sphincter defects and IBS interact.

The aim of this study therefore is to investigate the effect of IBS on severity of faecal incontinence symptoms after primary repair of OASIS.

## METHODS

All patients with major OASIS (defined as Grade IIIb, IIIc or IV by the Sultan classification [4]) in a single birthing unit over a two year period underwent endoanal ultrasonography (B&K, Denmark) at 6-12 weeks post-surgical repair (Group A). Surgical repair was performed by a specialist consultant under anaesthesia (general or spinal) using an overlapping technique if possible, otherwise an approximation technique was used. Any ultrasonographic gap or discontinuity for any vertical length, or horizontal width, in the anal sphincters was scored as a defect. The defect was scored separately for internal anal sphincter (IAS) or external anal sphincter (EAS). The endosonographic assessment was blinded to the ultimate faecal incontinence scores obtained at a later date.

At 1-3 years after the obstetric event these patients were sent a questionnaire designed to allow extraction and calculation of the Wexner faecal incontinence score (Figure 1). We defined Wexner score of [?] 9 as significantly affecting quality of life. [8] The Vaizey score was not used because of the integral use of ability to defer defaecation in this score, which would introduce considerable overlap with the presence of IBS complaints. However, the ability to defer defaecation longer than 15 minutes was included as an item in our questionnaire. The questionnaire also allowed us to calculate the presence and type of IBS based on the Rome IV criteria (Figure 2). Other variables that were collected were age, parity and mode of delivery, body mass index (BMI).

Two control groups were included, and these were aimed to be of equal size to Group A. The first control group consisted of primigravid women (Group B) who filled out a questionnaire at their first consultation of a midwife or obstetrician in the first trimester of their pregnancy. The second control group were women who underwent an elective Caesarean section (Group C) who filled out a questionnaire at a minimum of 12 months post-partum. Exclusion criteria were previous anal surgery, previous obstetric sphincter injury, inflammatory bowel disease and coeliac disease.

Statistical analysis was done with SPSS version 24 (IBM, USA). For comparison of binary variables Chi square test was used, for intra-group comparison of mean (SD) Wexner scores a t-test was used and for inter-group comparison of mean (SD) Wexner scores ANOVA was used. Format of data presentation was deliberately chosen to suit subsequent clinical usefulness. The study protocol obtained ethical approval from the local health district.

## RESULTS

A total of 82 women had surgical repair of major OASIS. Of these, 73 women (89%) returned the questionnaire at a mean 26 months post sphincter repair and these women formed Group A. Groups B and C consisted of 55 and 83 patients respectively recruited during the same period. Patient characteristics are presented in Table 1. Of note, patients in Group C were significantly younger than those in Groups A and B. The overall prevalence of IBS in our cohort was 12.8%

The inability to defer defecation for more than 15 minutes occurred more commonly in Group A patients (46.6%) versus Group B (21.8%) and Group C (27.7%) and this was statistically significant ( $p=0.009$ ).

In Group A, 46 patients (63%) had no residual sphincter defect, 10 patients (13.7%) had an isolated internal

anal sphincter (IAS) defect, 5 patients (6.9%) had an isolated external anal sphincter defect (EAS), and 12 patients (16.4%) had a defect in both IAS and EAS. There was no significant difference in Wexner score in relation to localisation or combination of sphincter defects and there was no difference in Wexner score between those patients that had any sphincter defect versus those that did not (Table 2). Group A patients had significantly higher mean Wexner scores than Group B and C patients. Perfect continence (Wexner score 0) was significantly less present in Group A (21.9%) patients compared with Group B (50.9%) and Group C (45.8%) (Table 3). There was no difference between Groups in number of patients with Wexner scores of 9 and above.

When the presence of IBS was taken into account, Wexner scores were significantly higher in patients with IBS and this was observed separately in all three patient groups. Inter-group comparison showed that when IBS was present, Group A patients had significantly higher Wexner scores than Group B and C patients. Interestingly when IBS was absent there was no significant difference between Wexner scores in inter-group comparison of all three groups (Table 4).

Wexner scores were also found to be significantly higher on intra-group comparison in all three groups based on those that could not defer defaecation longer than 15 minutes (Table 5). Inter-group comparison showed that Group A patients maintained significantly higher Wexner irrespective of whether they were able to defer defaecation for 15 minutes. Furthermore, the inability to defer defaecation for more than 15 minutes was not significantly related to an isolated IAS defect (7/34 vs 5/39,  $p=0.37$ ), isolated EAS defect (1/34 vs 4/39,  $p=0.22$ ), both IAS and EAS defect (8/34 vs 2/39,  $p=0.79$ ) or any sphincter defect (14/34 vs 13/39,  $p=0.49$ ).

For the total group, IBS presence in combination with inability to defer defaecation for 15 minutes was associated with the highest Wexner score (Table 6). Backwards stepwise linear regression including the following variables: age, IAS and or EAS ultrasonographic sphincter defect (isolated or in combination), parity, presence of IBS, inability to defer defaecation more than 15 minutes and BMI was performed. In the final model (adjusted R-square .241,  $F=7.68$ ,  $p=0.002$ ) presence of IBS (Beta=3.48,  $p=0.002$ ) and inability to defer defaecation for more than 15 minutes (Beta=2.17,  $p=0.044$ ) were the significant independent factors predicting increasing Wexner scores in Group A patients.

## DISCUSSION

IBS is chronic functional gastrointestinal tract disorder which causes abdominal pain and alteration to bowel habit in 10-15% of the population, which is in keeping with the results of our study. There is also a greater preponderance toward women, with some estimates suggesting more than half are without a formal diagnosis. [9] Our findings demonstrate that patients with IBS have significantly worse faecal incontinence after primary OASIS repair. Women without IBS did not show significant difference in faecal incontinence after primary OASIS repair compared to controls. Uniquely we have also shown that the presence of IBS in post caesarean section in primigravid patients – in whom there were no sphincter injuries – also demonstrated higher faecal incontinence scores albeit more modestly. Lastly we have shown that persistent sphincter defects after primary OASIS repair did not correlate to worse faecal incontinence scores. [10]

OASIS causes both short and long-term complications after childbirth such as perineal pain, dyspareunia, faecal and urinary incontinence; in addition to emotional and psychological effects. [11, 12] Immediate surgical repair by experienced obstetricians or colorectal surgeons trained in sphincter tissue recognition within 12 hours is considered the gold standard, either using an overlapping or end-to-end technique. [13, 14] The exact incidence of faecal incontinence after OASIS is likely under-reported as some patients feel unable to discuss their symptoms with a medical professional. [15]

OASIS are classified within the spectrum of perineal tears. The internationally accepted classification of obstetric perineal trauma is as follows [4]: first degree – laceration of vaginal epithelium or perineal skin, second degree – involvement of perineal muscles, third degree – disruption of <50% external sphincter (IIIa), >50% external sphincter (IIIb), or both external and internal sphincter (IIIc), and most severe fourth degree – disruption of anal epithelium. Previous studies have suggested that grading of obstetric sphincter injuries

can help prognosticate quality of life and manometry outcomes. [16, 17] The risk of sphincter defects following vaginal delivery may be as high as 26% and up to half of these are missed on routine physical examination immediately post-partum, however women with IBS are at no increased risk of obstetric sphincter injury. [10, 18]

When assessing women with different grades of sphincter defect on ultrasound, our findings reveal no significant difference in mean Wexner scores compared to women without sphincter defects. Roos et al [17] report comparable rates of incontinence and sphincter defects to our population, however they found that a combined IAS and EAS defect resulted in worse faecal incontinence after a mean follow up of 9 weeks. Our study used more liberal criteria to define ultrasonographic residual sphincter defects in the absence of standardised and clinically validated residual defect definitions. Our study confirms claims of other studies that ultrasonographic sphincter defects may not reliably correlate with increased severity of faecal incontinence after the initial post-partum period [19, 20]. Our findings provide evidence that after OASIS repair, screening for presence of IBS may be more valuable than ultrasonography in predicting those at risk of worse long-term faecal incontinence which could facilitate more targeted behavioural, dietary, or pharmacological intervention.

We found that women who are unable to delay defaecation experience more severe faecal incontinence. Faecal urgency occurs due to unexpected contractions within the rectum and subsequent relaxation of the anal canal. A population-based study by Bharucha et al [19] support our findings, identifying urgency as a significant risk factor for post-partum faecal incontinence. In a healthy rectum, intraluminal pressure beyond 300 millilitres results in a feeling of urgency. [21] Although not extensively studied, the effects of hormonal changes intra- and post-partum are also believed to influence gastrointestinal tract function in women with IBS. For example, oestrogen influences the gut-brain axis which upregulates visceral hypersensitivity and mucosal immune activation. [22] Manometry reveals increased mucosal sensitivity to electrical stimulation of the upper anal canal compared to parous women without IBS. [10] These factors may therefore lower the threshold required for urgency to occur and synergistically increase the risk of faecal incontinence following OASIS repair.

A major strength of this study was the dual versatility of the questionnaire which allowed standardisation of subjective symptoms by calculation of a Wexner score, and also diagnosing IBS based on Rome IV criteria. This ensured that patients who may not have a formal diagnosis of IBS (which as stated earlier is not infrequent) were appropriately categorised to increase accuracy of our results. An additional strength of the study was the mean follow up interval of over two years, which facilitated assessment of symptoms beyond the commonly studied early post-partum period.

A limitation to the present study was the predominance of younger patients in the control groups, as it is known that the risk of faecal incontinence increases with age [3]. Mean Wexner scores were significantly higher in the older Group A, but linear regression analysis allowed control for this variable and age did not significantly alter faecal incontinence scores in our cohort. Another limitation is the single centre design which may be improved by future research utilising a multi-centre design and recruiting a larger sample size.

## CONCLUSION

After primary repair of major OASIS, patients are less likely to retain perfect continence compared to control groups. Ultrasonographic mostly partial sphincter defects were detected in 37% of patients on follow up, but this did not correlate to a clinical difference in faecal incontinence scores. Faecal incontinence was significantly worsened by the presence of IBS, or the inability to defer defaecation for 15 minutes. Women who did not have IBS had similar or minor incontinence scores across the study groups of major OASIS repair, primigravid or post-caesarean section.

We propose that the presence of IBS interacts with the complex neuro-physiological coordination required for continence, which may be exacerbated by Grade III/IV perineal trauma. Screening for presence of IBS is therefore a useful tool to prognosticate the risk of faecal incontinence after major OASIS, but also to assess future faecal incontinence risk, if patients are known to be at high risk for OASIS, in order to advise on

optimal birthing options.

## ACKNOWLEDGEMENTS

N/A

## FIGURES & TABLES CAPTIONS

Figure 1. Wexner faecal incontinence score

Figure 2. Rome IV criteria for diagnosis of irritable bowel syndrome

Table 1. Patient characteristics

Table 2. Mean Wexner scores based on location and presence of ultrasonographic sphincter defect

Table 3. Wexner score distribution among cohort

Table 4. Mean Wexner scores based on presence of IBS among groups

Table 5. Mean Wexner scores based on ability to defer defaecation > 15 minutes

Table 6. Mean Wexner scores based on urge symptoms (inability to defer defaecation for > 15 minutes) in combination with IBS

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