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## Mode of delivery following an OASIS and caesarean section rates

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### ABSTRACT

**Objectives:** While the rate of obstetric anal sphincter injury (OASIS) is increasing, there is a lack of evidence on how best to advise women on mode of delivery (MOD) afterwards. The objectives of this study were to assess the clinical value of bowel symptoms, endoanal ultrasound and anorectal manometry in the management of pregnancies after an OASIS and evaluate the performance of different algorithms.

**Study Design:** This was a retrospective analysis of prospectively collected data in a university hospital perineal clinic. Women with OASIS undergoing endoanal ultrasound scan (EAUS) and anorectal manometry (AM) were included in this study (all women with an OASIS, except the asymptomatic 3a tears). A number of published algorithms were theoretically applied in this cohort to define recommended MOD after an OASIS.

**Results:** Out of the 233 women included in the study, 51 (21.9%) were symptomatic, 141 (60.5%) had persistent sphincter defects on EAUS and 124 (53.2%) had abnormal AM. One asymptomatic and five symptomatic women were found to have isolated internal anal sphincter (IAS) defects without external anal sphincter (EAS) defects. There were no women with low resting pressure and normal incremental squeeze pressure.

The application of the algorithm requiring only one abnormal investigation to be recommended caesarean would have led to an 81.5% caesarean rate. If women with symptoms of anal incontinence or abnormal investigations would be advised for caesarean the rate would be 85.0%. Using the local protocol where symptomatic women only needed one of the two investigations to be abnormal but asymptomatic women were required to have both investigations being abnormal, 94 were considered for caesarean (40.3%).

**Conclusion:** There is a wide range in the number of patients recommended to have caesarean section after an OASIS, depending on the used criteria and management algorithms. There is minimal additional information gained from identifying internal anal sphincter defects and measuring low resting pressures at manometry.

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### Introduction

Obstetric trauma is the leading cause of anal incontinence (AI) in women and can seriously affect physical, psychological and social wellbeing [1]. The rate of obstetric anal sphincter injury (OASIS) has been increasing worldwide [2]; in England, figures tripled from 1.8% in 2000 to 5.9% in 2012 [3].

Despite increasing incidence, evidence on the impact of subsequent pregnancy and vaginal delivery on functional bowel outcomes remains conflicting. While some studies have shown that a second vaginal delivery, with or without recurrent OASIS, increases the risk of AI [4,5], others have not [6]. The management

of a future pregnancy remains controversial due to a lack of robust evidence for the optimal mode of delivery (MOD) [7,8].

OASIS are classified as 3a (less than 50% of the external anal sphincter [EAS]), 3b (more than 50% of the EAS), 3c (involving the internal anal sphincter [IAS]) and fourth (including the anorectal mucosa) [9].

To counsel women appropriately, assessment of bowel symptoms, endoanal ultrasound (EAUS) and anal manometry (AM), either alone, or in combination are typically used. However, the proposed management algorithms have been created based on small single-centre observational studies [10,11].

The Royal College of Obstetricians and Gynaecologists guideline [7] on management of third and fourth degree perineal tears states 'All women who have suffered OASIS should be counselled regarding the mode of delivery and this should be clearly documented in the notes. If the woman is symptomatic or shows abnormally low

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anorectal manometric pressures and/or endoanal ultra-sonographic defects, an elective caesarean section may be considered.' Based on this guidance Karmarkar et al at St Mary's Hospital evaluated an algorithm where any woman with either symptoms of AI or EAS/IAS defects on ultrasound >30 degrees or low resting (<40 mmHg) or incremental pressures (<20 mmHg) is recommended elective caesarean section (CS) for future deliveries [10].

A slightly different management protocol has been proposed by the Sultan group in Croydon University Hospital [9]. Here, women with objective substantial compromise of anal sphincter function are offered an elective CS. This is defined as an EAS defect >30 degrees and a maximum squeeze pressure increment of <20 mmHg. IAS defects, low resting pressures and bowel symptoms do not have a clear role in this algorithm.

The local protocol used during the study period recommended an elective caesarean section for asymptomatic women with both EAS defect >30 degrees and maximum squeeze pressure increment of <20 mmHg. For symptomatic women only one abnormal investigation (EAS defect or low squeeze incremental pressure) was required for CS to be recommended.

As significance of isolated internal IAS defects and isolated low resting pressures remains unclear, we assessed the value of these findings considering their contribution in the different protocols.

The objectives of this study were to assess the clinical value of bowel symptoms, EAUS and AM in the management of pregnancies after an OASIS and evaluate the performance of different algorithms.

## Methods

This was a retrospective analysis of data, prospectively collected and entered in a dedicated database, from the perineal clinic at the Norfolk and Norwich University Hospital between April 2011 and March 2016. Women with OASIS undergoing EAS and AM were included in the study.

All women who sustained an OASIS were referred routinely to a dedicated perineal clinic at 8–12 weeks postnatally. Basic demographic data, including age, parity, gestation at delivery, body mass index (BMI), MOD and birth weight were collected. Symptoms of AI were assessed using the Pescatori score [12]. This is a validated questionnaire that provides a grading system for AI which takes into account both the degree and frequency of symptoms of incontinence for flatus/mucous, liquid stool and solid stool. The Pescatori score does not include faecal urgency and so it is the presence of any AI that was considered to be significant and the patient deemed symptomatic. All patients were examined and pelvic floor muscle tone assessed using the Oxford Grading score [13].

The protocol in our hospital was for all women with an OASIS, except the asymptomatic 3a tears, to be referred on for further investigations - both EAUS and AM.

EAUS was performed using a BK Medical FlexFocus 1202 ultrasound scanner. 360° axial images were obtained and recorded. The EAS and IAS were assessed, and any defect or scarring noted. It is difficult to discriminate using EAUS between a scar that forms during the healing process of repaired torn muscle ends as opposed to more extensive scarring that forms in the gap created by non-apposition or wound breakdown [14]. To avoid overestimation of defects due to "normal" scarring we followed the suggested definition by Sultan group, where a break in the normal continuity of the sphincter muscles that extend for more than one hour on the clock face (30 degrees) [9].

AM was performed using the Medical Measurement Systems (MMS) Solar manometry system. The resting and squeeze pressures were measured at the level of the deep, superficial and subcutaneous parts of the EAS. Incremental pressure was calculated by subtracting resting pressure from squeeze pressure. A value of less than

20 mmHg for incremental pressure was considered an abnormal result based on the available literature [15].

We then theoretically applied the different management algorithms to our cohort of patients,

Descriptive statistics were used to present the results and categorical variables were reported as frequencies using percentages. Statistical analyses were performed using Excel (Version 16.12).

## Results

There were 29,235 deliveries over the study period, 3.43% of which sustained an OASIS.

Out of 1002 women reviewed, 494 were asymptomatic following 3a tears and therefore not sent for further investigations. From the remaining 508, 233 women with complete investigations were included in the study as the rest declined EAUS or AM.

The mean age was 28.4 years (SD 7.6), mean BMI 25.1 (SD 5.6), mean birth weight 3680.5 g (SD 533.9). 78% of the women were primips. 72% had spontaneous vaginal deliveries, 22% forceps deliveries and 6% delivered by ventouse. The proportions of 3A, 3B, 3C and 4<sup>th</sup> degree tears were 49.3%, 38.4%, 8.4% and 3.9% respectively.

Fig. 1, summarises the symptomatic status and the results of the investigations. One asymptomatic and five symptomatic women had isolated IAS defects without EAS defects. No women had a low resting pressure but a normal increment on squeeze.

If symptoms alone were used to determine MOD, 51 out of 233 (21.9%) would be recommended CS, if EAUS alone was used (EAS or IAS defect), 141 (60.5%) and if manometry alone used, 124 (53.2%) (Table 1).

By using the local algorithm (symptomatic women only needed one abnormal investigation and asymptomatic both), 94 women (40.3%) were advised for CS. The application of the protocol recommended by the Sultan group would have led to 190 CS (81.5%), while the RCOG guidance, as expressed in the St Mary's Hospital algorithm, would have increased the number to 198 (85.0%) (Table 2).

## Discussion

This paper highlights the wide variation in CS recommendation rates following OASIS, from 22% to 85%, depending on the management algorithm used. In this cohort, there was limited value in identifying IAS defects and measuring low resting pressures at manometry. To our knowledge this is the first study comparing performances of different management algorithms for recommending MOD using a large cohort of women with complete sets of investigations after OASIS.

Vaginal delivery has been shown to be a viable option for selected women providing there is no significant compromise of the anal sphincter function following OASIS [16]. A UK survey found that 71% of colorectal surgeons but only 22% of obstetric consultants would recommend an elective CS after OASIS, with only 6% of the professionals making their decision based on the EAUS and AM findings [17]. Women's experiences must also be taken into consideration. The main themes identified by qualitative studies included concerns regarding continence, body image and sexual functioning [18]. The degree of OASIS (3c/4<sup>th</sup>) and sexual symptoms appear to have an impact on patient preference on MOD, while bowel symptoms had a limited role. Our study demonstrates the difficulty in advising MOD as there is no robust evidence to define significant subjective or objective compromise of the anal sphincter function. The presence of AI symptoms used alone (only 21.9% in our cohort) underestimated the diagnosis of compromised anal sphincter function, therefore EAUS and AM

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