Follow up of women after Obstetric Anal Sphincter Injuries (OASI)-what is the role of anorectal studies? An observational study.

Hawra Badri¹, Gillian Fowler², and Steven Lane³

¹Liverpool Women’s Hospital NHS Foundation Trust
²Liverpool Women’s Hospital
³University of Liverpool

July 27, 2022

Abstract

Objective To evaluate the benefit of performing anorectal studies on all women following primary Obstetric Anal Sphincter Injury (OASI) repair over performing them on symptomatic women only. Design Retrospective observational study. Setting Tertiary maternity unit in the U.K. Population or sample All women followed up in the perineal clinic over 13 years were included. Methods Women who attended perineal clinic between 2007 and 2020 underwent symptom assessment and anorectal studies at 6 weeks and 6 months post-partum. Anorectal studies including endo anal ultrasound (EAUS) and anal manometry (AM) were performed. The anorectal studies of symptomatic women who were the case group, were compared with asymptomatic women who were the control group. Main outcome Results 1,348 women were seen in the perineal clinic over 13 years. 454 (33.7%) women were symptomatic. 894 (66.3%) women were asymptomatic. 313 (35%) asymptomatic women had two abnormal anorectal studies, 274 (31%) had abnormal AM alone and 86 (9.6%) had abnormal EAUS alone. 221 (24.7%) asymptomatic women had normal anorectal studies. Conclusion Almost 70% of women were asymptomatic 6 months following primary OASI repair. Most had at least one abnormal anorectal study result. Selectively performing anorectal tests on symptomatic women would not identify asymptomatic women at risk of future faecal incontinence (FI) following further vaginal birth. Without anorectal study results, women would not receive accurate counselling about the risks of vaginal birth. Anorectal studies should be offered to all women following OASI where resources allow.
To evaluate the benefit of performing anorectal studies on all women following primary Obstetric Anal Sphincter Injury (OASI) repair over performing them on symptomatic women only.

**Design**
Retrospective observational study.

**Setting**
Tertiary maternity unit in the U.K.

**Population or sample**
All women followed up in the perineal clinic over 13 years were included.

**Methods**
Women who attended perineal clinic between 2007 and 2020 underwent symptom assessment and anorectal studies at 6 weeks and 6 months post-partum. Anorectal studies including endo anal ultrasound (EAUS) and anal manometry (AM) were performed. The anorectal studies of symptomatic women who were the case group, were compared with asymptomatic women who were the control group.

**Main outcome**

**Results**
1,348 women seen in the perineal clinic over 13 years. 454 (33.7%) women were symptomatic. 894 (66.3%) women were asymptomatic. 313 (35%) asymptomatic women had two abnormal anorectal studies, 274 (31%) had abnormal AM alone and 86 (9.6%) had abnormal EAUS alone. 221 (24.7%) asymptomatic women had normal anorectal studies.

**Conclusion**
Almost 70% of women were asymptomatic 6 months following primary OASI repair. Most had at least one abnormal anorectal study result. Selectively performing anorectal tests on symptomatic women would not identify asymptomatic women at risk of future faecal incontinence (FI) following further vaginal birth. Without anorectal study results, women would not receive accurate counselling about the risks of vaginal birth. Anorectal studies should be offered to all women following OASI where resources allow.

**Introduction**
Obstetric perineal trauma is common affecting up to 85% [1] of women. Unlike lesser degrees of perineal trauma, Obstetric Anal Sphincter Injuries (OASI) have been associated with long-term and life-changing consequences for 20-40% [2] of women. Anal incontinence (AI), psychosexual and psychosocial morbidity are amongst the most devastating consequences of OASI. OASI complicates overall 2.9% of births in the UK (range 0-8%) [3]. Primiparous women are particularly more susceptible, with an incidence of 6.1%, compared to multiparous women at 1.7% [3]. Primiparous women are likely to have not completed their families. Many of these women will choose to have further pregnancies, this has made mode of birth (MOB) counselling following OASI an increasingly relevant consideration.

There are no systematic reviews or randomised controlled trials to support the optimal MOB following OASI. The Royal College of Obstetricians and Gynaecologists (RCOG) provides guidance for the management of women with OASI in the Green top guidelines [4] based on best available evidence. They recommend all women with OASI should be offered MOB counselling and choice between further vaginal births or Caesarean Section. Counselling should be guided by symptoms and results of anorectal studies if available. Women should be informed that vaginal birth following OASI is associated with a 5-7% [5, 6] risk of OASI recurrence. Correct recognition and repair of OASI is associated with low reported incidences of AI; 60-80% of women are asymptomatic at 12 months [7]. Asymptomatic women with normal anorectal studies have been shown to not suffer short-term symptom deterioration following further vaginal birth [5]. Women experiencing
transient AI symptoms within 3 months of the index OASI should be aware that they are at increased risk of worsening symptoms following subsequent vaginal birth. These women are up to 17% [8, 9, 10] more at risk of symptom recurrence even if further OASI is not sustained. However, caesarean section may not be acceptable to all women. Women may wish to avoid the risks associated with surgery, including the impact on recovery and bonding with a new baby. Caesarean section also does not prevent deterioration of AI once sustained from OASI [11].

The RCOG recommend that all women with OASI should be assessed for symptoms at between 6-12 weeks [4] postpartum. However, only women reporting AI require referral to a specialist gynaecologist or colorectal surgeon. They advise, where possible, that symptomatic women should be followed up in a perineal clinic with access to anorectal studies including Endo anal ultrasound (EAUS) and Anal Manometry (AM) [4]. Symptomatic women or those with abnormal anorectal studies should be considered for an elective caesarean section [4].

The aim of this study is to evaluate the benefits of offering anorectal studies to all women with OASI, irrespective of symptoms to make recommendations about subsequent MOB. We hypothesised that all women should be offered anorectal studies following primary OASI repair because the results would influence MOB counselling offered to asymptomatic women.

**Materials and methods**

Data for all women with a history of OASI between January 2007 and December 2020 were entered into the clinic database prospectively. This data is required for annual audit and service evaluation purposes; therefore, Research Ethics Committee (REC) approval was not necessary.

Women were reviewed at 6 weeks and 6 months postnatally. Anorectal symptoms were ascertained using the validated St Mark’s Incontinence Score (SMIS), which grades severity of AI from 0 (none) to 24 (severe). Previous studies have formed severity sub-groups using the SMIS to aid analysis [12]. A score of 0 to 4 is considered mild, 5 to 8 is moderate and > 8 is severe. A complaint of faecal urgency generates a score of 4. This would not constitute as asymptomatic based on our unit policy. Therefore, a score of < 4 was regarded as asymptomatic in our study. Anorectal studies, including EAUS and AM were performed at 6 months post-partum. AM was performed using a Gaeltec CTR-1b compartmental Pressure Monitor. Maximum resting pressure and maximum squeeze were recorded. The difference between these two measurements is the incremental rise. A resting pressure of between 40 to 70 mmHg with an incremental rise of 20mmHg is regarded as normal based on expert opinion [13]. Resting pressure is reflective of internal anal sphincter (IAS) function whilst voluntary maximum squeeze is generated by the External anal sphincter (EAS) [14].

EAUS was performed using the BK medical Flex focus 500 ultrasound 1202. Three dimensional images of the sphincter complex were studied across three levels of ‘high’, ‘mid’ and ‘low’ as per the Liverpool Ultrasound Pictorial chart (LUPIC) [15]. Defects in the muscles of the EAS or IAS were identified as those exceeding 1 hour (>30 degrees) [16] on a clock face.

Asymptomatic women were defined as those with an SMIS<4 at both 6 weeks and 6 months follow up. The remainder being regarded as symptomatic. The anorectal studies for both these groups of women were compared. Normal anorectal studies were defined as AM with a resting pressure of between 40 to 70 mmHg and an incremental rise of 20mmHg on squeeze. Normal EAUS results were those without a residual sphincter defect of greater than 1 hour (>30 degrees).

**Statistical analysis**

Data was divided into two groups; symptomatic (n=454) and asymptomatic (n=894). The symptomatic and asymptomatic groups were sub-divided into four further groups; those with 2 normal anorectal studies, 2 abnormal anorectal studies, isolated abnormal AM and those with isolated abnormal EAUS results. As no formal sample size had been estimated, no hypothesis testing was undertaken. Data analysis was performed using SPSS, version 22.0.
**Results**

The derivative of the groups are illustrated in Figure 1.

1348 women were followed-up over 13 years. 454 (33.7%) were symptomatic and 894 (66.3%) were asymptomatic. In asymptomatic women, 313 (35%) had both abnormal EAUS and AM. 86 (9.6%) had isolated abnormal EAUS and 274 (31%) women had isolated abnormal AM. 221 (24.7%) asymptomatic women had normal anorectal studies.

In symptomatic women, 397 (87.4%) had at least one abnormal anorectal study. Most women had both abnormal EAUS and AM, 221 (48.7%). 138 (30.1%) women had only abnormal AM. 57 (12.5%) of women had normal anorectal studies.

Amongst both groups, most were primiparous, had a normal vaginal birth on land at post-dates and had a larger BMI (>25).

Table 1 outlines the demographic, birth and clinical follow up information of symptomatic women.

In this symptomatic group, women were more likely to have a higher order of OASI, with most sustaining a 3B tear. These women had higher numbers of abnormal anorectal studies with 47.4% (n= 221) having both abnormal AM and EAUS. Symptomatic women who had pool births had the highest numbers of abnormal AM results (50.4%).

Table 2 outlines the demographics, birth and follow up information of asymptomatic women.

Asymptomatic women who had a normal vaginal birth had more abnormal EAUS result (n= 62. 72.1%). Women who had forceps birth had more abnormal AM results (n= 95) 74.7%. Those birthing in the pool, had more residual sphincter defects on EAUS (93.3%). Asymptomatic women with 3A tears had mostly normal anorectal studies (71.8%). Women with higher orders of OASI (3B to 4th degree tears) were more likely to have abnormal anorectal studies even if asymptomatic. Only 23.4% (n=51) of asymptomatic women with 3B tears had normal anorectal studies and only 4.8% of women with 3C tears had normal anorectal investigations. No asymptomatic women with 4th degree tears had normal anorectal studies at 6 months review.

**Discussion**

This observational study was designed to evaluate if all women should be followed up with anorectal studies following primary OASI repair, regardless of symptoms. Our study identified that 66.3% (n=894) of women in our tertiary unit were asymptomatic at 6 months following primary OASI repair. This is in-keeping with the RCOG quoted range of 60-80% [4]. Of these asymptomatic women however, 313 (35%) had two abnormal anorectal studies, 274 (31%) had abnormal AM and 86 (9.6%) had abnormal EAUS. Only 221 (24.7%) had normal anorectal studies. Overall, the majority (75% n=673) of asymptomatic women, had at least one abnormal anorectal study. On the guidance of the RCOG green top guidelines, this asymptomatic group of women would not have been referred on to a specialist gynaecologist or colorectal surgeon for anorectal studies. This group of women could in-turn have been inaccurately counselled about the risks of developing FI after a subsequent vaginal birth.

Our study highlighted the concordance between anorectal studies and degrees of severity of OASI in symptomatic women. This is well documented by several other studies [17, 18, 19, 20]. We identified that most symptomatic women had at least 1 abnormal anorectal study (87.4% n=397) and of women who had 3B and 3C tears, only 23.4% (n=51) and 4.8% (n=10) had normal anorectal studies respectively. No asymptomatic women with 4th degree tears had normal anorectal studies. This is echoed in the results of other studies which identified higher rates of residual sphincter defects following 4th degree tears of 82% [21] and 85% [22]. This may simply be related to increased trauma inherent with higher order OASI. It may also be attributed to difficulties with IAS identification and repair in acute obstetric trauma. The IAS contributes to continence maintenance. IAS defects can be predictive of FI [23] and are associated with poorer quality of life outcomes [24]. 4th degree tears are the least common of all OASI, therefore opportunities to develop
expertise in their repair will be fewer, potentially contributing to less effective repairs. Based on our results, offering all women with 4th degree tears a caesarean section for future birth is a reasonable option in units that do not offer anorectal studies. 4th degree tears however do not preclude vaginal birth [25]. Sultan and Taithongchai [21] concluded that performing anorectal studies in these women allowed greater individualised counselling to be offered.

We identified that symptoms do not correlate to anorectal study findings, amongst asymptomatic women. In this group, 76.6% and 95.2% with 3B and 3C tears respectively had abnormal anorectal studies. Reliance on symptom assessment alone in women with full thickness tears especially would underestimate a significant number of women with residual sphincter defects who may also have impaired sphincter function. Asymptomatic women with 3A tears, however, were found to have normal anorectal studies in 71.8% of women (n=158). This could support the rationale behind the practice in some units [26] not to offer asymptomatic women with 3A tears anorectal studies. However, this approach would not capture asymptomatic women with abnormal anorectal studies; in our study, this accounted for 28% of women, who would be inadequately counselled about future MOB.

The strength of our study includes the large study size, use of validated symptom assessment tools, independent review of anorectal study results by a consultant Urogynaecologist and prospectively collected data over 13 years. An analysis of cost in setting up a perineal clinic service including equipment purchase and staff training against benefit would have enhanced this study. We acknowledge that retrospective observational studies are limited by bias in the planning and analysis stage.

MOB planning is an important consideration for all women with OASI. This is a balance between risks associated with caesarean section against risk of OASI recurrence or development of AI. Maternal choice is the most important determinant. The importance of avoiding paternalism and supporting patient autonomy through informed consent has been highlighted previously by the 2015 Montgomery ruling. Anorectal studies, namely EAUS has been demonstrated to reliably identify women at risk of AI. The presence of a residual sphincter defect on EAUS following primary OASI repair is a risk factor for AI, with these women 4 times more likely to develop AI [27]. Reduced resting and squeeze pressure on AM have been associated with impaired sphincter function, however the impact of this on symptom development is less well understood.

There is a lack of robust evidence to guide MOB counselling. It is paramount that women are supported to make informed choices based on reliable evidence. Guidance from the RCOG 2015 guidelines is based on the best available evidence. It recommends that symptoms should determine which women require anorectal studies and that asymptomatic women can be counselled about all options of birth including vaginal birth. Our data suggests that relying on symptom assessment alone in women with OASI is insufficient in asymptomatic women. We conclude that all women with OASI should be followed up with anorectal studies and this should be within a dedicated perineal clinic where possible. Further research including long-term follow up of women with OASI and subsequent birth outcomes is required to further inform optimal MOB following OASI.

Disclosure of interests: No conflicts of interest to declare.

Contribution of authorship:

H.B and G.F were involved in all stages of the research.

H.B was involved in the project design, data collection and drafted the article.

G.F was involved in the study conception, design and final approval of the article.

S.L provided statistical analysis and data interpretation.

Patient consent:

Anonymised data was collected for routine quality improvement purposes therefore no patient consent was required.
Funding:
No funding was received for this study.

Ethical approval:
Ethical approval was not necessary as data included within this study was collected and stored as part of routine quality improvement purposes.

References
15. Volløyhaug I, Taithongchai A, Arendsen L, van Gruting I, Sultan AH, Thakar R. Is endoanal, introital or transperineal ultrasound diagnosis of sphincter defects more strongly associated with anal incon-


Table 1: Patient demographics and birth details for symptomatic women followed up in the perineal clinic following OASI.
Demographics and birth details of Symptomatic women n=454

<table>
<thead>
<tr>
<th>Normal anorectal studies n=57 (12.6%)</th>
<th>Abnormal anorectal studies n=221 (48.7%)</th>
<th>Abnormal AM only n=138 (30.4%)</th>
<th>Abnormal EAUSS only n=38 (8.4%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>7 (30.4)</td>
<td>24 (24.8)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>16 (69.6)</td>
<td>75 (75.2)</td>
<td></td>
</tr>
</tbody>
</table>

Grade of OASI n (%)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Normal anorectal studies</th>
<th>Abnormal anorectal studies</th>
<th>Abnormal AM only</th>
<th>Abnormal EAUSS only</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>25 (44.3)</td>
<td>70 (31.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3B</td>
<td>21 (41.2)</td>
<td>96 (43.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3C</td>
<td>8 (14.5)</td>
<td>31 (14.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th</td>
<td>2 (4.0)</td>
<td>22 (10.0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*NVD= normal vaginal delivery

**NRFD= non-rotational forceps delivery.

Table 2: Patient demographics and birth details for asymptomatic women followed up in the perineal clinic following OASI.

Demographics and birth details of asymptomatic women n=894

<table>
<thead>
<tr>
<th>Normal anorectal studies n=221 (24.7%)</th>
<th>Abnormal anorectal studies n=313 (35.0%)</th>
<th>Abnormal AM only n=274 (30.6%)</th>
<th>Abnormal EAUSS only n=86 (9.6%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age mean (st.dev)</td>
<td>30 (5)</td>
<td>30 (5)</td>
<td></td>
</tr>
<tr>
<td>BMI mean (st.dev)</td>
<td>27.12 (5.46)</td>
<td>25.3 (5.2)</td>
<td></td>
</tr>
<tr>
<td>Parity n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>161 (75.3)</td>
<td>236 (75.4)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>47 (21.9)</td>
<td>69 (22.0)</td>
<td></td>
</tr>
<tr>
<td>2+</td>
<td>5 (2.9)</td>
<td>8 (2.5)</td>
<td></td>
</tr>
<tr>
<td>Gestational age Median (IQR)</td>
<td>40+1 (39+1, 41+0)</td>
<td>40+2 (39+3, 41+4)</td>
<td></td>
</tr>
<tr>
<td>Birthweight mean (st.dev)</td>
<td>3569 (496)</td>
<td>3632 (490)</td>
<td></td>
</tr>
<tr>
<td>Delivery n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NVD*</td>
<td>168 (67.0)</td>
<td>200 (63.9)</td>
<td></td>
</tr>
<tr>
<td>NRFD**</td>
<td>73 (33.0)</td>
<td>113 (36.1)</td>
<td></td>
</tr>
<tr>
<td>Pool birth n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15 (6.8)</td>
<td>17 (21.5)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>141 (63)</td>
<td>62 (78.5)</td>
<td></td>
</tr>
<tr>
<td>Grade of OASI n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3A</td>
<td>158 (71.8)</td>
<td>117 (37.4)</td>
<td></td>
</tr>
<tr>
<td>3B</td>
<td>51 (23.4)</td>
<td>126 (40.2)</td>
<td></td>
</tr>
<tr>
<td>3C</td>
<td>10 (4.8)</td>
<td>51 (16.3)</td>
<td></td>
</tr>
<tr>
<td>4th</td>
<td></td>
<td>17 (5.4)</td>
<td></td>
</tr>
</tbody>
</table>

*NVD= normal vaginal delivery.

**NRFD= non-rotational forceps delivery.

Hosted file