Occult anal sphincter injuries—myth or reality?

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Objectives To establish the true prevalence of clinically recognisable and occult obstetric anal sphincter injuries (OASIS).

Design Prospective interventional study.

Setting Busy district general hospital.

Sample Two hundred and fifty-four women having their first vaginal delivery over a 12-month period were invited. Two hundred and forty-one (95%) participated and 208 (86%) attended follow up.

Methods Women had a clinical examination at delivery by the accoucheur and repeated by an experienced research fellow immediately after delivery. All identified OASIS were verified and repaired by the duty specialist registrar or consultant. Endoanal ultrasound was performed immediately postpartum prior to suturing and repeated seven weeks later.

Main outcome measures Prevalence of recognised and occult anal sphincter injuries.

Results Fifty-nine (24.5%) women sustained OASIS. The prevalence of OASIS increased significantly from 11% to 24.5% when women were re-examined. Of these, 30 occurred in deliveries by midwives who missed 26 (87%) and 29 following deliveries by doctors who missed 8 (28%) injuries. All clinically apparent OASIS were also identified on endoanal ultrasound. In addition, three (1.2%) women had an occult anal sphincter injury. Two of these occult sphincter injuries were isolated to the internal anal sphincter (IAS) and would not usually be clinically detectable.

Conclusions OASIS occur more frequently than previously reported. Many remain undiagnosed and are subsequently classified as occult when identified on anal endosonography. Genuine occult injuries are rare. Training in perineal anatomy and recognition of OASIS needs to be enhanced in order to increase detection of OASIS and minimise the risk of consequent anal incontinence.

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Introduction

Obstetric trauma is the major cause of anal incontinence in women and is believed to affect 40,000 mothers (5%) annually in the UK.1 However, it is largely under reported due to social stigma and embarrassment. Recognised obstetric anal sphincter injuries (OASIS) occur in 0.4–19% of vaginal deliveries in centres practising mediolateral and midline episiotomies, respectively.2,3

Obstetric-related anal incontinence was previously believed to be largely due to pudendal neuropathy.4,5 However, following the advent of anal endosonography most of these women demonstrated ‘occult’ anal sphincter injuries (Fig. 1). A strong association has been shown between anal incontinence and occult anal sphincter injury diagnosed by ultrasound.6 There are now nine prospective studies6–14 showing that between 20% and 41% of women sustain occult sphincter injuries. However, it remains to be established whether these injuries are truly ‘occult’ or represent ‘overt’ anal sphincter injuries that have either been wrongly classified as a second-degree tear1,15 or missed.16

Furthermore, as OASIS are scrutinised during risk management meetings, there is a disincentive to document these injuries accurately. Previous teaching caused confusion in classification17 and a recent study by Fernando et al.1 found that 33% of practising obstetric consultants in the United Kingdom were wrongly classifying external anal sphincter (EAS) tears as second-degree tears. Sultan et al.15 interviewed 75 trainee doctors and 75 midwives and found that there was considerable inconsistency in their classification, and that most were unaware that anal incontinence was an important consequence of vaginal delivery. Consequently, a new classification was suggested18 and this has now been accepted by the RCOG19 and the International Consultation on Incontinence20 (Table 1). OASIS therefore represent third or fourth-degree tears. Concern has also been raised that some anal
sphincter injuries are being missed at the time of delivery. This has been demonstrated at Queen Charlotte’s Hospital, London, where a clinical research fellow examined women who sustained perineal trauma and found that 40% of OASIS were being missed.

In view of the anatomical confusion, inconsistency in classification of perineal tears and evidence that OASIS are being missed, we aimed to determine the true prevalence of clinically overt and occult anal sphincter trauma in women having their first vaginal delivery.

**Methods**

Women having their first vaginal delivery over a 12-month period between February 2003 and January 2004 at Mayday University Hospital were invited to participate. A trained clinical research fellow (VA) recruited women prior to delivery during office hours, nights and weekends.

All consenting women had a repeat perineal and rectal examination by the research fellow immediately after being examined by the accoucheur. In addition, when the delivery was conducted by a doctor, the midwife caring for the woman examined the perineum and her findings were noted. When OASIS were diagnosed they were confirmed by the on-call specialist registrar or consultant. Labour and delivery details were recorded prospectively.

Endoanal ultrasound (Fig. 1) was performed in the left lateral position using a 10-MHz 360° rotating probe (B & K Naerum, Denmark). All women had endoanal ultrasound scans performed at delivery (prior to suturing) and repeated at seven weeks postpartum. All scans were video recorded and reviewed independently by two experts in endoanal ultrasonography (AHS & RT) who were blinded to the clinical diagnosis.

Data were entered into a Microsoft Excel database and analysed by SPSS version 11.0 (Chicago, Illinois, USA). To investigate the change in dependent proportions a McNemar test was used, and to compare proportions in independent groups the $\chi^2$ test was used. Women were given written information about the study in the antenatal period and all gave written consent when admitted in labour.

**Results**

Over the study period there were a total of 1495 primiparous women who had a vaginal delivery of whom 254 were invited and 241 (16%) consented to participate in the study. Two hundred and thirty-two (96%) were nulliparous and nine (4%) had had a previous caesarean section (none in the second stage of labour).

One hundred and seventy-three (72%) deliveries were conducted by midwives and 68 (28%) by doctors. Sixty-three (91%) of the deliveries by doctors were instrumental deliveries (40 vacuum extraction, 23 forceps deliveries). Ninety-eight (41%) had a mediolateral episiotomy performed. The comparable episiotomy and instrumental delivery rates in our institution during the same period were 39% and 21%, respectively. The prevalence of OASIS increased significantly from 11% to 24.5% (McNemar’s test $P < 0.000$) when women were re-examined by the trained research fellow.

One hundred and twenty-nine of the 173 (75%) deliveries were performed by midwives with at least five years experience. The diagnosis of injuries by the midwives and research

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**Table 1. Classification of perineal tears**

<table>
<thead>
<tr>
<th>Intact perineum</th>
<th>No visible tear</th>
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<tbody>
<tr>
<td>First-degree tear</td>
<td>Injury to skin only</td>
</tr>
<tr>
<td>Second-degree tear</td>
<td>Injury to the perineum involving perineal muscles but not the anal sphincter</td>
</tr>
</tbody>
</table>
| Third-degree tear | Injury to the perineum involving the anal sphincter complex:  
| | 3a: less than 50% external sphincter thickness torn  
| | 3b: more than 50% external sphincter thickness torn  
| | 3c: IAS torn |
| Fourth-degree tear | Injury to the perineum involving the anal sphincter and anal epithelium |

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fellow are shown in Table 2. Of the 173 deliveries, midwives classified eight as OASIS of which only four had OASIS confirmed by the research fellow. In a further two cases, the midwife suspected OASIS and requested a doctor’s opinion but neither of these were found to have OASIS. In total, 30 sustained OASIS but only 4 were correctly identified by the midwife. Of the remaining 26 OASIS, the midwife made a diagnosis of a second-degree tear in 25 and in one case classified it as a first-degree tear. All 30 women with OASIS had the diagnosis confirmed either by the on-call specialist registrar and consultant and their anal sphincter was repaired in theatre according to a standardised protocol.  

The remaining 68 deliveries were performed by doctors, 14 by senior house officers under supervision and 54 by specialist registrars. None of the women delivered by doctors had an intact perineum and only one woman had a first-degree tear. Of the 68 deliveries, 22 (32%) had OASIS identified by the doctor performing the delivery and all were confirmed by the research fellow. In a further seven cases OASIS were missed by the doctor performing the delivery. In four cases, the career senior house officer conducting the delivery failed to identify the OASIS that were subsequently confirmed by the duty specialist registrar and research fellow. In three further cases the research fellow identified OASIS that were missed by the duty specialist registrar and these injuries were all confirmed by the on-call consultant. One woman with a second-degree tear was wrongly classified as third degree by a senior house officer. Specialist registrars missed 14% of OASIS, this being significantly less than the 67% missed by senior house officers ($\chi^2$ test, $P = 0.016$). The midwife caring for each woman delivered by a doctor was asked to examine the perineum in the same manner as they would normally do after delivery. Only 1 of the 29 (3.4%) OASIS was identified and no midwife performed a rectal examination. Twenty-seven were classified as second-degree tears and one as first degree. The classification of perineal trauma following deliveries performed by doctors is shown in Table 3.  

The results of the endoanal ultrasound scan are shown in Table 4. Two hundred and nine (87%) attended follow up at a mean of seven weeks and two days (SD = 16 days). There were 11 discrepancies on scan reports initially that were resolved on review. All women who had OASIS had a sonographic defect at delivery. In addition, there were three defects on ultrasound that were not seen clinically. Two of these involved the internal anal sphincter (IAS) alone and one was a combined defect of the IAS and EAS. No de novo defects were seen at follow up.  

**Discussion**

Anal incontinence is a social stigma that can have a devastating effect on a woman’s quality of life. Although anal sphincter injury remains the major aetiological factor, it was previously largely attributed to ‘occult’ anal sphincter injuries.  

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**Table 2.** Rates of perineal trauma in deliveries conducted by midwives. The question mark (?) represents suspected anal sphincter injuries and details of these are given in the Results section  

<table>
<thead>
<tr>
<th>Midwives diagnosis (%)</th>
<th>Research Fellow diagnosis (%)</th>
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</thead>
<tbody>
<tr>
<td>Intact perineum</td>
<td>Intact perineum</td>
</tr>
<tr>
<td>32 (18.5)</td>
<td>24 (13.9)</td>
</tr>
<tr>
<td>First-degree tear</td>
<td>First-degree tear</td>
</tr>
<tr>
<td>20 (11.6)</td>
<td>7 (4)</td>
</tr>
<tr>
<td>Second-degree tear</td>
<td>Second-degree tear</td>
</tr>
<tr>
<td>111 (64.2)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>Third/fourth-degree tear</td>
<td>Third/fourth-degree tear</td>
</tr>
<tr>
<td>8 (4.6)</td>
<td>0</td>
</tr>
<tr>
<td>Third-degree tear*</td>
<td>Third-degree tear*</td>
</tr>
<tr>
<td>2 (1.2)</td>
<td>0</td>
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</table>

* Suspected anal sphincter injuries. See Results section for further details.
This is the first prospective study to accurately establish the prevalence of anal sphincter injury using the new internationally accepted classification of perineal trauma. 18,20 Secondly, this is the first study in which endoanal ultrasound was performed immediately postpartum and then repeated seven weeks later to establish the true prevalence of occult sphincter injuries. To avoid bias, all ultrasound images were reported independently by two clinicians who were blinded to the clinical diagnosis.

We found that when a trained research fellow re-examined postpartum women before suturing of the perineum, the prevalence of OASIS increased significantly from 11% to 24.5%. This finding is consistent with another observational study in which the rate of OASIS doubled when women were re-examined. 16 Our findings indicate that the majority of midwives and junior doctors (senior house officers) were failing to identify OASIS. This is in keeping with questionnaire-based studies in which the majority of practising doctors and midwives indicated that they were inadequately trained in diagnosing and repairing perineal trauma. 1,15 We therefore believe that our findings are not unique to local practice but probably reflect a more widespread phenomenon. Doctors and midwives were not blinded to the intent of the study because women subsequently found to have OASIS had to have their anal sphincter injury repaired in theatre with written consent. However, their prior knowledge of the study did not appear to affect their clinical practice as the rates of episiotomy and instrumental deliveries did not differ from that of other primiparous women delivering in this unit.

All clinically diagnosed OASIS were identified by endoanal ultrasound. In three women, defects were identified by endoanal ultrasound but not seen clinically. Two of these were isolated IAS injuries. It is unclear whether these minor IAS defects were due to clinical disruption or whether they represent distortion of the IAS as a result of the shearing forces during delivery. 6 In practice, isolated IAS injuries would not normally be clinically apparent as the EAS would need to be torn as well. There was only one anal sphincter injury diagnosed by scan that was not recognised at delivery (involving both the IAS and EAS). This may therefore represent a genuine occult sphincter injury. No new defects were identified by ultrasound at follow up that were not seen on the first scan performed immediately after delivery, indicating that all anal sphincter injuries occur at the time of birth and not in the puerperium. This study also demonstrates that following appropriate training, clinical examination can be as accurate as anal endosonography in the immediate postpartum period. However, as postpartum anal endosonography is technically difficult, time consuming, expensive and requires additional expertise, it should not substitute accurate clinical examination.

By performing anal endosonography in the immediate postpartum period and repeating it seven weeks later, we have demonstrated that genuine occult sphincter injuries are a rare occurrence. Therefore, almost all ‘occult’ sphincter injuries described previously 6–14 probably represent missed tears. Although two other studies have shown that endoanal ultrasound is feasible in the postpartum period neither study had independent clinical verification nor were follow up scans performed. 23,24

<table>
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<tr>
<th>Table 4. Endoanal ultrasound scan findings</th>
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<tbody>
<tr>
<td><strong>Type of injury</strong></td>
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<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Intact perineum</td>
</tr>
<tr>
<td>First-degree tear</td>
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<tr>
<td>Second-degree tear</td>
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<tr>
<td>3a tear</td>
</tr>
<tr>
<td>3b tear</td>
</tr>
<tr>
<td>3c tear</td>
</tr>
<tr>
<td>Fourth-degree tear</td>
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<tr>
<td>All third/fourth-degree tears (OASI)</td>
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We have also demonstrated that clinical examination at the time of delivery remains the cornerstone of diagnosis of anal sphincter damage. In each case, the research fellow performed a careful examination of the perineum and vagina. In keeping with previous recommendations,23 he performed a rectal examination to exclude rectal or anal sphincter injury. Visual inspection combined with palpation by performing a pill-rolling motion between the index finger in the rectum and the thumb over the anal sphincter23 improved the detection rate of OASIS. Unfortunately, although most midwifery and obstetric textbooks recommend that a rectal examination should be performed after perineal repair, very few indicate the need for rectal examination before repair.

**Conclusions**

Our study has demonstrated that a large number of OASIS are missed at delivery. These injuries that have previously been classified as ‘occult’ do have clinical relevance as it has been shown that 42% of women who have asymptomatic ‘occult’ anal sphincter defects after their first vaginal delivery develop faecal incontinence after a subsequent vaginal delivery.26 It is therefore important that doctors and midwives undergo more focussed and intensive training to recognise these tears at delivery. Recent innovations such as using a specially designed latex model and fresh animal anal sphincters in dedicated hands-on workshops22 (www.perineum.net) are proving very popular. These hands-on workshops have been shown to change clinical practice of doctors27 and midwives.28 Consequently, a fourfold change of practice was noted among midwives who began performing rectal examinations prior to and after perineal repair.

Recognition of the deficiencies of current training and more widespread implementation of re-education programmes need reappraisal so as to improve identification of OASIS. Only then can we minimise the risk of developing anal incontinence—a physically and socially devastating affliction.

**Acknowledgements**

We would like to thank B & K Medical for loaning the scanner to perform this project.

**Competing interests**

Mayday University Hospital provides training courses for doctors and midwives in perineal repair.

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**Ethical approval**

The study was approved by the Croydon Ethics and Research Committee.

**References**

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