The clinical significance of postpartum transperineal ultrasound of the anal sphincter

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Abstract

Background and objective: To evaluate the clinical significance of postpartum anal sphincter damage by transperineal ultrasonography (TPUS) performed on the day of delivery.

Methods: Continence questionnaires were handed out and TPUS was performed on 154 consecutive primiparous women 6–24 h after vaginal delivery. At 2 and 6 months later, complaints and sphincteric sonographic appearance were reassessed. The puerperal women’s clinical status and sonographic findings in the immediate and late postpartum period were evaluated.

Results: Thirty-five (23%) women complained of anal incontinence on the first postpartum day and anal sphincter damage was demonstrated by TPUS in 31 (89%) of them. Four women with anorectal complaints had an intact anal sphincter by TPUS. Follow-up questionnaires, 2 months later, revealed 30 symptomatic women: all of them had sonographically recognized tears on the initial TPUS and 27 of them had positive findings on the TPUS performed 2 months after birth. Six months after delivery, 27 women reported symptoms and all of them had sphincteric disruption evidenced on TPUS performed on the day of delivery. All the women with intact sphincter on the initial TPUS were asymptomatic 6 months later.

Conclusion: TPUS findings on the day of delivery are related to long-term anorectal complaints, supporting a potential role for TPUS as a screening aid for anal sphincter tears.

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Keywords: Anal sphincter; Flatus; Anal incontinence; Transperineal ultrasound

1. Introduction

Vaginal delivery is the most common cause of damage to the anal sphincter in women [1]. Between 13 and 25% of all primiparous women sustain injury to the anal sphincter complex in the course of labor and report fecal or flatus incontinence during the puerperium [2–9]. Although most of them suffer flatus incontinence, which is considered a relatively minor health issue, the debilitating impact on the social and sexual life of these women is considerable [2]. Early detection of injury, particularly during the immediate postpartum period, is of paramount importance since prompt and appropriate surgical correction may prevent long-term consequences. Overt obstetric anal injuries are usually evident in the delivery room and are usually treated surgically by a variety of proctological techniques [10]. Conversely, occult injuries usually remain undetected until the puerperium or later and are discovered by endoanal sonography or manometry performed for the evaluation of persistent anorectal complaints.

Anal endosonography is the current gold standard for diagnosing anatomical anal sphincter disruption, while manometry is helpful in detecting dysfunctional but intact sphincter, such as that seen in neurological trauma [3,4,11–14]. Both methods for exploring sphincter damage require specialized equipment used mostly by expert gastroenterologists, radiologists or proctologists and...
essentially unsuitable in the setting of the delivery room. Thus, a more accessible screening tool, operable by obstetricians in the delivery room, easily interpreted and cost-effective would be a welcome supplement to the obstetric armamentarium.

Transperineal [7,15,16] and transvaginal [17,18] ultrasonography (TPUS and TVUS, respectively) were suggested as substitutes for anal endosonography almost a decade ago, and their applicability and correlation with the gold standard endoanal ultrasonography are well studied. Peschers et al. [15] assessed the feasibility of TPUS by evaluating the inter-observer reproducibility and consistency with the endoanal approach. Roche et al. [16] reported that TPUS appears to be a practicable and tolerable alternative to anal endosonography in female patients and that it provides adequate information on external sphincter defects. They suggested that this procedure might be particularly useful in incontinence screening.

Unlike the substantial information available on the feasibility, ease of use and reproducibility of TPUS, there are apparently no published data on the clinical significance of TPUS findings. We assessed postpartum sphincteric integrity by TPUS and evaluated the clinical implication of positive findings in the immediate and late postpartum periods.

2. Methods

The study population included primiparous women delivered vaginally at Lis Maternity Hospital between June 2002 and January 2003. We excluded women with a history of chronic intestinal disease (Crohn’s disease, ulcerative colitis), acute gastroenteritis within the week preceding delivery and those who underwent any surgical or diagnostic procedure involving the anal canal prior to the current pregnancy. No antenatal or intrapartum dietary regimen was practiced, and the parturients were allowed to eat and drink during labor.

The study was IRB approved, and the women were recruited into the study prior to delivery after having received a detailed account about the examination and follow-up visits. The Wexner incontinence scoring system was used to evaluate the usage of pads and lifestyle alteration as well as the consistency and frequency of incontinence [19].

Fourteen women refused the sonographic examination and were dropped. The remaining participants were referred to the ultrasound unit 6–24 h after vaginal delivery and filled in a questionnaire on past medical and surgical history: none had any anorectal complaints before delivery. The forms listed a variety of incontinence symptoms, such as spontaneous or intercourse-related flatus/anal incontinence, defecation urgency and inability to distinguish solid from liquid stools and stools from flatus. Obstetrical data, such as mode of delivery, birth weight, perineal tears or episiotomy were gathered from the delivery room’s computerized records.

TPUS was performed by an expert sonographer using a transvaginal probe with a dynamic focus of 5–7 MHz (Sonoline Elegra, Siemens Medical System, Inc., USA). The sonographer was unaware of the patient’s clinical status, having been cautioned not to inquire about any existing complaints. With the woman in the dorsal lithotomy position, the probe was gently placed on the perineum and gradually inclined until the best view of the concentric muscle layers was achieved and filled most of the screen. Special attention was paid to the entirety of the hypoechoic ring, representing the internal anal sphincter encircling the echogenic irregularity of the anal mucosa, as well as to the completeness of the outer hyper-echogenic ring reflecting the external anal sphincter (Figs. 1 and 2).

At the end of the examination, the level of discomfort was graded on a scale from 1 to 5 (1 = minimal or none, 5 = unbearable). The interval between placing the probe until achieving the desired view was also recorded.

At 2 and 6 months postpartum, the participants were invited to undergo a follow-up TPUS and asked to fill in another continence questionnaire which addressed current complaints compared to those in the immediate postpartum period.

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All statistics were done using SPSS for Windows version 11 (SPSS Inc., Chicago, IL). A $p$ value of $<0.05$ was considered statistically significant.

3. Results

The results of all three phases of this study were available for 154 primiparous women. Fourteen other initially asymptomatic women were lost to follow-up and are not included in the final analysis of the results. All parturients were delivered vaginally, with a vacuum extraction rate of 5.2% and no forceps deliveries. One hundred twenty-five (81%) of the participants had epidural anesthesia with early postpartum ambulation (4–6 h). Episiotomy was performed in 103 (67%) and spontaneous perineal tears defined as second degree or higher were detected in 34 (22%). Seven women (4.5%) had persistent occipitus posterior presentation and 9 (5.8%) had birth-weights $>4000$ g.

Flatus or fecal incontinence was reported on the day of delivery by 35 women (23%) while 31 (89%) of them had anal sphincter damage that was demonstrated by TPUS. The vast majority of this group (29 women, 93%) had a partial external tear and two had a full-thickness tear. TPUS demonstrated partial external sphincteric tears in four out of 119 asymptomatic (3%) women, and they comprised the TPUS false positive group (Table 1). Noteworthy, only 2 of the 35 symptomatic parturients were diagnosed in the delivery room as having a third degree perineal tear (full thickness) and they underwent an immediate surgical repair by an expert proctologist according to our institutional policy.

Two months later, a repeated survey was conducted using the same questionnaire and TPUS evaluations. The symptoms had been resolved in 5/35 women (14%) and persisted or worsened in 30 (86%). Most (29/30, 90%) of the women with persistent or worse complaints had a well-demarcated sphincteric tear on the TPUS that had been performed on the day of delivery. TPUS performed 2 months after delivery revealed stigmata of sphincteric tear in 27 of 30 (90%) symptomatic women (Table 2). The group of five women with ano-rectal complaints during the first survey but no complaints 2 months later had normal TPUS findings on the examination performed 2 months postpartum. All the symptom-free women in the immediate postpartum period remained so 2 months later, but two of them still had findings consistent with anatomical disruption on TPUS.

The third phase of the study took place 6 months postpartum. The symptoms had abated in three women (10%) and persisted in 27 (90%). All 27 women with persistent complaints at 6 months postpartum had had normal TPUS findings 2 months after delivery and one of them still had findings consistent with anatomical disruption on TPUS.

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### Table 1

<table>
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<th>Symptomatic</th>
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A two by two table showing the features of TPUS done 2 months after delivery regarding symptoms on the same day

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<td>125</td>
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<tr>
<td>Total</td>
<td>30</td>
<td>124</td>
<td>154</td>
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</tbody>
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Sensitivity (%) 90
Specificity (%) 98
PPV (%) 93
NPV (%) 98

A two by two table showing the features of TPUS done 6 months after delivery regarding symptoms on the same day

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<td>5</td>
</tr>
<tr>
<td>TPUS –</td>
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<td>127</td>
<td>149</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>127</td>
<td>154</td>
</tr>
</tbody>
</table>

Sensitivity (%) 18
Specificity (%) 100
PPV (%) 100
NPV (%) 82

4. Discussion

The clinical significance of sphincteric disruption as detected by TPUS would have to be established before implementing TPUS as a screening method for early detection of potentially detrimental anal sphincter injuries. Our results support the ability of TPUS performed shortly after birth to detect both short- and long-term anorectal injuries, and they validate the utility of this approach in the third stage of labor in order to detect and treat occult sphincter injuries.

In our study, 17.5% of the primiparous women reported ano-rectal complaints 6 months after delivery and all of them were detected by the TPUS performed 6–24 h after birth. The ultrasonic scan performed on the same occasion detected anatomic disruption in another eight women, four of whom were asymptomatic at that time and reported no complaints 6 months later. Four parturients with anorectal complaints in the immediate postpartum period had normal TPUS findings, but one has to bear in mind that anatomical disruption is not the sole etiology for such symptoms and that functional neurological injuries may contribute to the development of anal incontinence in sonographically normal-appearing sphincter. Consistent with earlier reports [10], we found most anal muscular damage to be occult, with only 2/35 symptomatic women having overt third degree tears diagnosed and surgically repaired in the delivery room, thus further emphasizing the need for a screening tool in the delivery room set-up.

TPUS performed in the delivery room set-up as a screening aid for long-term anorectal complaints (Table 4) yielded a sensitivity and specificity of 100 and 94%, respectively, and the positive and negative predictive values were 77 and 100%, respectively.

Table 4

A two by two table showing the features of TPUS done on the day of delivery regarding long-term symptoms 6 months later

<table>
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<th>Symptomatic</th>
<th>Asymptomatic</th>
<th>Total</th>
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<tr>
<td>Total</td>
<td>27</td>
<td>127</td>
<td>154</td>
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</tbody>
</table>

Sensitivity (%) 100
Specificity (%) 94
PPV (%) 77
NPV (%) 100
TPUS demonstrating disrupted sphincter, but only five of them had persistent findings at the third phase of the study. This observation can be explained by two processes: natural repair of the sphincteric tear with adequate alignment of muscle fibers, and the interposing of scar tissue with a hyperechogenic appearance which is hard to discriminate from a normal external sphincter. These processes may underlie the beneficial utility of TPUS in the delivery room set-up, taking place as it does before the development of scar tissue. It is also possible that symptomatic women with an intact sphincter as demonstrated by TPUS 6 months postpartum had a combined anatomical–functional damage and so were still incontinent despite the anatomical realignment of muscle fibers.

The level of discomfort experienced by the examinee during TPUS is minimal, as demonstrated by the low inconvenience score and the fact that no women ranked TPUS-related discomfort as grade 4 or 5. The short duration of the examination (mean of 42 s and less than one minute in 78% of the cases) probably contributed to the negligible degree of bother, a feature that the parturient should find highly acceptable in a screening tool shortly after birth.

This study addresses the clinical implications of sonographic findings by a transperineal approach. Immediate postpartum TPUS examination is a promising screening tool in the delivery room set-up since it is widely available, feasible, causes minimal discomfort and has confirmed clinical implication for both short- and long-term fecal/flatus incontinence. The sensitivity and specificity of immediate postpartum TPUS screening for detecting women with long-term anal incontinence awaits a large-scale prospective study.

Acknowledgment

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References


