411

van Rumpt-van de Geest D A[1], van der Gaast M H[1], Steensma A B[1]
1. *Erasmus Medical Center*

THREE-DIMENSIONAL TRANSPERINEAL ULTRASOUND IMAGING OF ANAL SPHINCTER AFTER SURGICAL PRIMARY REPAIR.

Hypothesis / aims of study

Transperineal 3D/4D ultrasound is a non invasive investigation method to detect levator abnormalities and to evaluate defects of the anal sphincter (1). Third and fourth degree lacerations of the anal sphincter after vaginal delivery are a known risk factor for symptoms of fecal incontinence in the future (FI) (2). Whether sustained defects are more at risk for developing FI is unknown. Our hypothesis is that persistent defects are more at risk for developing FI.

Study design, materials and methods

In a prospective observational study all women attending our pelvic floor clinic between October 2006 and March 2010, women with either a history of third degree anal sphincter or follow up after surgical repair in our hospital were included in this study.
All patients underwent a standardized interview and pelvic floor ultrasound imaging, using a Voluson 730 Expert system and a 4-8 MHz RAB probe for imaging of the levator ani. For anal sphincter imaging a 5–9 MHz RNA probe was used, obtaining volumes at rest and in pelvic floor contraction. FI was defined as involuntary loss of soft or hard stools more than once a month. Offline analysis of the volumes was performed using GE Kretz software (4D View version 5.3). For analysis of levator defects TUI imaging was performed and the analysis of the anal sphincter, dynamic VCI static imaging was used with a slice thickness of 2mm. Anal sphincter defect (ASD) was defined as an interruption of the external anal sphincter (EAS) and/or internal anal sphincter (IAS) as seen on ultrasound. The length of the defect was defined according to Norderval (3) with a range from 0 (no defect) to 7 (with a total length of IAS and EAS). The length and the thickness of the EAS in the midsagittal and coronal plane at 12 o'clock were measured in rest and during contraction. After ultrasound imaging women were divided into two groups: intact sphincter (Figure 1A) or defect sphincter (Figure 1B) on perineal ultrasound. Statistic analyses were performed with the computer software package Statistical Package for the Social Sciences (SPSS Inc, Chicago, Ill) for Windows version 15.0 using Pearson Chi-square and Student's-test correlations were used for comparison of normally distributed data and the Mann-Whitney U test for nonparametric data. P<0.05 (two-sided) was considered statistically significant.

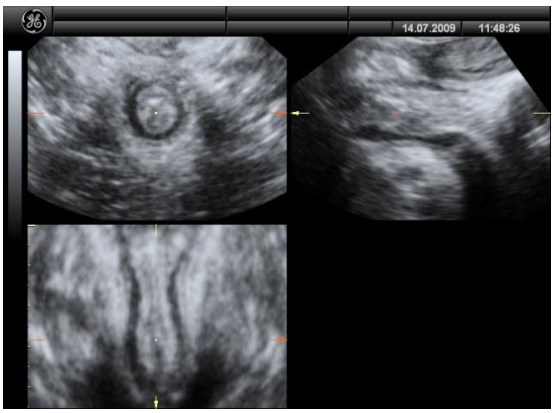

Figure 1A intact sphincter

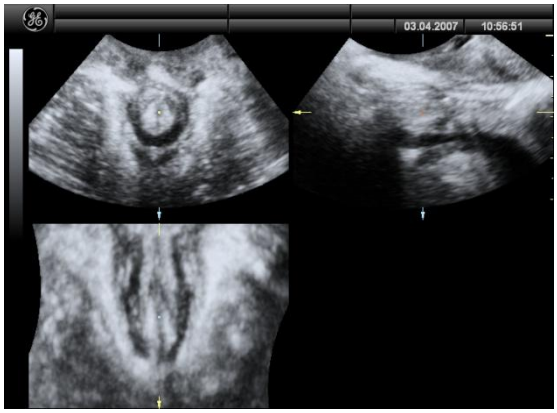

Figure 1B persistent defect sphincter (score7)

Results

Eighty-four women were included for this study, the median age was 35.5 years (range 19 - 77), parity 2 (1-5). Twenty percent of women did have a history of an instrumental delivery. The leading complaints were flatus incontinence (56%), soiling (12%), FI (39%), urinary symptoms (20%) and prolapse symptoms (7%).
The first group consisted of 35 (42%) women without defects on ultrasound. The second group consisted of 49 women with a sphincter defect to some extent; medium defects (score 1-4) was noted in 33 women and severe defects (5-7) in 16 women. The majority of the sphincter lesions occurred both the EAS and IAS (51%). Only 3 women had an IAS defect, an EAS defect was seen in 21 women (43%). The length of the EAS varied between 0.0 and 2.07cm. When analyzing women with complaints of FI, 13 women had an intact sphincter and 20 women had ultrasonographic defects. Patient characteristics of these women are listed in Table 1. The length of EAS in the group with the intact sphincters was statistically significant longer compared to the EAS in the group of sphincters with defects (1.40 vs. 0.85 cm, $p < 0.05$). As well, when comparing the women with no complaints of FI with intact sphincters (22 women) or defect sphincters (29 women) there was also a statistically significant difference in length in favor of the intact sphincters (1.47vs 0.79 cm, p=0.001).
Major levator ani defects (TUI score 8 for each side) were found in 51% of all patients. However, 32% of women did not show defects at all. The mean TUI score was 7.5. No differences for major levator defects were found between both groups or between women with or without complaints of FI.

Table 1. Characteristics of patients with fecal incontinence

	No defect (n=13)	**Defect (n=20)**	
Age (yr)	44 (29-65)	39.5 (19-66)	ns

Instrumental delivery	3	3	ns
Birth weight (gr)	3850 (3000-4900)	3650 (2890 - 4880)	ns
EAS (cm)	1.40 (1.14-2.21)	0.86 (0.0-1.89)	$p < 0.05$
Levator defect	11	6	ns

Interpretation of results

Surprisingly, FI was not associated with persistent anal sphincter defects, major levator defects or length of the EAS. It is still difficult to predict whether a woman will develop FI after a third or fourth degree perineal tear or not. We could not find a statistically significant association between the two groups, except that the length of the EAS was statistical significantly longer in the group with the ultrasonographic intact sphincters. The clinical relevance of this finding remains unknown. Moreover, the findings in this study show that 37% of women with intact sphincters on ultrasound developed FI, but also that 59% of the women with persistent defects on ultrasound had no complaints of FI at all. No association was found between complaints of FI and major levator defects. The severity of levator defects was similar in both groups. We are aware of the small numbers investigated that could bias these results. Developing FI is probably not only depending on the sphincter repair after third or fourth perineal tears, but also on other factors like stretch injury to the pelvic floor and pudendal nerve lesions. Moreover, women over 50 years of age tend to have more symptoms of FI than women younger than 50 years. Between the two groups, no statistical significant difference in age could be found.

Concluding message

Sustained defects of the anal sphincters were not more prone for developing FI than intact sphincters after anal sphincter repair. The significantly longer EAS is not a guarantee for better function of the anal sphincter. Thus, anatomical and functional repair differ and further research in this area may provide the answers.

References

1. UOG (2006); 27: 119 - 123
2. Br J surg (2003); 90 : 1333-1337
3. UOG (2009);33: 337 - 343

Specify source of funding or grant	**None**
Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**No**
This study did not require ethics committee approval because	**Observational study**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**