

## COMPARISON OF THE ANAL SPHINCTER COMPLEX EVALUATION WITH AND WITHOUT TOMOGRAPHIC ULTRASOUND IMAGING TECHNIQUE IN PATIENTS WITH OASIS.

### Hypothesis / aims of study

The only validated definition of 'significant External Anal Sphincter (EAS) trauma', in transperineal ultrasound (TPUS), is a visible defect of at least 30 degrees circumference in at least 4/6 tomographic slices using the tomographic ultrasound imaging technique (TUI). But, it is only for symptomatic patients, only involves the EAS and the TUI is not available for all ultrasonographers. The objective of our study is to compare the anal sphincter evaluation with and without TUI in patients with OASIS.

### Study design, materials and methods

The anal sphincter complex was evaluated in patients with a history of OASIS, with and without the TUI technique twice, at intervals of 1-3 weeks. The presence or absence of any tear in the EAS or IAS and its placement (internal, medial or external third of the anal canal) was recorded and described using the Starck scoring system. Intraobserver and inter-technique correlation was calculated, using the Cohen's Kappa correlation (k) for categorical variables and the intraclass correlation coefficient (ICC) for numeric variables. The association between patient's symptoms and US findings was also calculated.

### Results

63 women were evaluated. 26 patients (41.3%) were intrapartum diagnosed of 3a degree tear, 26 patients (41.3%) of 3b degree tear, 6 patients (9.5%) of 3c degree tear, 4 patients (6.3%) of 4th degree tear and 1 "button hole" tear (1.6%). 43 of the 63 patients (68.25%) reported symptoms of anal incontinence (AI). The mean Wexner's Score was 2.73 ( $\pm 3.18$ ).

Using the TUI technique: The mean length of the anal canal was 33.66 mm ( $\pm 4.56$ ).

Sixteen of the 63 (25.4%) patients did not present residual defects in the anal sphincter. In 31 (49.2%) cases, a defect in the EAS was observed, in 14 (22.2%) the defect was in both sphincters and in 2 cases (3.2%) a defect was observed in the IAS.

The number of affected slices for EAS was  $2.83 \pm 1.98$  and for IAS  $0.97 \pm 1.85$ . The location of these affected slices is shown in table 1. The intraobserver correlation when assessing which sphincter was affected was excellent, when using the TUI technique,  $k=0.9$ . For the defect location showed a  $k=0.92$  in the IAS and in the case of the EAS a  $k=0.57$  (table 1).

The mean of the Starck's score obtained was  $5.25 \pm 3.89$  in the first analysis and  $5.54 \pm 3.96$  in the second. The association between the ultrasound findings, using the Starck score, with patient's symptoms, evaluated with the Wexner score, was calculated and a statistically significant positive correlation was found with a Spearman Rho test:  $0.268$ ,  $p=0.03$ .

With the sweeping technique: The mean length of the anal canal was 32.43 mm ( $\pm 4.63$ ).

14 of the 63 (22.2%) patients did not present residual defects in the anal sphincter. In 31 (49.2%) cases, a defect in the EAS was observed, in 16 (25.4%) the defect was in both sphincters and in 2 cases (3.2%) a defect was observed in the IAS. The location of the defect is shown in table 1. The intraobserver correlation for the affected sphincter was excellent, with the sweeping technique,  $k=0.85$ . For the IAS, the intraobserver correlation in the location of the defect was good for both EAS and IAS ( $k=0.74$  and  $k=0.78$ )(table 1).

The mean of the Starck's score obtained was  $5.56 \pm 3.72$  and  $5.25 \pm 4.14$ . The association between the ultrasound findings with patient's symptoms show a positive correlation, but it is not statistically significant, when not using the TUI technique (Spearman Rho test:  $0.209$ ,  $p=0.1$ ).

Inter-techniques evaluation: The agreement for the anal canal length is good,  $ICC=0.7$ .

The correlation between both techniques is excellent for the Starck's score:  $ICC: 0.91$  with a CI 95%:  $0.85-0.94$ . But for the different individual parameters, this correlation is moderate in the case of the EAS ( $k=0.64$ ,  $0.51$  and  $0.54$  for depth, length and angle) and good for the IAS ( $k=0.8$ ,  $0.64$  and  $0.73$  for depth length and angle).

The correlation for the affected sphincter was excellent,  $k=0.85$ . The location of the defect, showed a good correlation for defects in the EAS located in the external and medial third of the anal canal, but poor correlation in the internal third: 25.4% (16) patients are supposed to have a residual defect in the internal third of the anal canal with the TUI technique but not with the sweeping technique. The correlation when trying to define the exact location of the defect is good for the IAS ( $k=0.65$ ) and moderate for the EAS ( $k=0.47$ )(table 1).

Table 1: Defect location

| EAS            | TUI 1 | TUI 2 | Intraobserver correlation (k) | Sweeping 1 | Sweeping 2 | Intraobserver correlation (k) | Inter-technique correlation (k) |
|----------------|-------|-------|-------------------------------|------------|------------|-------------------------------|---------------------------------|
| External third | 3     | 13    | 0.57                          | 1          | 1          | 0.74                          | 0.47                            |
| Middle third   | 1     | 0     |                               | 1          | 2          |                               |                                 |
| Internal third | 0     | 0     |                               | 0          | 0          |                               |                                 |

|                         |       |       |                               |            |            |                               |                                 |
|-------------------------|-------|-------|-------------------------------|------------|------------|-------------------------------|---------------------------------|
| External + Middle third | 16    | 6     |                               | 33         | 27         |                               |                                 |
| Middle + Internal Third | 4     | 7     |                               | 5          | 5          |                               |                                 |
| All anal canal          | 21    | 21    |                               | 7          | 6          |                               |                                 |
| IAS                     | TUI 1 | TUI 2 | Intraobserver correlation (k) | Sweeping 1 | Sweeping 2 | Intraobserver correlation (k) | Inter-technique Correlation (k) |
| External third          | 4     | 4     | 0.92                          | 6          | 2          | 0.78                          | 0.65                            |
| Middle third            | 0     | 0     |                               | 3          | 3          |                               |                                 |
| Internal third          | 0     | 0     |                               | 1          | 0          |                               |                                 |
| External + Middle third | 2     | 3     |                               | 3          | 4          |                               |                                 |
| Middle + Internal Third | 4     | 4     |                               | 1          | 1          |                               |                                 |
| All anal canal          | 6     | 5     |                               | 4          | 5          |                               |                                 |

#### Concluding message

The assessment of the anal sphincter complex can be done without TUI technique, because there is a good agreement when it is not used. There is a need for standardize the definition of defect and to create a proper classification or grading system of the sphincter defects observed in the transperineal ultrasound.

#### References

1. Guzmán Rojas RA, Kamisan Atan I, Shek KL, Dietz HP. Anal sphincter trauma and anal incontinence in urogynecological patients. *Ultrasound Obstet Gynecol.* 2015 Sep;46(3):363-6. doi: 10.1002/uog.14845. Epub 2015 Aug 10.

#### Disclosures

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