Utility of Endoanal Ultrasonography in Assessment of Primary and Recurrent Anal Fistulas and for Detection of Associated Anal Sphincter Defects

By

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Background

- Careful evaluation of perianal sepsis, particularly fistula-in-ano, is crucial for decision making and planning for surgical management.
- Thorough assessment serves to decrease the incidence of recurrence and FI postoperatively, hence achieve better outcomes.
- Magnetic resonance imaging (MRI) and EAUS are usually employed for the primary evaluation of complex and high FIA.

- Although previous studies investigated the overall accuracy and sensitivity of EAUS in the identification of the fistula track, presence of secondary extensions, and position of internal opening; no emphasis was made on its utility in the assessment of anal sphincters and detection of occult sphincter defects.
- This study aimed to investigate the role of 3D-EAUS in delineating the anatomy of FIA in comparison with the findings of EUA and to compare the accuracy and diagnostic utility of 3D-EAUS in recurrent and primary FIA.

- Another objective of the study was to investigate the utility of 3D-EAUS in detection of asymptomatic, occult anal sphincter defects in recurrent anal fistulas.

Methods

- This is a retrospective analysis of prospective data of patients with FIA who were investigated using 3D-EAUS in the colorectal surgery unit, Mansoura University hospitals between January 2012 and February 2017.

- Adult patients of both genders who presented with primary or recurrent anal fistula were included.

- We excluded patients with previous anorectal surgery for indications other than anal fistula and patients with associated anorectal pathology such as rectal prolapse, hemorrhoids or anal fissure

- Patients were assessed by taking full history of the complaint, local examination of the perineum including DRE, and anal manometry in patients with recurrent anal fistula

- EAUS was performed with patients in the left lateral position using a FlexFocus 400 Ultrasound Scanner (BK medical, Herlev, Denmark) with a rotating endoprobe and a 16-MHz 3D 2052 transducer.

- Anal fistula appeared as hypoechoic tracts or focal soft tissue lesions within anal wall structures.

- The primary fistula track was classified according to Park's classification as intersphincteric, high or low transsphincteric, suprasphincteric and extrasphincteric.

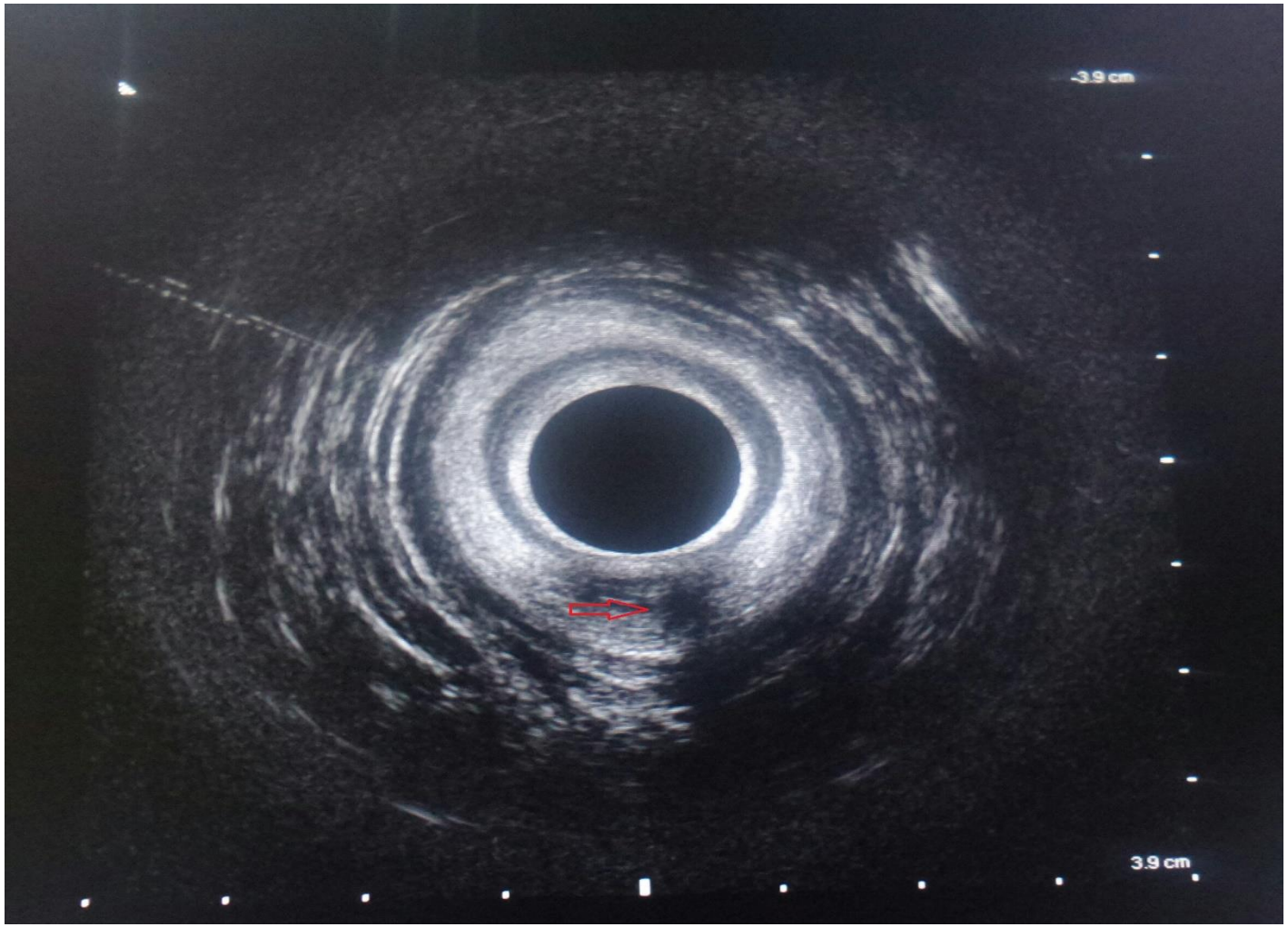
- Secondary branches including supralevator extensions of the primary tract and horse-shoe fistula were also identified and recorded.

Data collection and analysis

Patients' records were screened by two of the authors and the following variables were extracted:

- Patients' demographics as age, gender, and associated comorbidities.
- Data of clinical examination as type of FIA and position of external and internal opening.
- Continence state of the patients as assessed by Wexner continence score.
- Characteristics of FIA revealed by EAUS and EUA including position of the track, presence of secondary tracks as supralevator extension, position of the internal opening, and condition of the anal sphincters.

The concordance between 3D-EAUS (index test) and EUA (reference standard) regarding the position of internal opening, position of fistula tract, and condition of anal sphincters was assessed using Cohen's kappa coefficient (k).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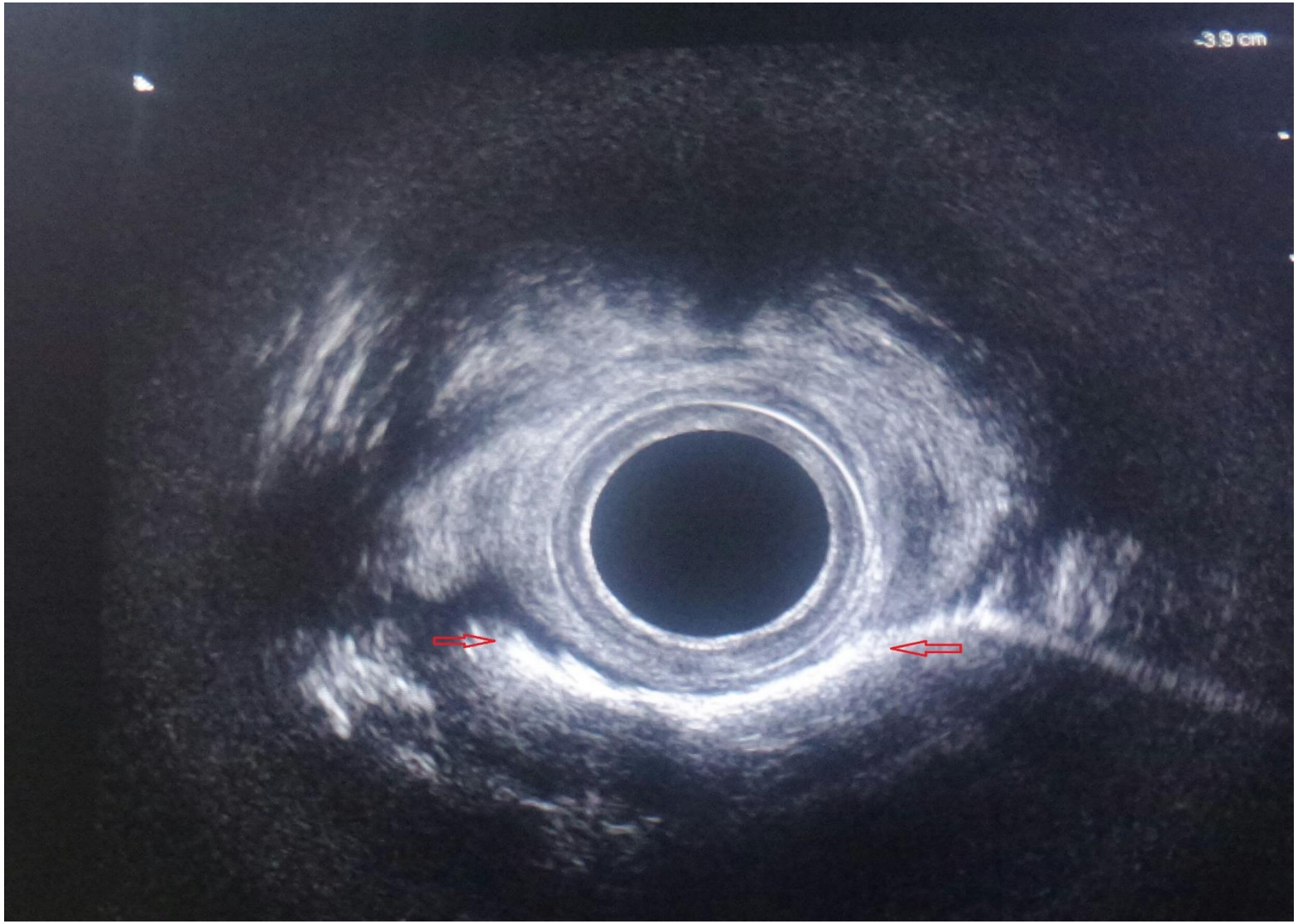
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Results

- Of 154 patients with FIA who were investigated with EAUS, 131 were included to the present study.
- Patients were 114 males and 17 females of a mean age of 43.3 years.
- Nine (6.8%) patients complained of FI caused by previous fistula surgery with median Wexner score of 8.
- 52% of patients presented with recurrent anal fistula after previous fistula surgery.
- As for patients with recurrent anal fistulas associated with anal sphincter defect in EAUS the mean resting anal pressure was 45.7± 16.2 mmHg and the mean squeeze anal pressure was 103± 40.2 mmHg.

- 3D-EAUS was able to detect the internal opening in 128 (97.7%) patients and to recognize the position of the fistula tract in 131 (100%) patients.
- According to EAUS, there were 78 (59.5%) high trans-sphincteric, 21 (16%) low trans-sphincteric, and 32 (24.5%) intersphincteric fistulas.
- Thirty-three (25.2%) patients had a secondary extension of their primary fistula track and five (3.8%) had horse-shoe intersphincteric anal fistula.
- A singular defect in the EAS was detected by EAUS in 19 (14.5%) patients with 100% sensitivity rate.
- The size of EAS defects ranged from 8.3% to 25% of the anal circumference.
- Twelve of the 19 patients with EAS defects had symptoms of FI whereas seven patients had asymptomatic occult sphincter defects

Summary of the overall accuracy and sensitivity of ERUS and its concordance with EUA

Variable		Value
Detection of the internal opening	Accuracy (%)	114/131 (87)
	Kappa (95% CI)	0.748 (0.63- 0.866)
	Sensitivity (95% CI)	97.4% (92.7 -99.5)
Detection of the primary tract	Accuracy (%)	116/131 (88.5)
	Kappa (95% CI)	0.83 (0.74- 0.92)
	Sensitivity (95% CI)	89.3 (82.7- 94)
Detection of secondary tracts	Accuracy (%)	30/33 (91)
	Kappa (95% CI)	0.937 (0.867-1)
	Sensitivity (95% CI)	100% (88.4-100)

Comparing the diagnostic utility of EAUS in primary and recurrent anal fistulas

Variable		Primary anal fistula	Recurrent anal fistula	P Value
Number (%)		63 (48)	68 (52)	-----
Mean age ± SD		43 ± 13.3	43.6 ± 12	0.786
Male/Female		9/54	8/60	0.865
Detection of internal opening	Accuracy (%)	56/63 (88.8)	58/68 (85.3)	0.725
	Kappa coefficient (95% CI)	0.759 (0.585-0.934)	0.735 (0.573- 0.897)	--------
	Sensitivity (95% CI)	98.2 (90.6- 99.9)	96.6 (88.3- 99.6)	--------
Detection of the position of the fistula tract	Accuracy (%)	57/63 (90.4)	60/68 (88.2)	0.906
	Kappa coefficient (95% CI)	0.901 (0.826- 0.977)	0.687 (0.483- 0.891)	--------
	Sensitivity (95% CI) for HTF	100 (86.7- 100)	91.6 (80- 97.7)	
	Sensitivity (95% CI) for LTF	57 (28.8- 82.3) 100 100	91.7 (61.5 -99.8)	
	Sensitivity (95% CI) for IF	(85.1- 100)	62.5 (24.5- 91.5)	--------
Detection of Secondary branches	Accuracy (%)	10/10 (100)	20/23 (87)	0.536
	Kappa coefficient (95% CI)	1	0.898 (0.768- 1)	--------
	Sensitivity (95% CI)	100 (69.1- 100)	100 (83.2- 100)	--------

Outcome of surgery

- The median follow-up period was 24 (4-42) months.
- Nine (6.8%) patients developed recurrence of anal fistula postoperatively and one (0.76%) developed minor degree of FI (Wexner score = 3).
- Six patients who developed recurrence of anal fistula had previously recurrent fistula and three had primary anal fistula.

Conclusions

- 3D-EAUS is a reliable imaging modality for preoperative assessment of anal fistula.
- The diagnostic utility of 3D-EAUS was comparable in primary and recurrent FIA implying no significant impact of postoperative scarring on the accuracy and sensitivity of EAUS.
- 3D-EAUS had the privilege of detecting symptomatic and occult anal sphincter defects in patients with recurrent FIA with higher accuracy and sensitivity than DRE.
- Therefore, we recommend performing EAUS as routine preoperative assessment of FIA, particularly the recurrent cases where anal sphincter defects after prior intervention may be anticipated.

Thank You