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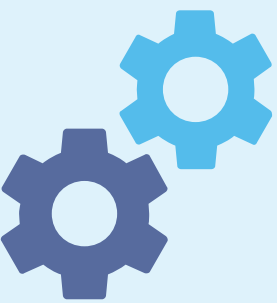
Objective

Can an in-house **artificial intelligence (AI)** tool help **novice clinicians identify significant external anal sphincter (EAS) defects** on transperineal ultrasound (TPUS)?

We compared **AI-assisted novice assessments** to **both novice and expert manual analyses** in terms of:



Accuracy



Perceived workload



Interpretation time

Methods

102 TPUS volumes were manually analysed with **tomographic ultrasound imaging (TUI)** sequences (Fig. 1) [1] by:

- A novice (1 year of TPUS experience)
- An expert (> 5 years).

AI-assisted subset: **17 TPUS volumes with expert-confirmed EAS defects (≥3 slices with defects)** were re-evaluated by the novice with AI-assistance (Fig 2).

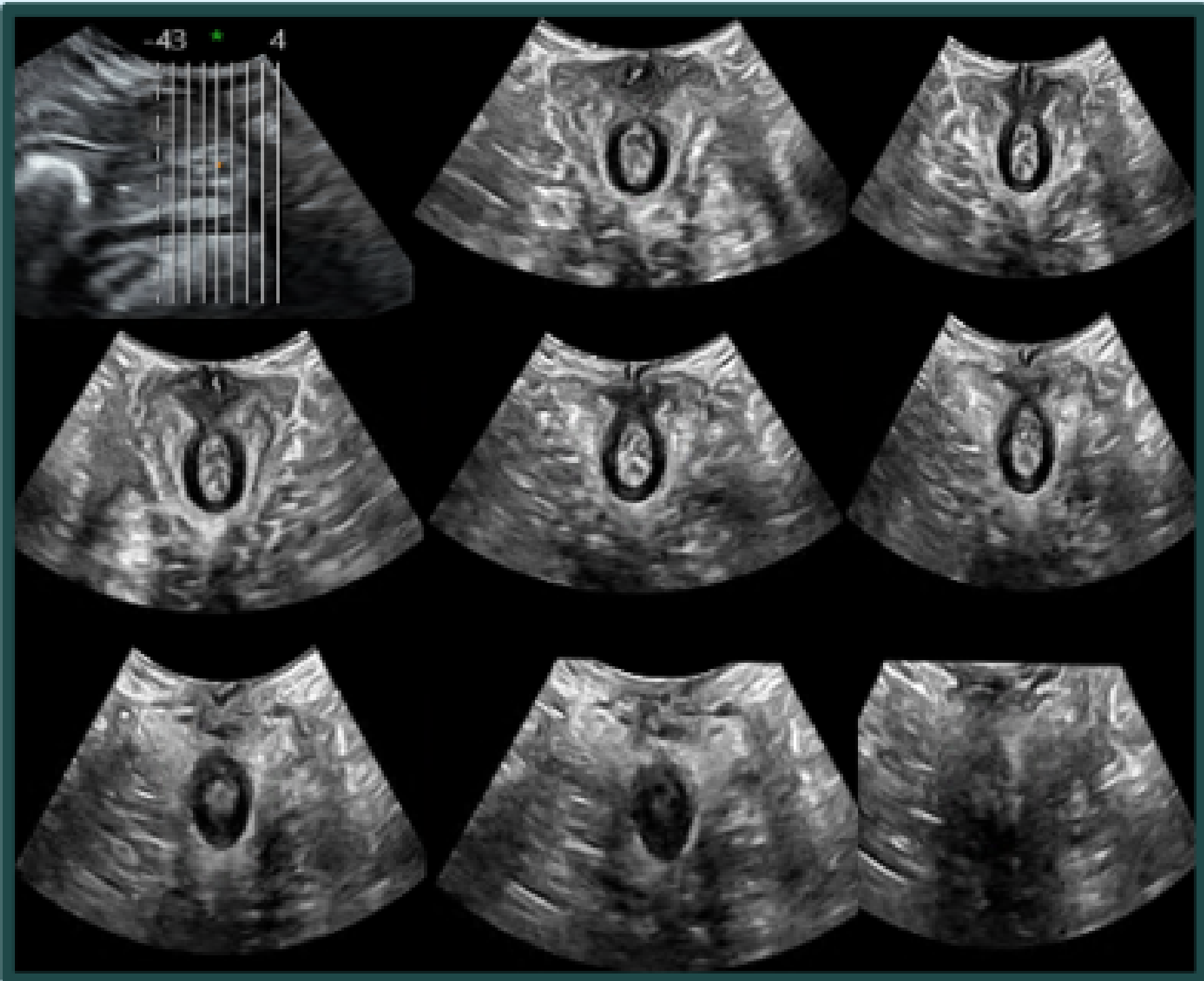


Fig 1: TUI sequence shown during manual analysis.

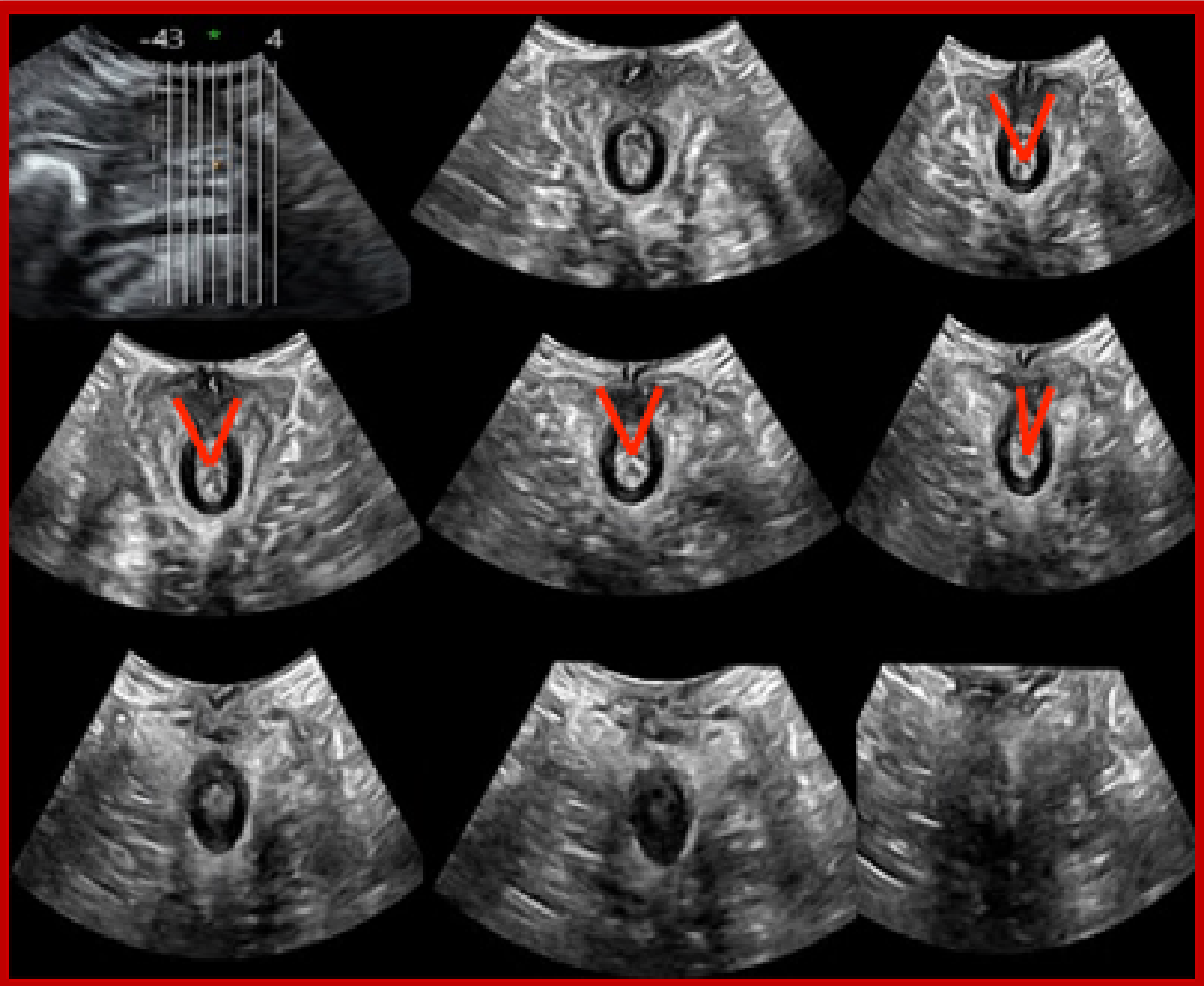


Fig. 2: AI-assisted TUI sequence with automatic defect overlay.

Metrics: novice **disagreement rate** (% of slices where a novice marked a defect/intact while the expert marked intact/defect). **Time** and **NASA Task Load Index (NASA-TLX)**.

Results

Across the entire dataset, novice manual analysis disagreement rate was 12.9%. In the **subset** (n=17) (Table 1), the **novice’s manual disagreement rate doubled to 23.5%**, and they identified 3 of 6 severe EAS defect cases.

With **AI-assistance:** novice disagreement rate **reduced to 15.7%**, and **5 out of 6 patients** were identified with significant EAS defects.

	Novice manual analysis	Novice AI-assistance	Expert manual analysis	AI analysis
Disagreement rate (%)	23.50	15.70	NA	14.70
Kappa Cohen coefficient	0.55	0.69	NA	0.70
Number of patients with defects on at least 4 TUI slices	3 patients	5 patients	6 patients	5 patients
Time (seconds)	153.40	119.80	76.50	2.10
NASA-Task Load Index score	54.30	26.30	NA	NA

Table 1: Comparison between novice manual analysis, AI-assisted novice analysis, expert manual analysis and AI automatic analysis on a subset of 17 cases.

With AI assistance: 🧠 **Detection ↑ (+2 patients)** ⌚ **Time ↓ (-35 seconds) (p=0.018)**
📉 **Workload ↓ NASA-TLX halved.**

Conclusion: **AI-assistance improved novice detection of EAS defects**, enabling identification of two additional patients with significant EAS defects. AI-assistance also **halved workload** and **significantly reduced analysis time**.

[1] Dietz HP. Exoanal Imaging of the Anal Sphincters. J Ultrasound Med. 2018 Jan.