

Automatic Classification of Endometriosis from Free-Text Gynaecological Ultrasound Reports Using Large Language Models: A Proof of Concept

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OBJECTIVES

Gynecological ultrasound units maintain large repositories of free-text reports containing detailed descriptions of endometriosis-related findings. Extracting structured diagnoses is language-specific and requires extensive manual review, limiting their use for research, audit, and epidemiological surveillance. We describe a proof-of-concept by applying Large Language Models (LLMs) to automatically classify endometriosis using the #ENZIAN framework from free-text gynecological ultrasound reports in any language, without manual annotation.

METHODS

Free-text reports from a dedicated tertiary endometriosis referral unit were exported from institutional software over a 3-month pilot period. Both the Exam Summary and Diagnosis Comment fields were extracted and batch-processed via the Claude API (Anthropic). 169 consecutive reports were analyzed in a non-English language, demonstrating language independence. The LLM assigned #ENZIAN compartments (P/O/T/A/B/C/FA/FB/FI and F(abdominal wall)) and graded severity per rASRM-informed criteria as: severe (tubal occlusion, frozen pelvis, bowel wall invasion), moderate (endometrioma, DIE-B, adhesions), or mild (adenomyosis, superficial disease).

RESULTS

Pathology was detected in 66/169 reports (39.1%): 31 adenomyosis (FA - 47.0%), 38 peritoneal (P - 57.6%), 22 endometriomas (O - 33.3%), 9 uterosacral/parametrium (B - 13.6%), 4 bowel DIE (C+FI - 6.1%), 28 pelvic adhesions (including T - 42.4%), 7 tubal occlusions (T - 10.6%), 1 abdominal wall scar endometriosis (F - 1.5%). Regarding severity: severe in 11 (16.7%), moderate in 31 (47.0%) and mild in 24 (36.4%). Full #ENZIAN breakdown in Table 1.

Table 1. #ENZIAN compartment classification and severity (n=29 reports with pathology; Keckstein et al., Acta Obstet Gynecol Scand 2021)			
Finding / Subtype	n	% of pathology	Severity
Overall (n=66 / 169 reports, 39.1%)			
FA: adenomyosis	31	47.0%	Mild/Moderate
P: peritoneal endometriosis	38	57.6%	Mild
O: ovarian endometrioma	22	33.3%	Moderate
B: uterosacral / parametrium	9	13.6%	Moderate
Bowel DIE (C + FI)	4	6.1%	Severe
Pelvic adhesions (incl. T)	28	42.4%	Moderate/Severe
Tubal occlusion	7	10.6%	Severe
A: vagina / RVS / retrocervical	1	1.5%	Moderate
F(abdominal wall): caesarean scar	1	1.5%	Moderate
FB: bladder	0	0%	—
FU: ureter	0	0%	—

Finding / Subtype	n	% of pathology	Severity
Severity distribution (n=66)			
Severe	11	16.7%	Tubal occlusion, frozen pelvis, bowel DIE
Moderate	31	47.0%	Endometrioma, DIE-B, adhesions
Mild	24	36.4%	FA (adenomyosis), superficial peritoneal
Severity graded per rASRM-informed criteria (revised American Society for Reproductive Medicine): severe = tubal occlusion, frozen pelvis, or bowel wall invasion (muscularis); moderate = endometrioma, DIE-B (uterosacral/parametrium), or pelvic adhesions; mild = adenomyosis (FA) or superficial peritoneal disease only. #ENZIAN per Keckstein et al., Acta Obstet Gynecol Scand 2021.			

CONCLUSIONS

Free-text gynecological ultrasound reports across multiple documentation fields are an underutilized resource for structured analysis of endometriosis data. LLM-based #ENZIAN classification identified the full disease spectrum, including bowel and abdominal wall involvement, without manual annotation and regardless of report language. Prospective validation against expert-annotated ground truth is the planned next step.

Keywords: endometriosis; deep infiltrating endometriosis; ultrasound; large language model; natural language processing; free-text classification