

COMPARATIVE DIAGNOSTIC ACCURACY ACROSS MULTIPLE IMAGE-ENHANCED ENDOSCOPY MODALITIES FOR GASTRIC INTESTINAL METAPLASIA: A BAYESIAN BIVARIATE RANDOM-EFFECTS NETWORK META-ANALYSIS

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INTRODUCTION

Gastric intestinal metaplasia (GIM), a precursor to gastric cancer, is often missed by standard white-light endoscopy (WLE), highlighting a critical need for advanced endoscopic imaging to improve detection and outcomes.

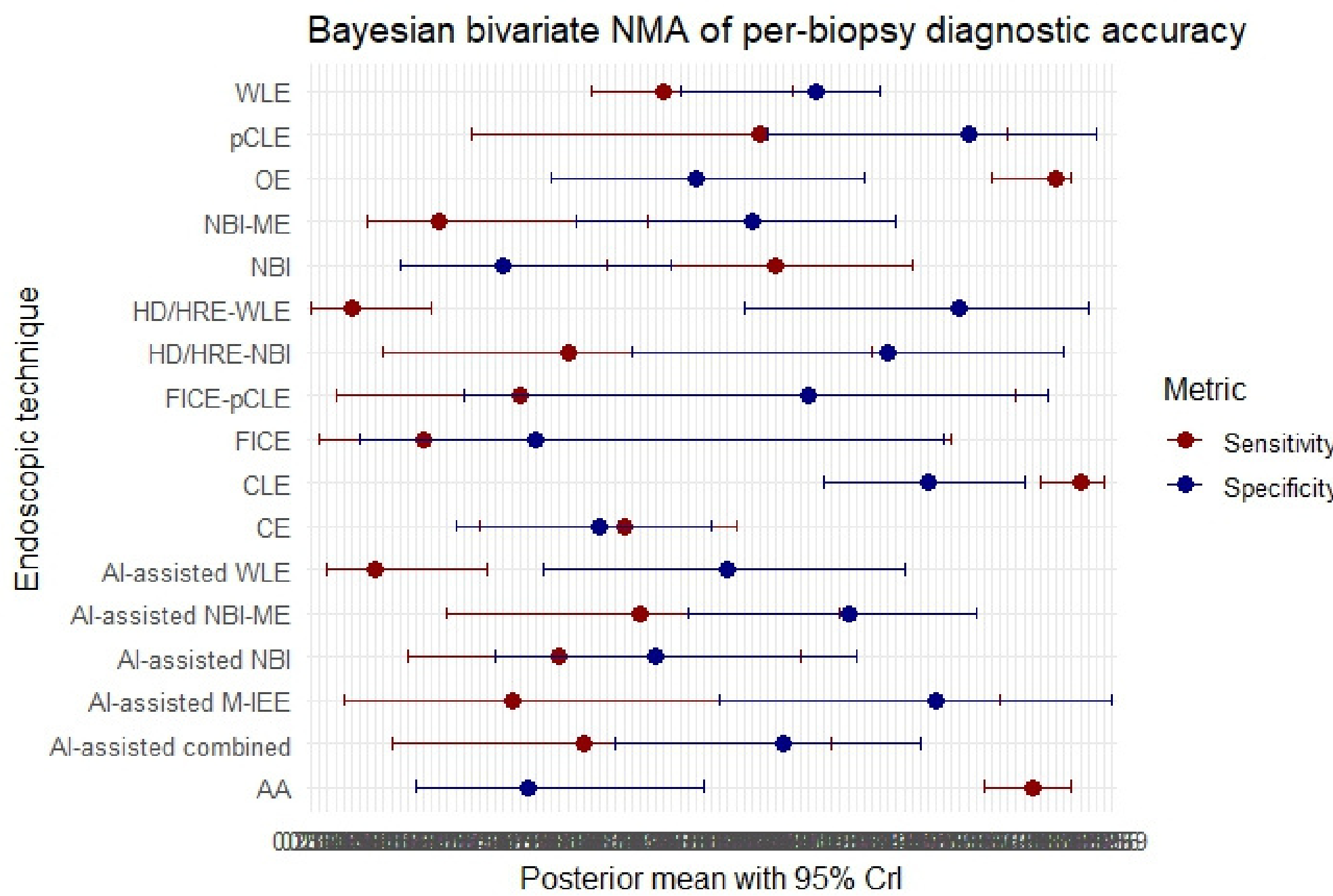
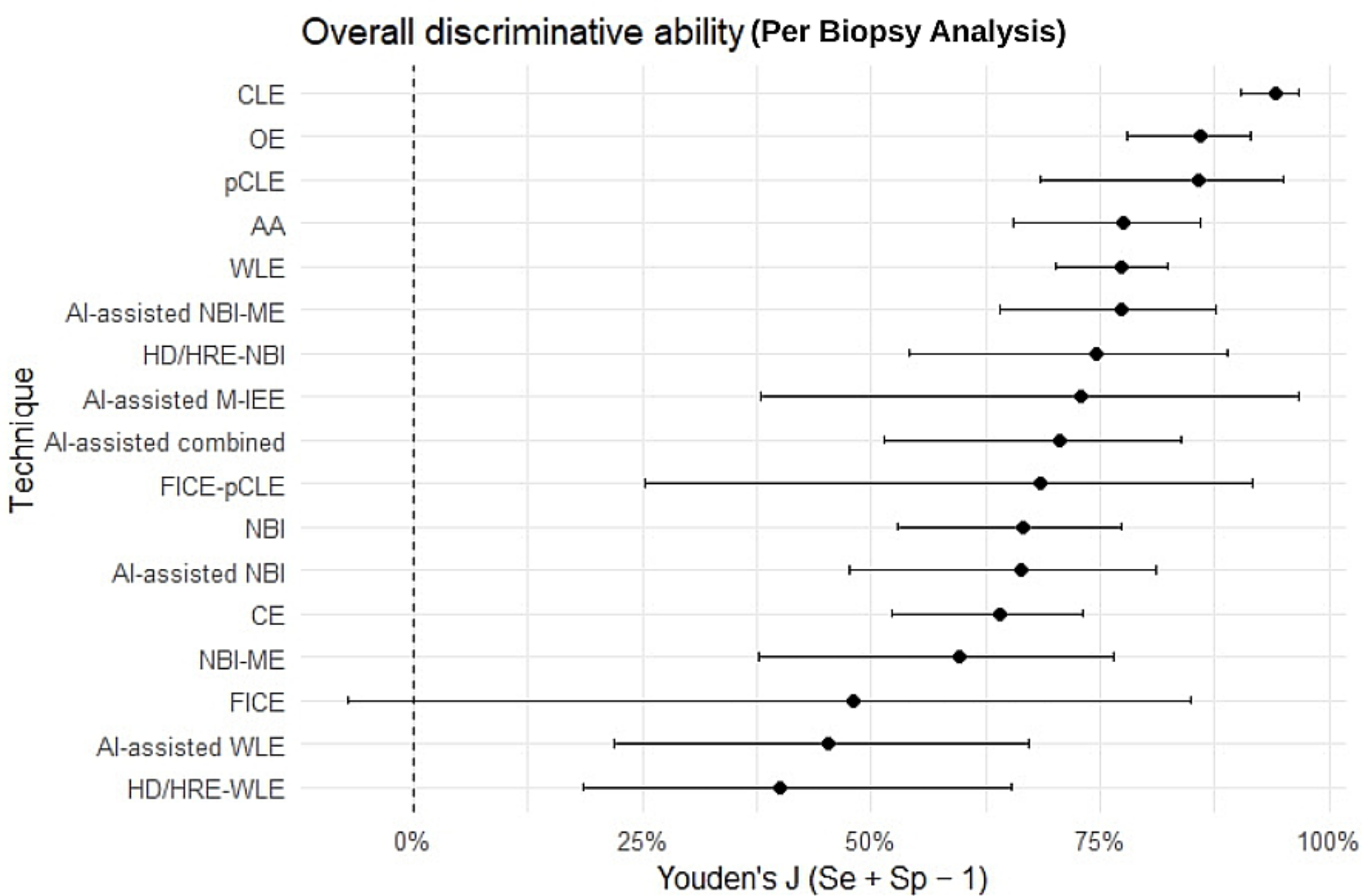
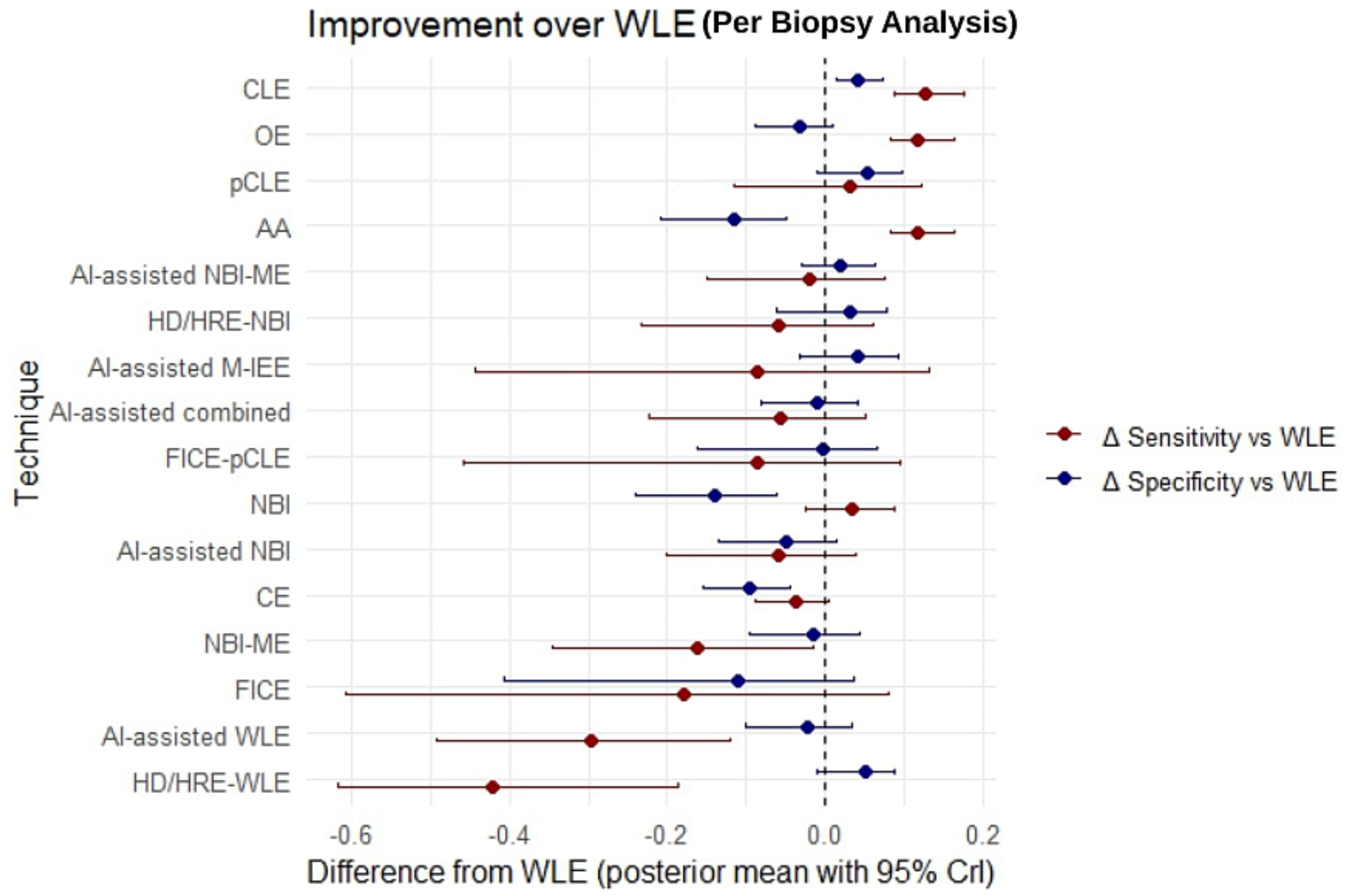
METHODS

We conducted a Bayesian bivariate random-effects network meta-analysis of diagnostic accuracy for gastric intestinal metaplasia (GIM). Eligible studies were prospective comparative diagnostic accuracy trials in adults, assessing endoscopic modalities against standard WLE. Interventions included image-enhanced endoscopy techniques (NBI, magnifying NBI, chromoendoscopy, optical enhancement (OE), AI-assisted modalities) and microendoscopy (CLE, pCLE). PubMed, Embase, and Scopus were searched (>2,300 records screened). Arm-level counts were extracted. Sensitivity and specificity were modeled jointly on the logit scale with correlated study-level random effects. Posterior means and 95% credible intervals (CrIs) were summarized.

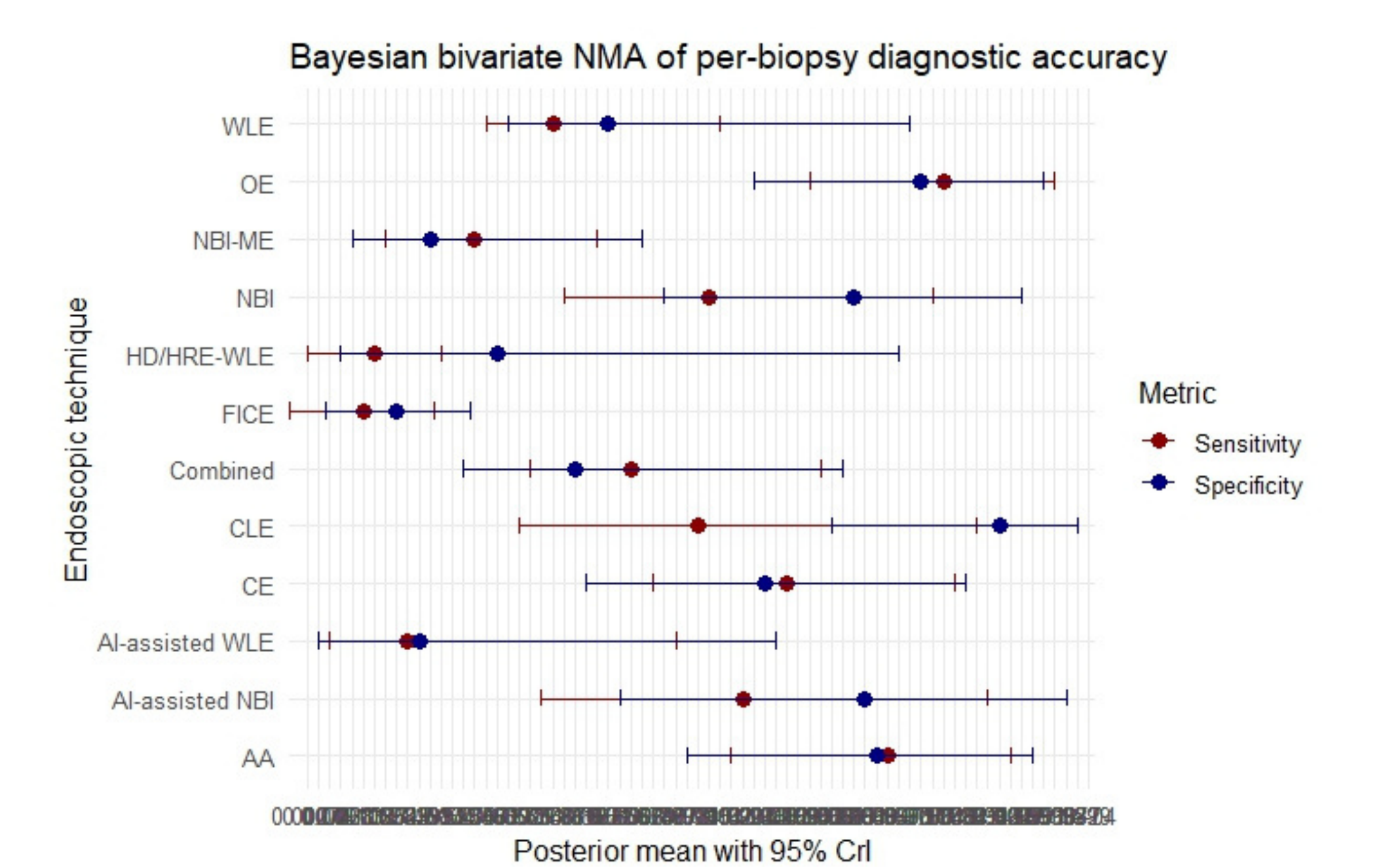
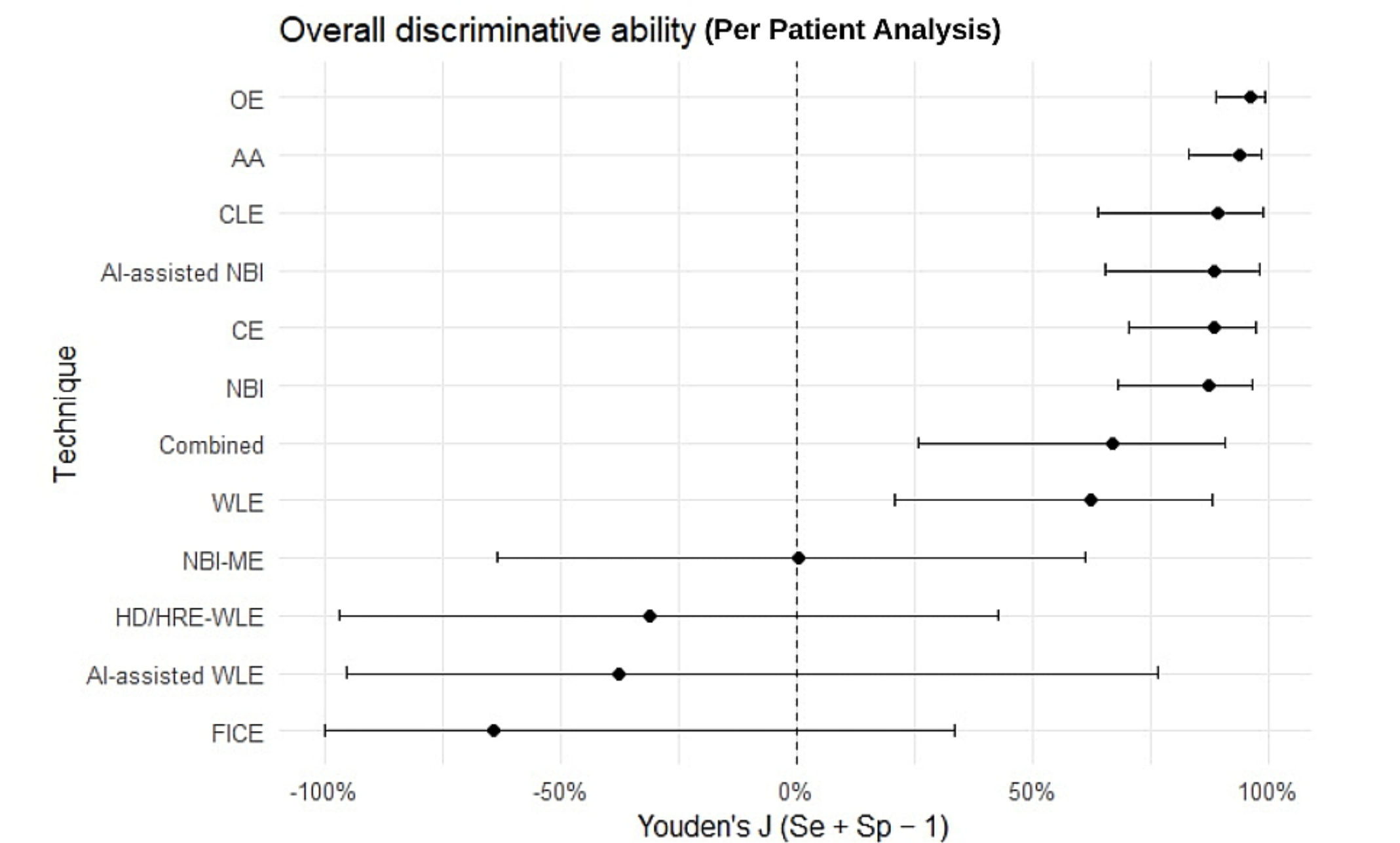
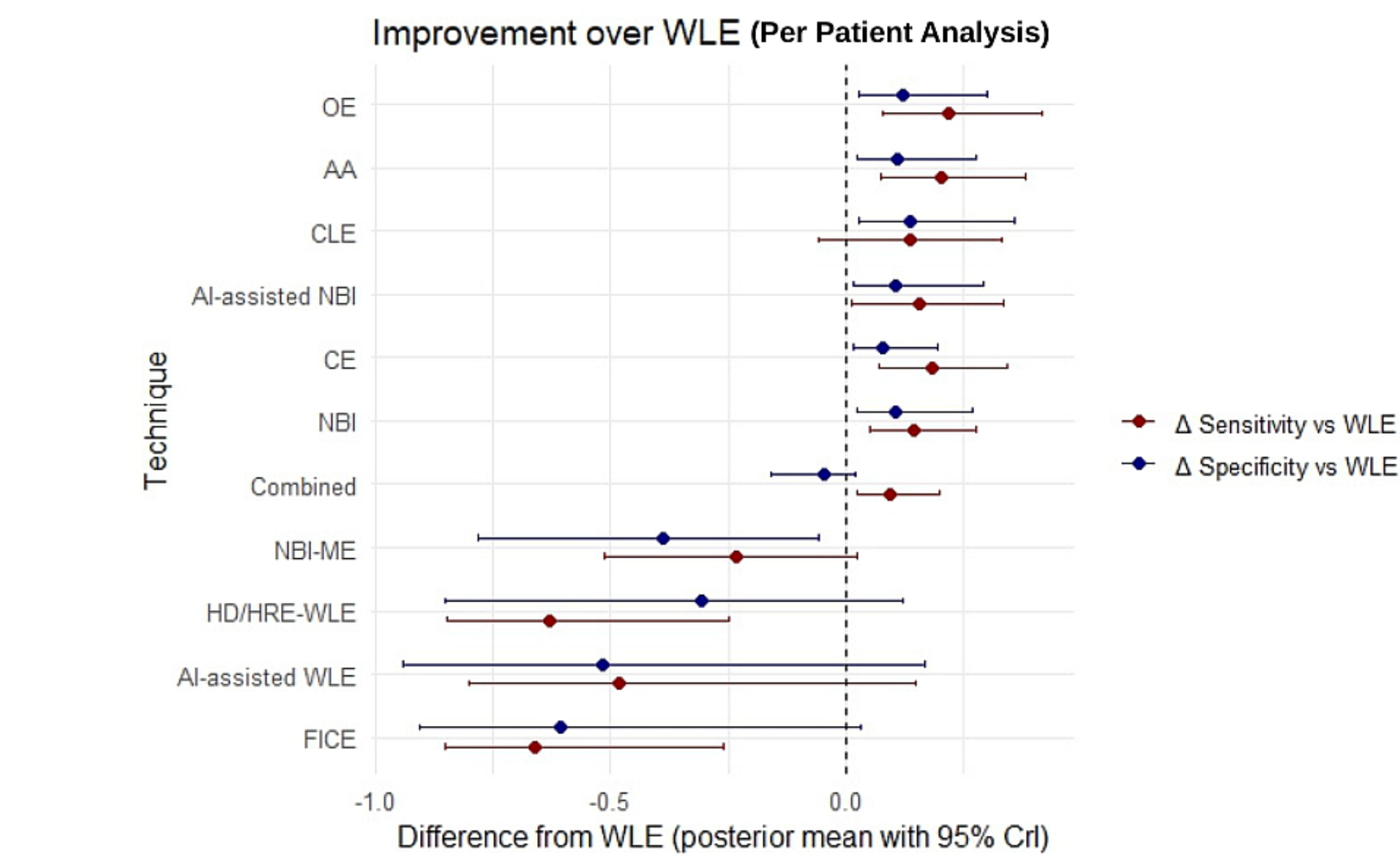
RESULTS

In per-biopsy analyses, heterogeneity was moderate (σSe 1.36, 95% CrI 1.02-1.81; σSp 1.02, 0.74-1.40) with weak correlation (ρ 0.14). CLE achieved the highest accuracy (Se 99.0%, 95% CrI 98.0-99.6; Sp 95.2%, 91.5-97.6). OE also performed strongly (Se 98.1%, Sp 87.9%), while pCLE (Se 89.5%, Sp 96.3%) and AI-assisted NBI-ME (Se 84.2%, Sp 93.0%) provided balanced performance. Conventional WLE showed lower accuracy (Se 86.3%, Sp 91.0%), and NBI favored sensitivity over specificity (Se 89.7%, Sp 76.9%). HD/HRE-WLE was limited by low sensitivity (44.0%) despite preserved specificity (96.0%). Rankings by Youden's J placed CLE highest, followed by OE and pCLE, with HD/HRE-WLE lowest. Per-patient analyses showed high heterogeneity (σSe 2.26, 95% CrI 1.54-3.33; σSp 2.86, 1.89-4.26) and strong positive correlation (ρ 0.75). OE emerged the most accurate technique overall (Se 98.5%, 95% CrI 95.6-99.7; Sp 97.7%, 92.4-99.6). Acetic-acid chromoendoscopy also performed well (Se 97.0%, Sp 96.8%), as did AI-assisted NBI (Se 92.1%, Sp 96.5%) and CLE (Se 90.2%, Sp 99.2%), while standard WLE was less reliable (Se 76.6%, Sp 85.8%). NBI-ME (Se 53.5%, Sp 46.8%) and sparse-evidence nodes such as FICE, AI-assisted WLE, and HD/HRE-WLE showed wide uncertainty and poor accuracy.

Per Biopsy Analysis



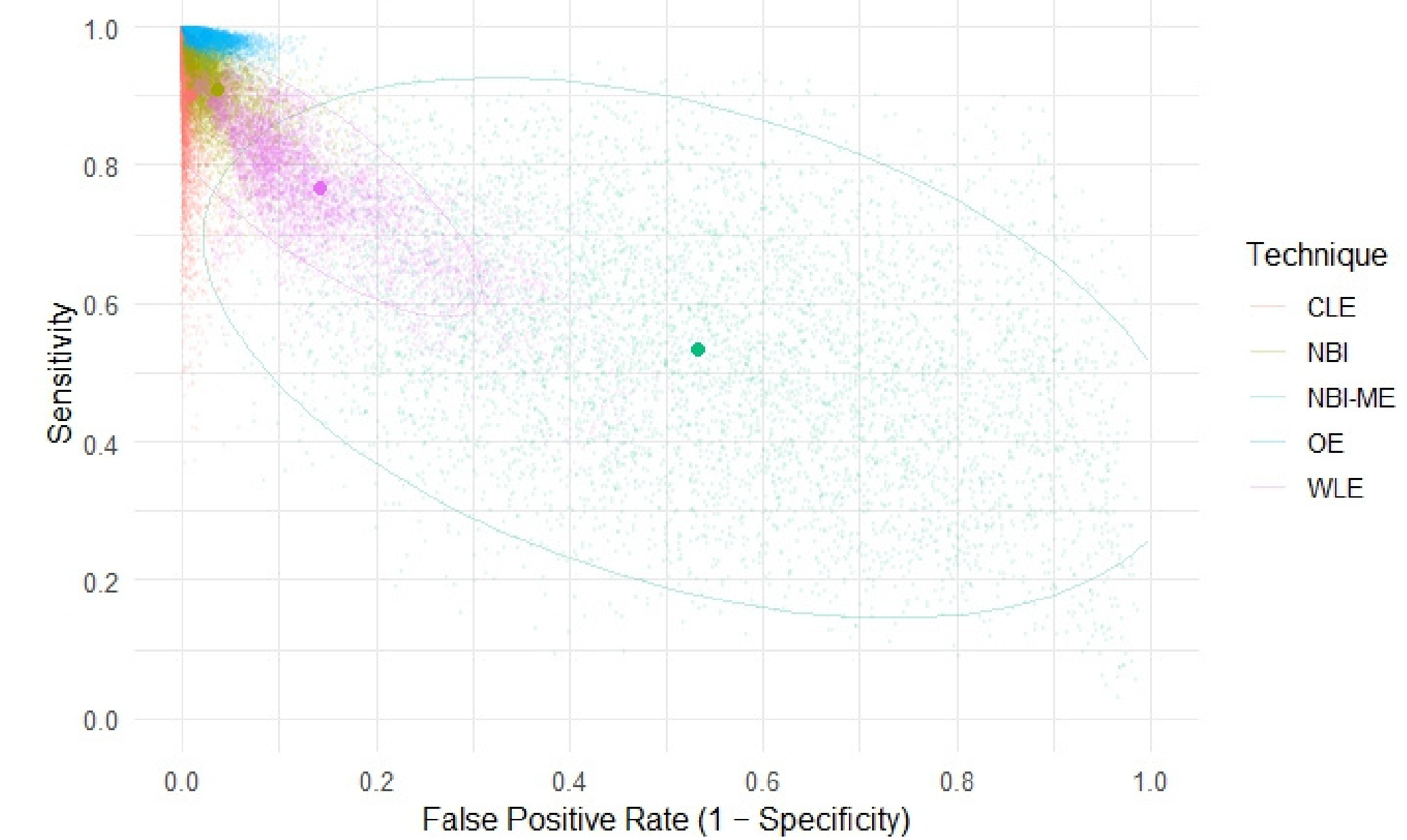
Per Patient Analysis



HSROC summary: posterior clouds and 95% ellipses Per Biopsy Analysis



HSROC summary: posterior clouds and 95% ellipses Per Patient Analysis



CONCLUSIONS

CLE, OE, and pCLE provided the strongest discriminative ability in per-biopsy analyses, while per-patient data confirmed OE, acetic-acid chromoendoscopy, AI-assisted NBI, and CLE as the most favorable techniques.

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