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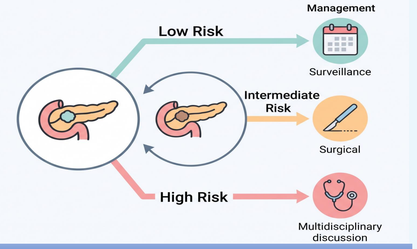
اولین کنگره بین المللی تحول خدمات سلامت

۲۷ و ۲۸ مهر ماه



AI-Assisted Risk Stratification of Pancreatic Cystic Lesions: Integrating Imaging, EUS, and Clinical Decision-Making

Code: 1580



Mobina Katal

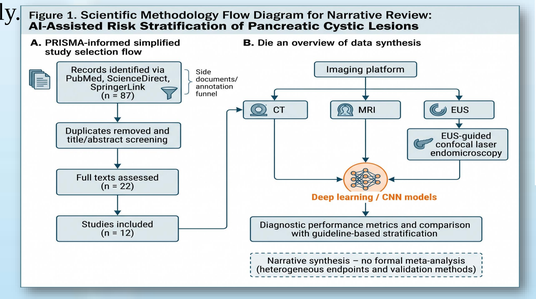
Surgical Technology Student, Islamic Azad University, Sari Branch, Sari, Iran, Mobikt8870@gmail.com

Backgrounds

Pancreatic cystic lesions are increasingly found incidentally on CT/MRI. A subset mainly IPMNs and mucinous cystic neoplasms—carries malignant potential, but current guidelines (Fukuoka, European, ACG) have imperfect sensitivity and specificity. EUS adds high-resolution imaging and cyst-fluid sampling, yet interpretation remains operator-dependent. This review asks whether EUS-based AI models add diagnostic value over conventional imaging and clinical markers for malignant risk stratification.

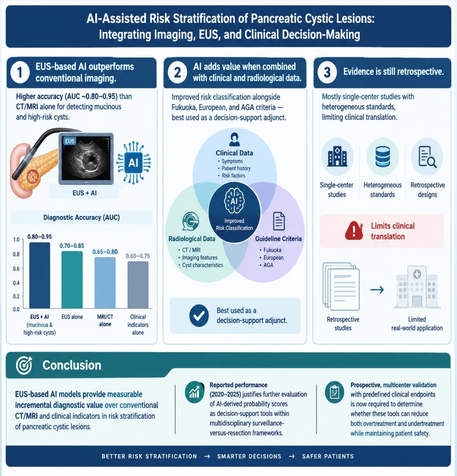
Methods

Narrative review of English studies (2020–2025) in PubMed, ScienceDirect, and SpringerLink on AI/ML for PCL assessment using CT, MRI, EUS, or EUS-guided endomicroscopy. 87 records screened; 12 studies included. Data extracted on architecture, modality, reference standard, and diagnostic metrics; synthesised narratively.

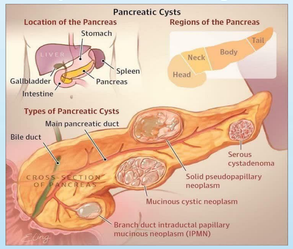


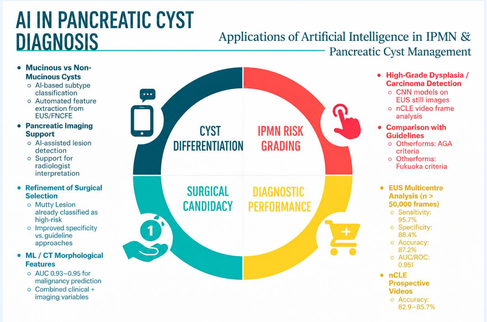
Findings

AI applications in pancreatic cysts focus on three tasks: cyst-type differentiation, detection of high-grade dysplasia/carcinoma in IPMNs, and refinement of surgical candidacy. CNN models on EUS and nCLE images achieved up to 87.2% accuracy (AUROC 0.951), and machine-learning models combining clinical and CT features reached AUCs of 0.93–0.95 for malignancy prediction. However, heterogeneity in datasets and validation limits direct comparison between models.

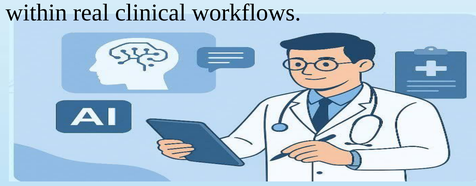


particularly CNNs trained on EUS and nCLE data, shows strong potential in risk stratification of pancreatic cystic lesions—distinguishing mucinous from non-mucinous cysts, detecting high-grade dysplasia or carcinoma within IPMNs, and refining surgical candidacy among lesions already classified as high-risk.



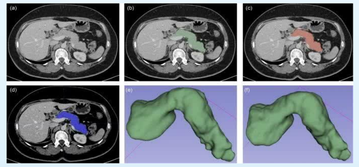


Machine-learning models combining clinical variables with CT morphological features also improve malignancy prediction and specificity compared with some guideline-based approaches. Limitations: Most studies are retrospective, histologically verified high-grade cases are limited, external validation is infrequent, and heterogeneity in datasets, acquisition protocols, and reference standards limits direct comparison. Few models have been tested prospectively within real clinical workflows.



Conclusion

1. EUS-based AI outperforms conventional imaging. Higher accuracy (AUC ~0.80–0.95) than CT/MRI alone for detecting mucinous and high-risk cysts.
2. AI adds value when combined with clinical and radiological data.
Improved risk classification alongside Fukuoka, European, and AGA criteria — best used as a decision-support adjunct.
3. Evidence is still retrospective.
Mostly single-center studies with heterogeneous standards, limiting clinical translation.



References

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