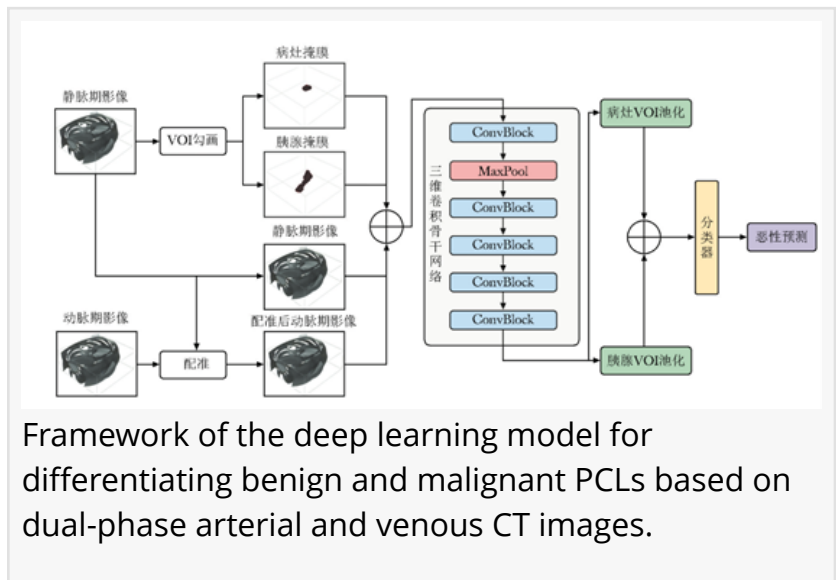


Dual-phase CT sharpens deep-learning assessment of pancreatic cysts

GA, UNITED STATES, August 18, 2026 /EINPresswire.com/ -- A deep-learning approach that reads two contrast-enhanced computed tomography (CT) phases may help clinicians distinguish benign from malignant [pancreatic cystic lesions](#) (PCLs) before surgery. By combining arterial- and venous-phase images with maps of the pancreas and the lesion, the model captured complementary structural and blood-flow-related information that can be difficult to assess consistently by eye. In an independent test set, the best-performing system showed strong sensitivity for malignant lesions and produced decisions broadly aligned with a radiologist's assessments. The findings suggest that dual-phase CT could support more consistent risk stratification, helping identify patients who need closer evaluation while reducing uncertainty in the management of incidentally detected pancreatic cysts.



Framework of the deep learning model for differentiating benign and malignant PCLs based on dual-phase arterial and venous CT images.

Pancreatic cystic lesions are being found more frequently as cross-sectional imaging becomes more common. Their clinical importance varies widely: some lesions remain harmless, whereas others carry malignant potential and may require surgery. Current assessment relies on features such as cyst walls, septa, mural nodules, solid components, pancreatic-duct changes, and surrounding tissue involvement. Yet these signs often overlap across disease types, and interpretation can vary with reader experience. Conventional radiomics can quantify image patterns, but it depends heavily on segmentation, handcrafted feature selection, and technical choices that may limit reproducibility. Because of these challenges, deeper investigation is needed into noninvasive models that integrate complementary imaging phases and produce reliable preoperative risk estimates.

Researchers from the Department of Radiology at Peking Union Medical College Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, reported the study online on July 13, 2026, in the Medical Journal of Peking Union Medical College Hospital. The team developed and evaluated three-dimensional deep-learning models using arterial- and

venous-phase contrast-enhanced computed tomography (CT) scans from patients with pathologically confirmed pancreatic cystic lesions (PCLs). Their goal was to determine whether combining both imaging phases could improve benign-malignant classification and provide an objective aid for clinical decision-making before surgery.

The retrospective, single-center study included 480 patients with 485 lesions collected between June 2014 and May 2023; 206 lesions were malignant and 279 were benign. The researchers divided lesions into training, validation, and independent test sets in a 3:1:1 ratio while keeping all lesions from the same patient in one subset. After image registration and preprocessing, they supplied four three-dimensional channels to five neural-network architectures: arterial-phase CT, venous-phase CT, a pancreatic mask, and a lesion mask. Postoperative pathology served as the reference standard. ResNeXt50 delivered the highest overall point estimates. In the test set, it achieved an area under the receiver operating characteristic curve (AUC) of 0.822, 73.20% accuracy, 82.93% sensitivity, and 66.07% specificity. Its AUC exceeded those of venous-only and arterial-only versions, which reached 0.796 and 0.785, respectively. It also showed higher point estimates than conventional radiomics for AUC, accuracy, and sensitivity. However, the dual-phase gains over single-phase models and the apparent advantages over radiomics were not statistically significant. Model classifications showed good agreement with two readings by one radiologist, but the study was not designed to establish equivalence or superiority to physicians.

The authors said the model's main promise lies in giving clinicians an additional, repeatable view of malignancy risk rather than replacing expert judgment. Arterial and venous images reveal different parts of a lesion's story, they said, from vascularized solid tissue to cyst walls, septa, and relationships with the surrounding pancreas. Combining these signals may help flag lesions that deserve closer attention. They added that specificity and probability calibration still require improvement, and that model outputs should be interpreted alongside clinical findings, laboratory tests, magnetic resonance imaging, endoscopic ultrasound, and radiologist assessment.

The approach could eventually support triage, multidisciplinary review, and follow-up planning for patients with uncertain pancreatic cysts. Its relatively high sensitivity may be useful for identifying malignant or high-risk lesions that should undergo further evaluation, while its standardized analysis could reduce variability between readings. However, the evidence remains preliminary: the dataset came from one hospital, included only surgically treated patients, required manual lesion segmentation, and contained a limited number of cases for deep-learning comparisons. Before clinical deployment, the model will need recalibration and validation across hospitals, scanners, and imaging protocols. Future systems may also combine CT with magnetic resonance imaging, endoscopic ultrasound, cyst-fluid analysis, tumor markers, and clinical symptoms.

References

DOI

[10.12290/xhyxzz.2026-0410](https://doi.org/10.12290/xhyxzz.2026-0410)

Original Source URL

<https://xhyxzz.pumch.cn/article/doi/10.12290/xhyxzz.2026-0410>

Funding information

National Natural Science Foundation of China, grant 82372051; National Key Research and Development Program of China, "Diagnostic and Therapeutic Equipment and Biomedical Materials," grant SQ2024YFC2400371; National High Level Hospital Clinical Research Funding, grant 2025-PUMCH-D-002; and Beijing Natural Science Foundation Youth Program, grant 7264409.

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