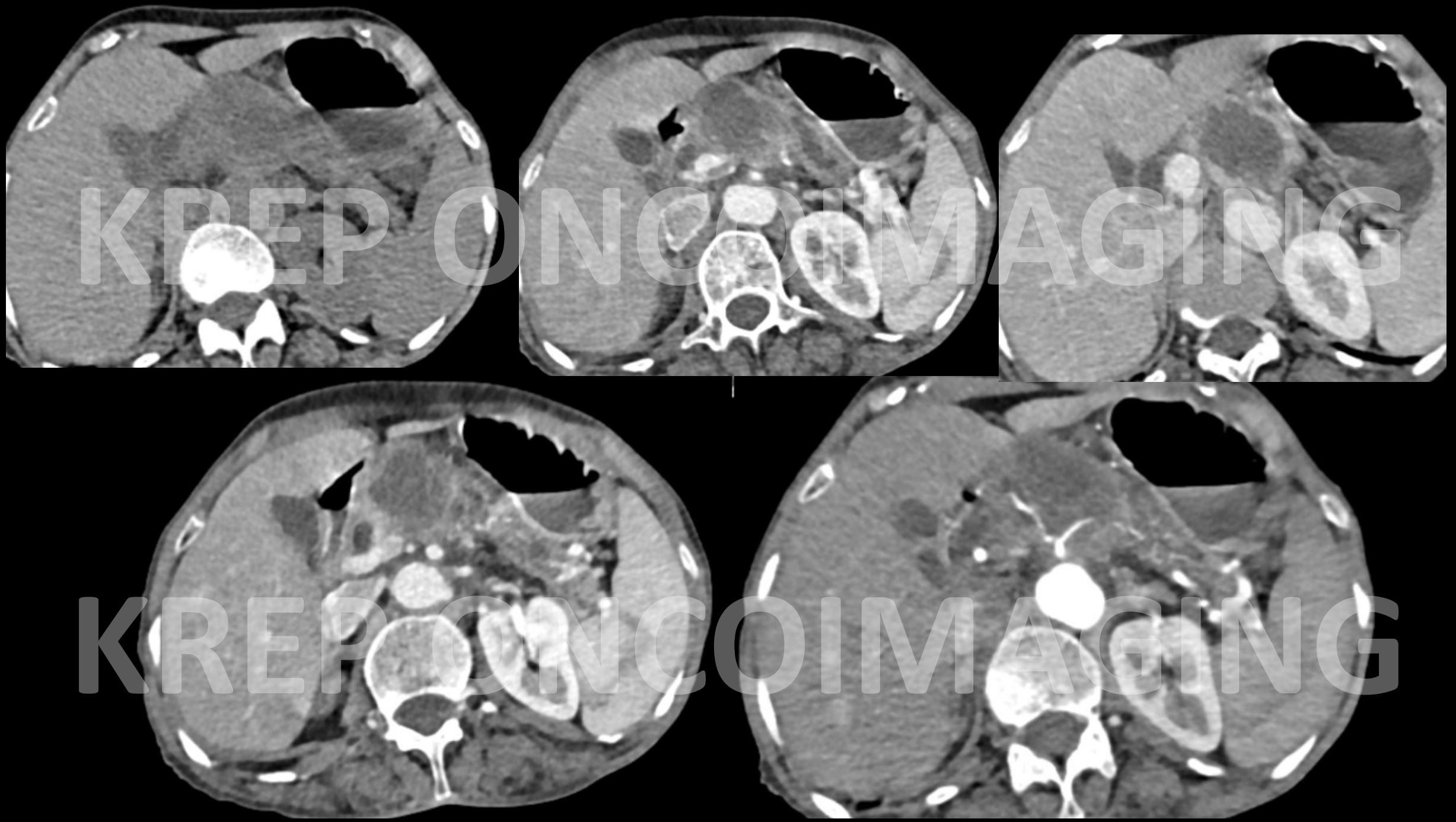
2025

KARNATAKA RADIOLOGY EDUCATION PROGRAM

70 y female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KREPON COIMAGING

- Proximal body
- Cystic / necrotic with thick enhancing walls.
- Hypoenhancing
- PD dilated in distal pancreas with abrupt cutoff. Duct-Parenchyma ratio 0.6. Absent duct penetrating sign. CBD prominent with smooth tapering near ampulla, no periampullary lesion identified.
- No stent.
- Marked asymmetric atrophic distal pancreas.
- Celiac trunk – involved. PV – focal abutment <90 degree.
- Splenic artery and CHA – involved.
- Invasion – lesion shows lost planes with crus of diaphragm.
- No significant regional nodes.
- Conclusion – Carcinoma Pancreas, unresectable.

Checklist Staging Pancreatic cancer

Location	Periampullar - head - body - tail
Morfology	Solid - cystic - mixed
Diameter	Largest diameter in mm in any plane
Enhancement	Hyper - iso - hypo
CBD and PD	Diameter
Stent in situ	No - yes
Parenchyma	Normal - atrophic - pancreatitis
Coeliac trunc-AMS - hepatic.a	Normal anatomy or variation - collaterals Contact: no | <90° | 90°- ≤180° | 180°- ≤270° | >270° Stenosis: no | ≤50% | >50% | occlusion
Portal vein - VMS	Contact: no | <90° | 90°- ≤180° | 180°- ≤270° | >270° - length of venous involvement Stenosis: no | ≤50% | >50% | occlusion | thrombosis
Invasion	Peripancreatic fat - root of mesentery-hepatoduodenal lig - Inferior caval vein - Aorta - duodenum - transverse colon
T-stage	T1 -T4
N-stage	Regional lymph nodes
M-stage	Metastases - non-regional lymph nodes

1. Pathology & Epidemiology

- Pancreatic ductal adenocarcinoma (PDAC) represents over 90% of pancreatic malignancies, with peak incidence in the 7th to 8th decade.
- Strongly linked to risk factors such as smoking, chronic pancreatitis, diabetes, and certain hereditary syndromes. Five-year survival rate remains under 10%.

2. Routes of Spread & Staging

- Characterized by aggressive local invasion with early spread to peripancreatic soft tissues, duodenum, spleen, and major vessels.
- Lymphatic dissemination via peripancreatic, celiac, mesenteric, and para-aortic routes; frequent liver, peritoneal, and lung metastases.
- Staged by TNM criteria (tumor size, regional nodes, distant spread) and resectability: localized, borderline resectable, locally advanced, or metastatic.

3. Diagnostic Imaging: CT & MRI Patterns

- Multiphasic contrast CT is the gold standard, revealing an ill-defined, hypodense, hypoenhancing mass (most often head of pancreas).
- MRI shows hypointensity on T1, variable hyperintensity on T2, and delayed enhancement. MRCP is valuable for ductal assessment.
- Dual-energy CT and low-voltage techniques improve sensitivity for small or isoattenuating tumors.

4. Imaging Indicators of Malignancy

- Tumor-induced pancreatic duct cut-off and upstream ductal dilation, with loss of normal lobular architecture.
- Vascular encasement (SMA, celiac axis, portal vein), invasion of adjacent organs, and lymphadenopathy are key for assessing stage and operability.
- Obstructive jaundice is common with head lesions due to CBD compression.

5. Histopathology & Molecular Features

- Characteristic features include glands/tubules infiltrating desmoplastic stroma and frequent perineural and lymphovascular invasion.
- KRAS mutation (>90%), along with inactivation of CDKN2A/p16, TP53, and DPC4/SMAD4; precursor lesions (Pan-IN) share genetic changes.
- Subtypes have varied prognosis and treatment response (classical vs basal-like; molecular profiling is increasingly relevant).

6. PET/CT, Endoscopic & Functional Imaging

- FDG-PET/CT highlights hypermetabolic primary and metastatic foci; endoscopic ultrasound guides biopsy and staging.
- Imaging essential for surgical planning, resectability decision-making, neoadjuvant therapy response, and surveillance.

7. Oncologic Prognosis & Management

- Surgery (Whipple or distal pancreatectomy) viable for <20% at diagnosis; margin-negative resection and nodal status are strongest survival predictors.
- Most cases are diagnosed late, requiring multimodal therapy: FOLFIRINOX, gemcitabine/nab-paclitaxel, targeted and immunotherapy under investigation.
- Tumor microenvironment's immunosuppressive nature drives resistance; molecular markers increasingly guide trials and personalized therapy.

8. Oncoradiologic Reporting Essentials

- Tumor size/location, vessel involvement (contact >180°, occlusion), ductal encroachment, adjacent organ invasion, nodal and distant spread must be described.
- Specific morphologic features, potential resectability, and association with precursor lesions (Pan-IN, IPMN) should be noted.

Contributors

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