



MIRAGE: tumori neuroendocrini, uno sguardo al futuro

Sabato 3 ottobre 2026

Aula magna Nuovo Arcispedale S. Anna
Cona, Ferrara

Il Segretario
Dott. M. Vason

Il Presidente
Dott. R. Zoppellari

Sono stati richiesti crediti formativi ECM
per Medici, Infermieri
Sono disponibili attestati di partecipazione per gli studenti in Medicina

Responsabili Scientifici: MC Zatelli, MR Ambrosio
Segreteria Scientifica: RM Ruggeri, G. Russo, P Borges de Souza



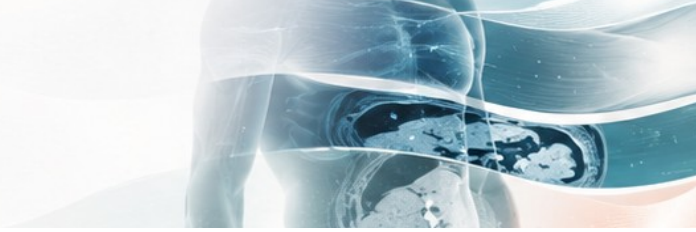
NENs: Imaging radiologico

Prof. Aldo Carnevale

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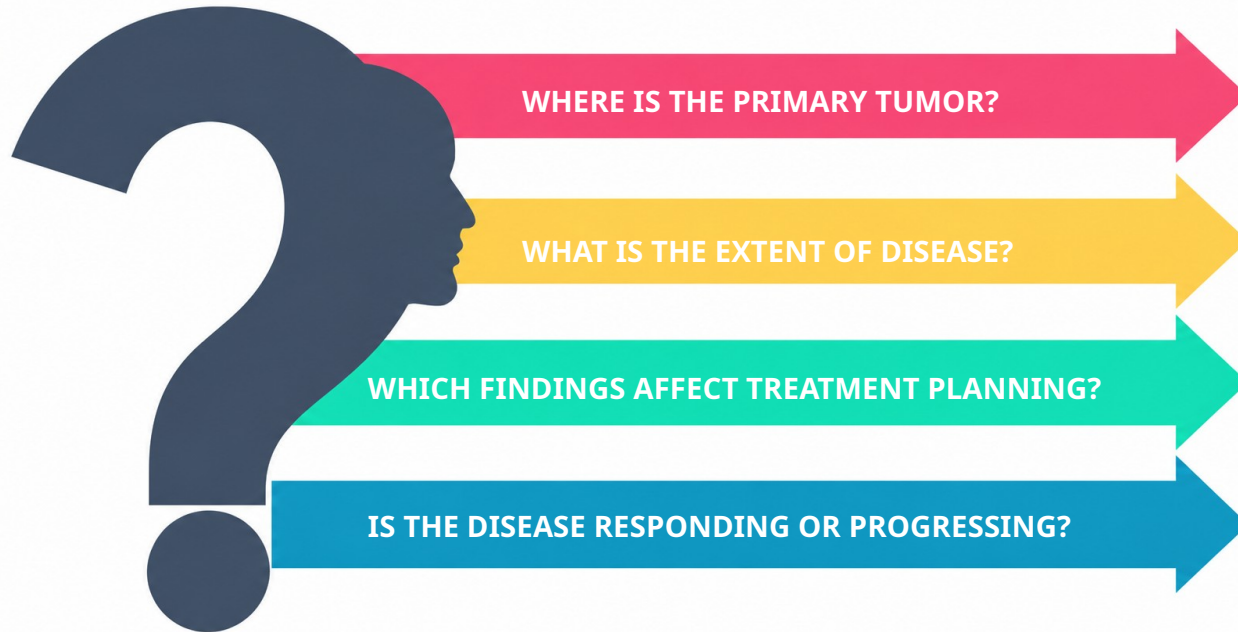


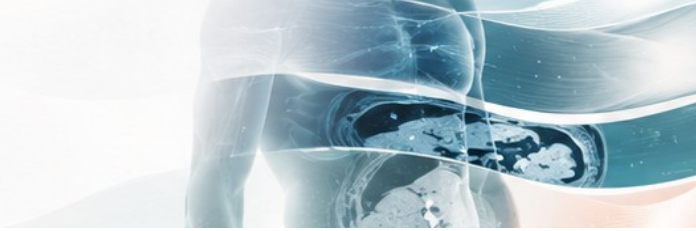




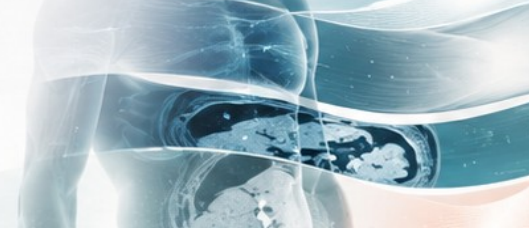
Scope and objectives

Key imaging questions in NETs





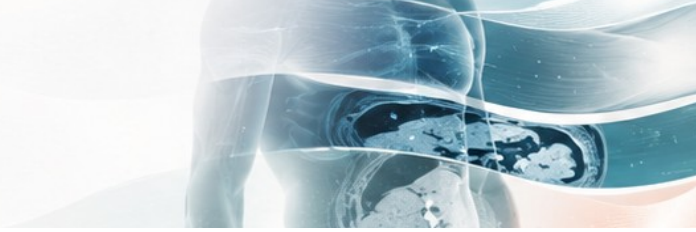
1. Pulmonary Neuroendocrine Proliferations and Neoplasms



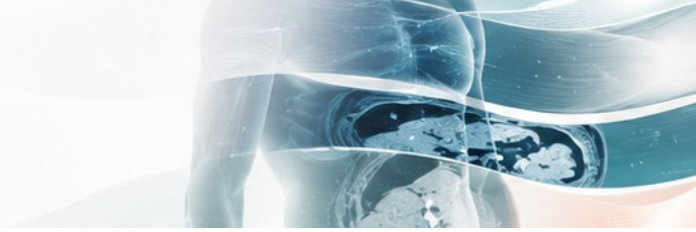
1. Pulmonary Neuroendocrine Proliferations and Neoplasms

Poorly differentiated NECs

- Large-cell neuroendocrine carcinoma
- Small-cell lung carcinoma

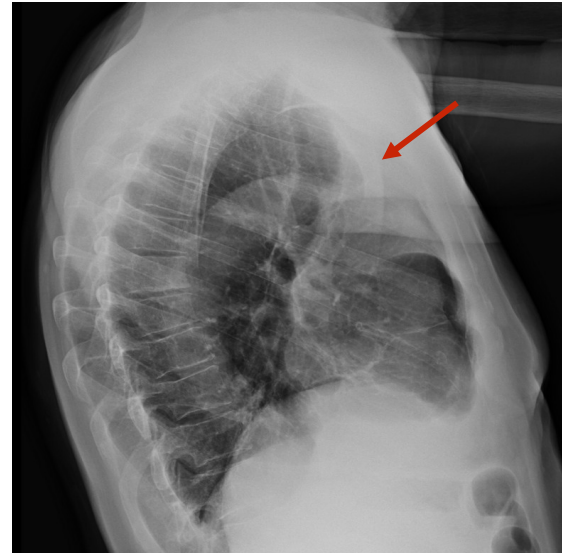
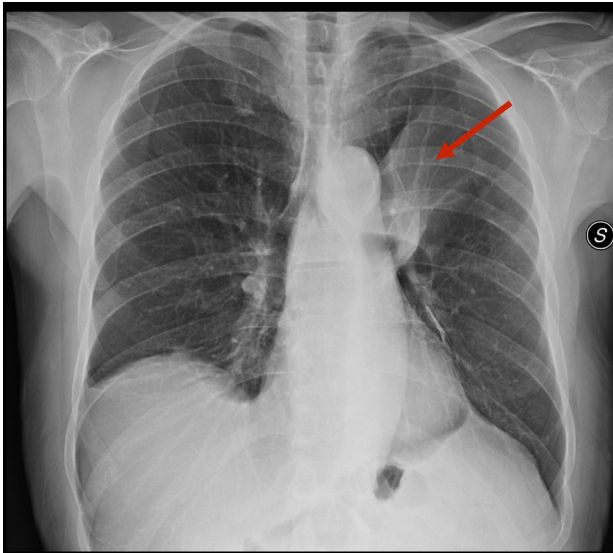


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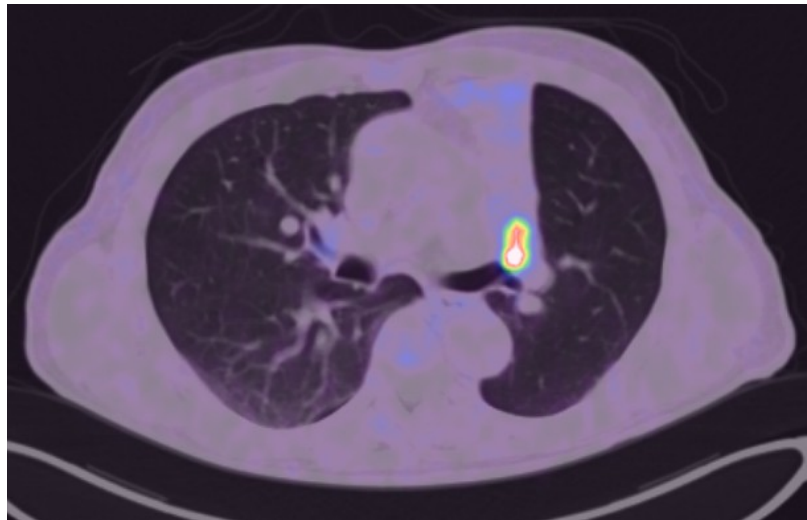
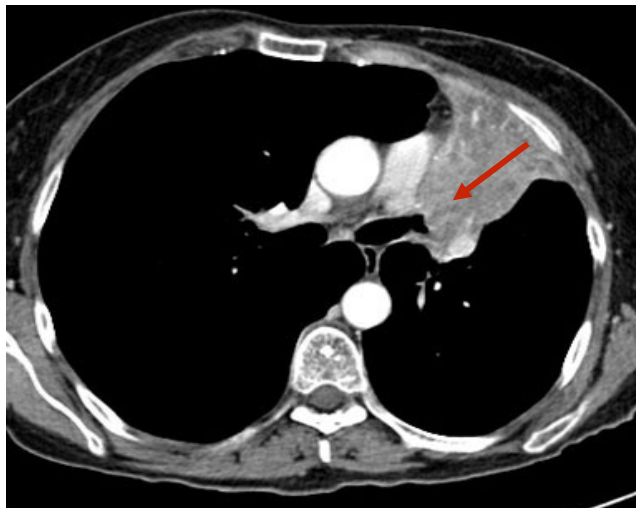
1. Pulmonary Neuroendocrine Proliferations and Neoplasms

Typical bronchial carcinoid



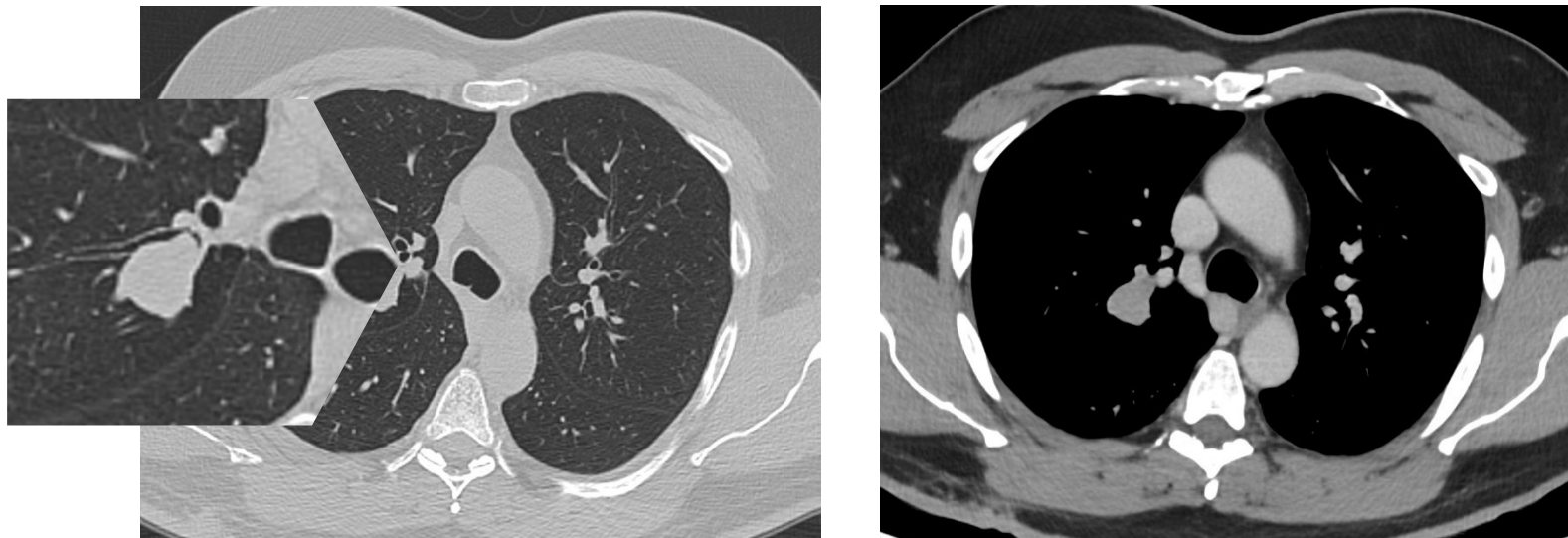
LUL ATELECTASIS

Typical bronchial carcinoid



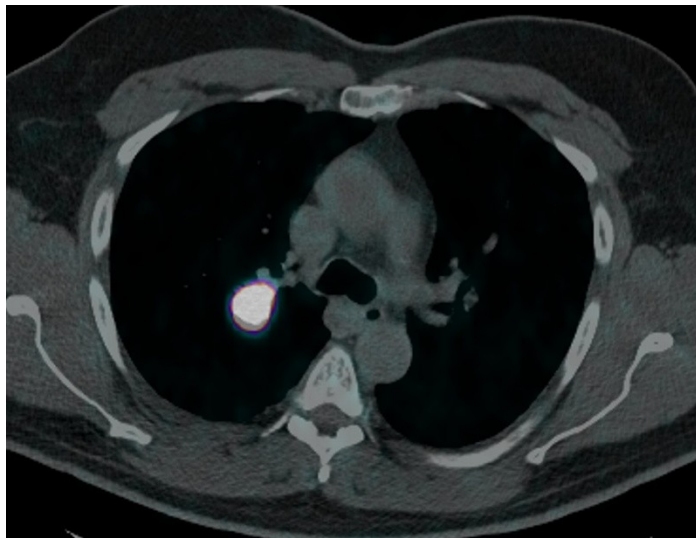
LUL ATELECTASIS WITH CENTRAL CARCINOID

Typical bronchial carcinoid

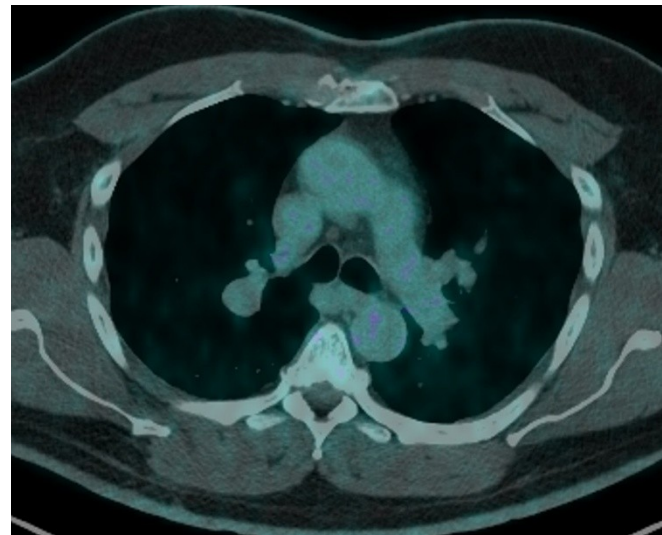


SOLITARY LUNG NODULE LOCATED CENTRALLY AT THE LEVEL OF SEGMENTAL BRONCHI

Typical bronchial carcinoid



68Ga-DOTATOC PET-CT

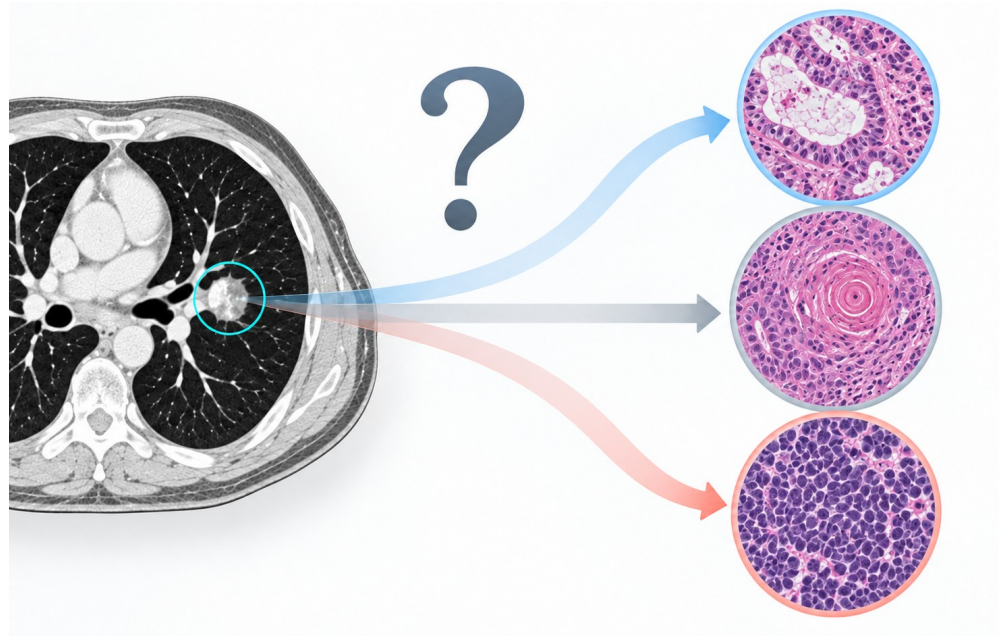


18F-FDG PET-CT

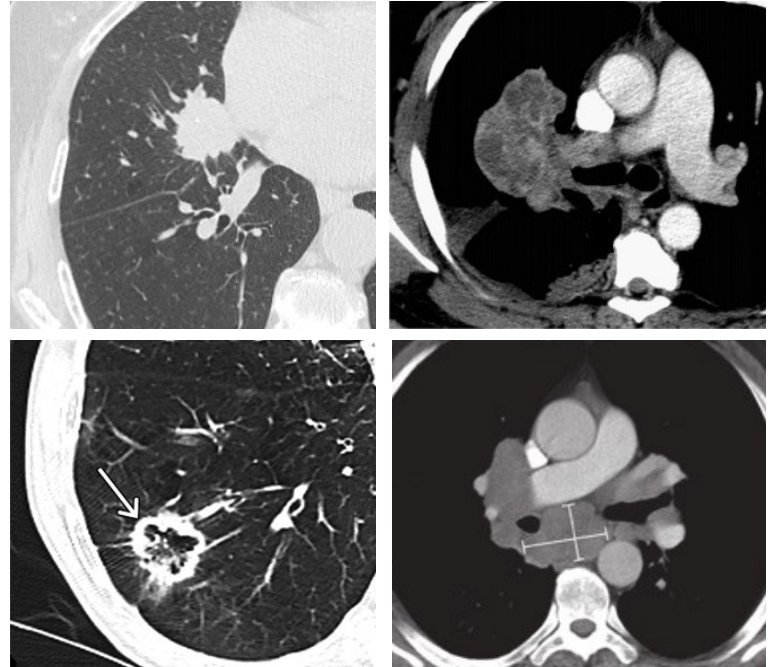


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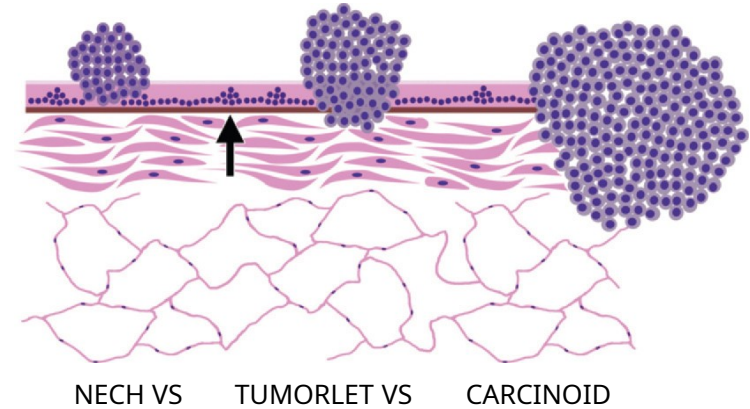
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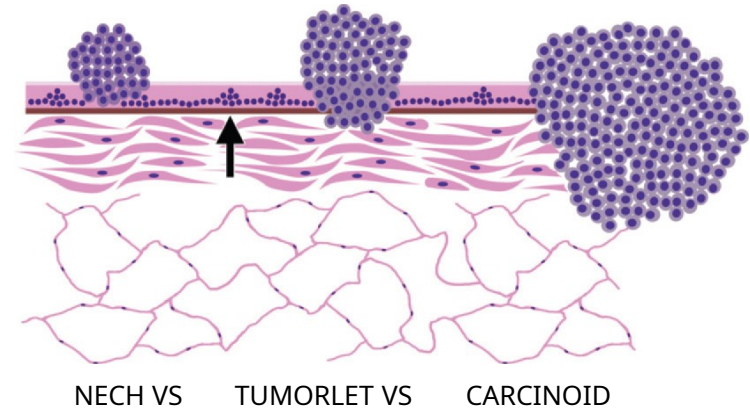


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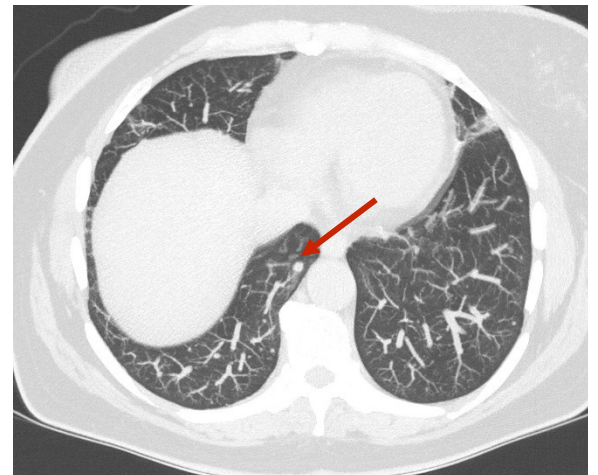
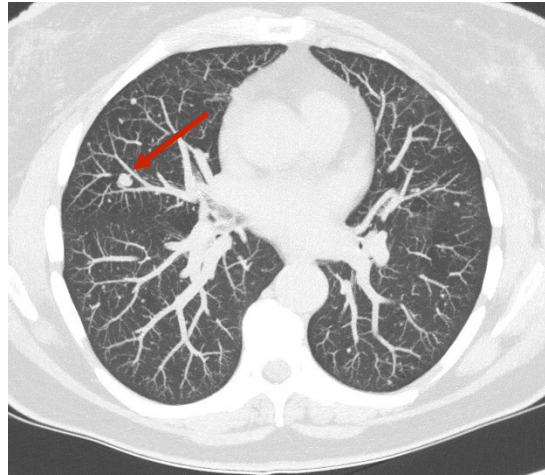
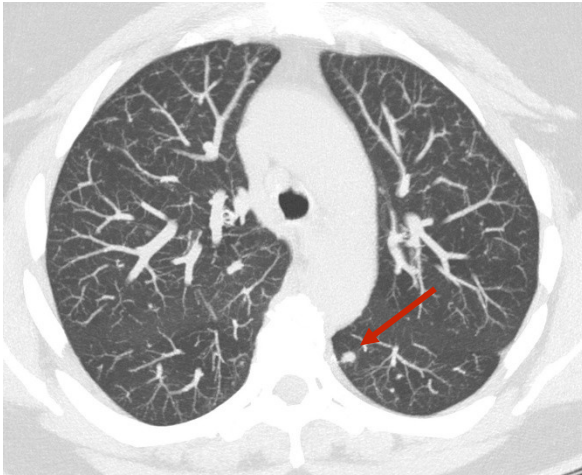


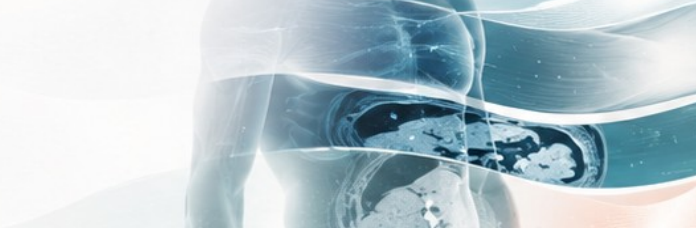
Benson RE. Spectrum of pulmonary neuroendocrine proliferations and neoplasms. Radiographics. 2013

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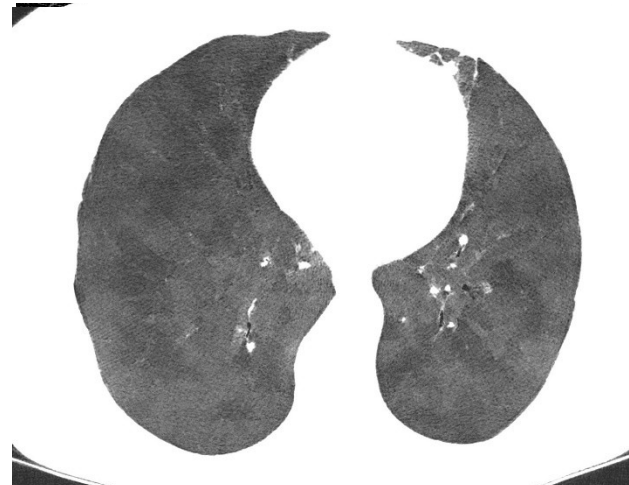


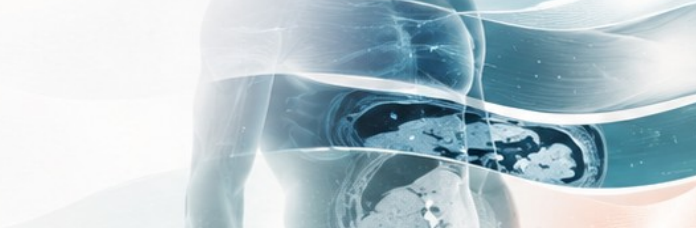
DIPNECH





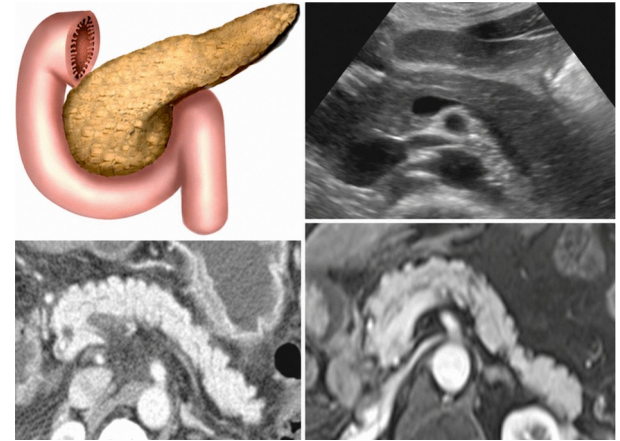
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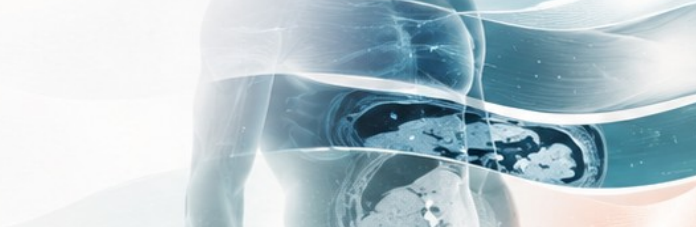




2. Pancreatic Neuroendocrine Tumors

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Advantages:

Limitations:

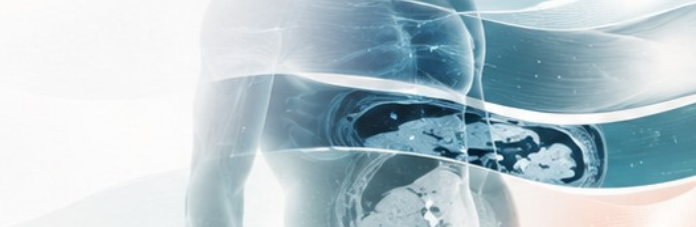
Ionizing radiation (long-term surveillance)

Iodinated contrast medium

Lower sensitivity for small liver metastases

Small or poorly enhancing PanNENs may remain occult

Detection strongly depends on correct arterial-phase timing



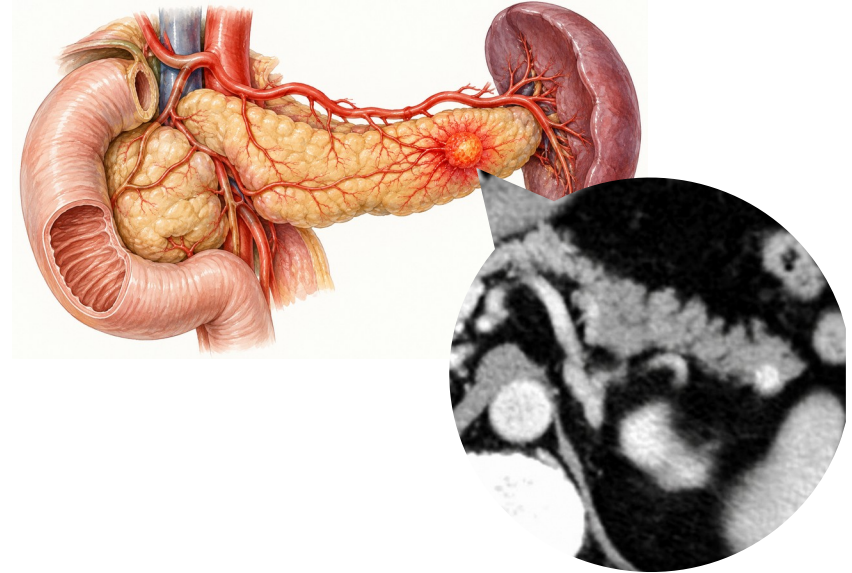
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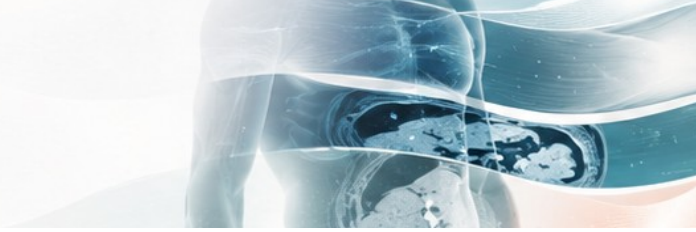
Advantages:

Limitations:

Longer examination time and greater sensitivity to motion
Lower availability and higher cost
Less suitable for comprehensive thoracic staging
Dynamic arterial phases may suffer from timing or respiratory artefacts

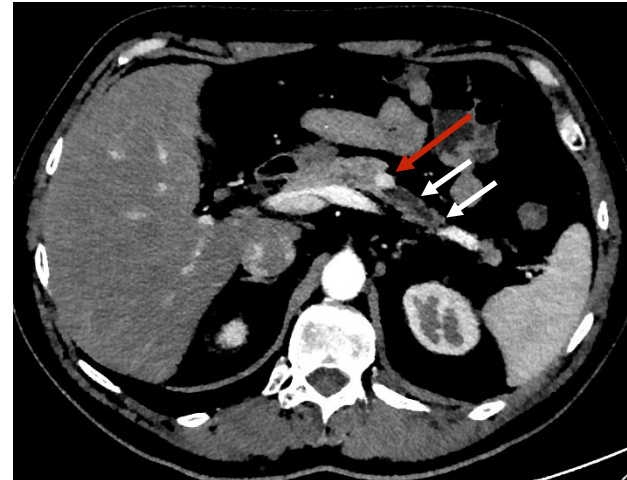
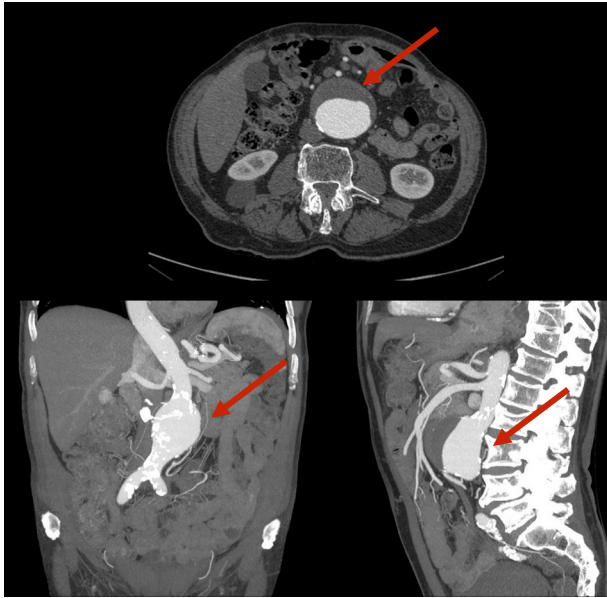
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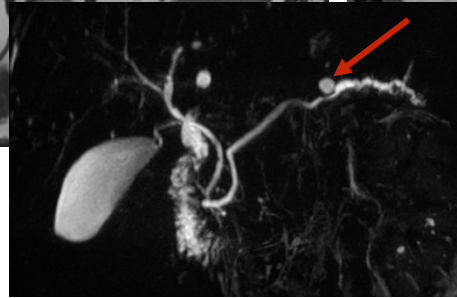
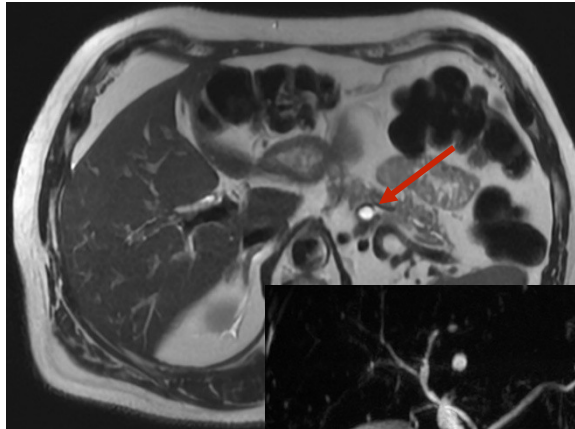
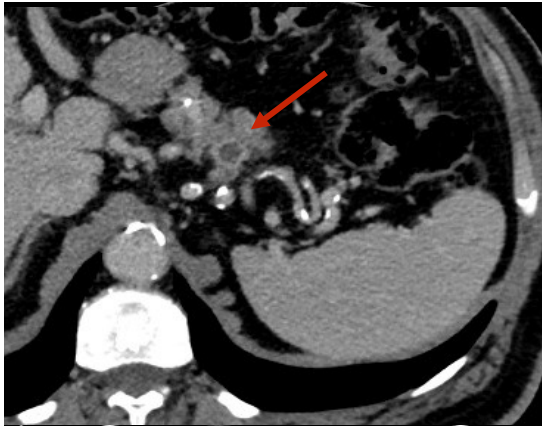


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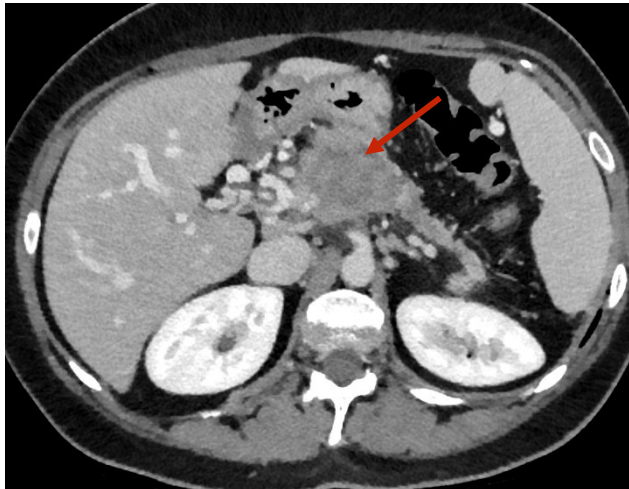
Pancreatic Neuroendocrine Tumors



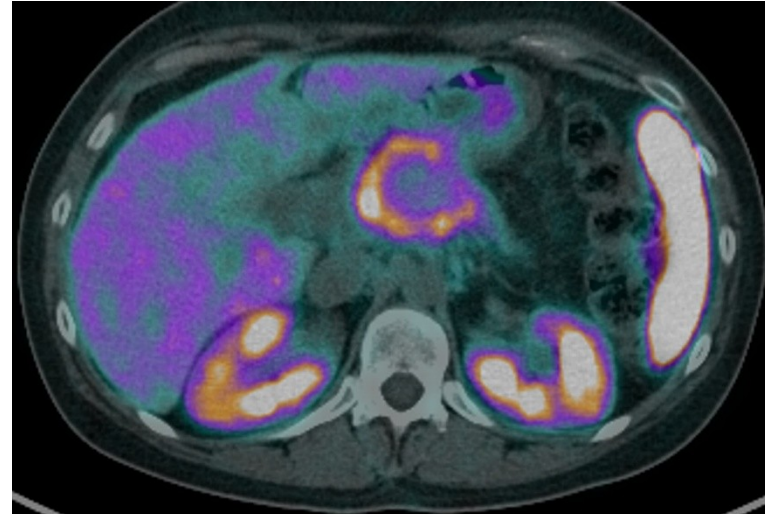
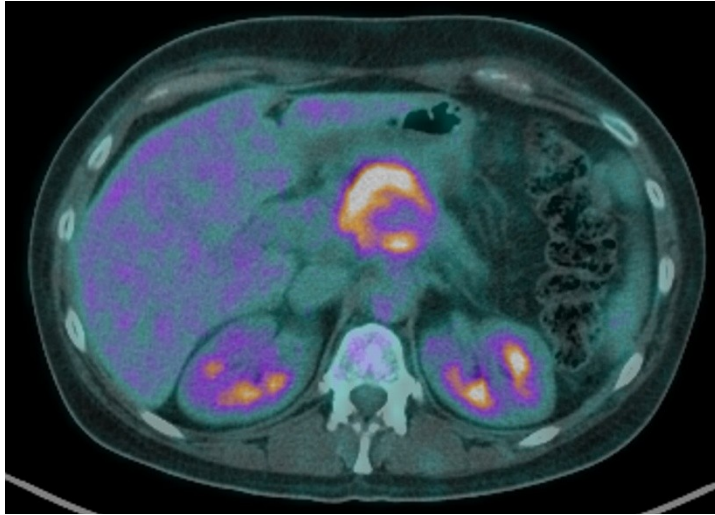
Pancreatic Neuroendocrine Tumors



Pancreatic Neuroendocrine Tumors



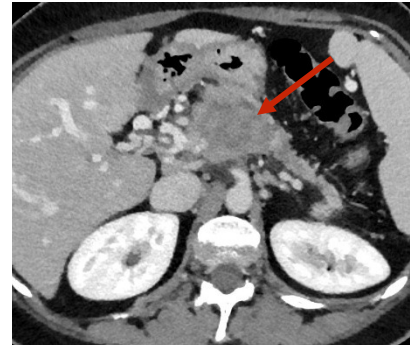
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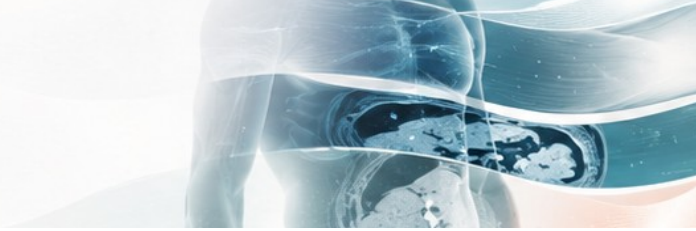


2. Pancreatic Neuroendocrine Tumors



VS





3. Gastrointestinal Neuroendocrine Tumors

62%	26%	11%
Imaging	Endoscopy	Surgery

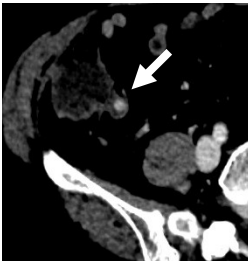


3. Gastrointestinal Neuroendocrine Tumors

1. Nodular or polypoid

Mucosal or submucosal lesion

Usually small and hypervascular



2. Plaque-like

Mural thickening with serosal puckering

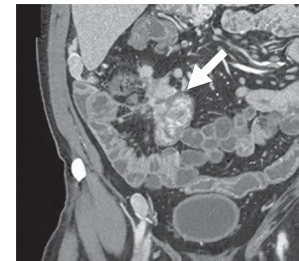
May produce focal bowel retraction



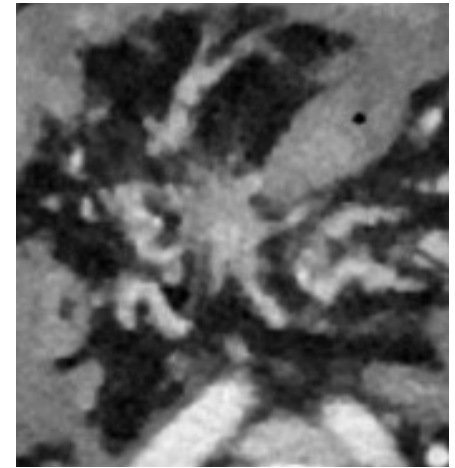
3. Carpet-like

Segmental submucosal spread

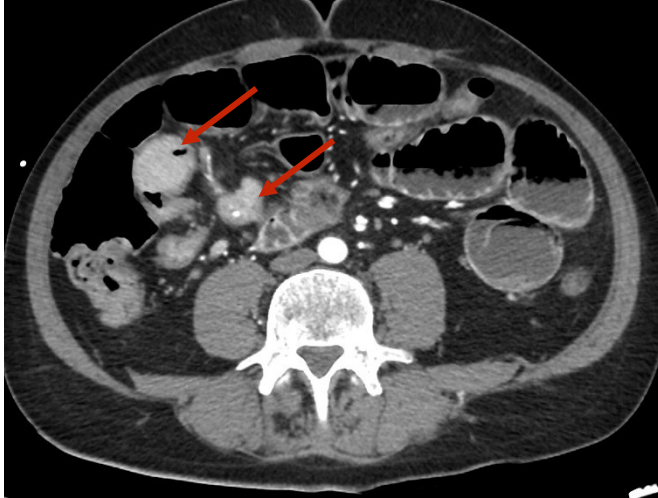
May mimic ileal Crohn disease



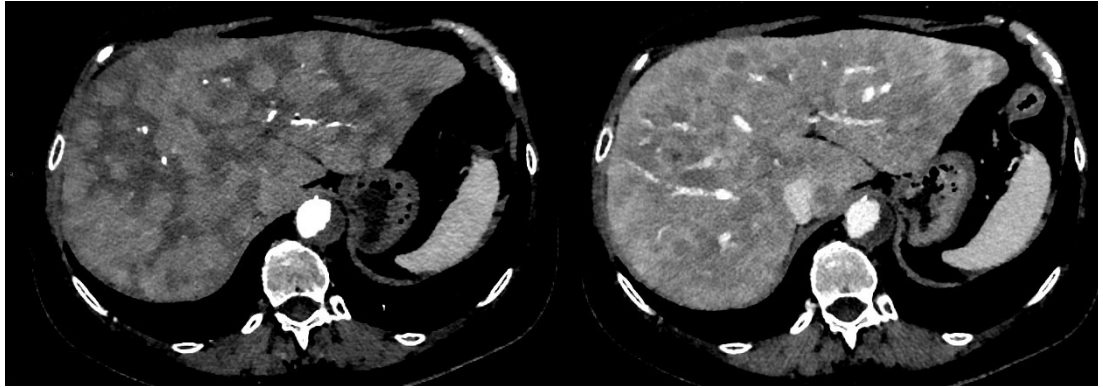
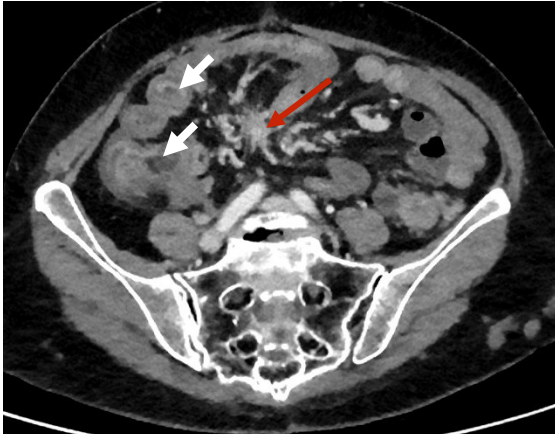
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Si-NEN

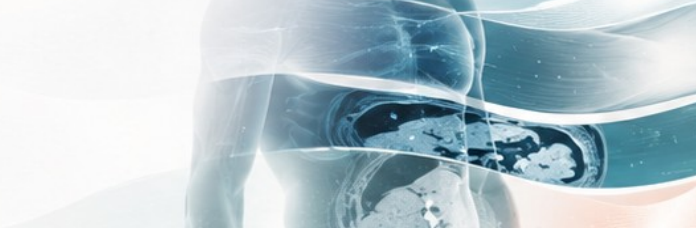


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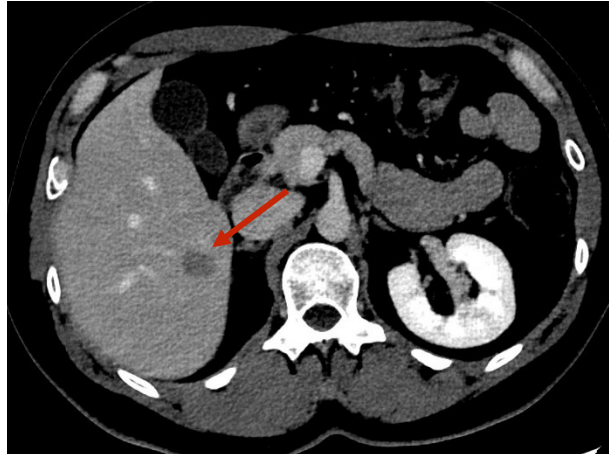


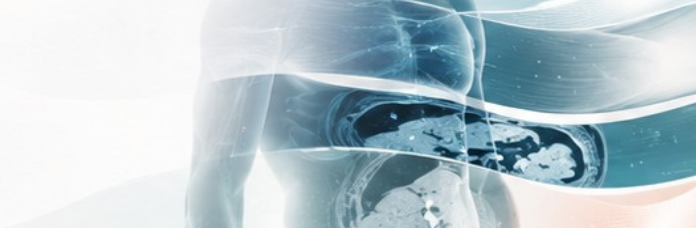
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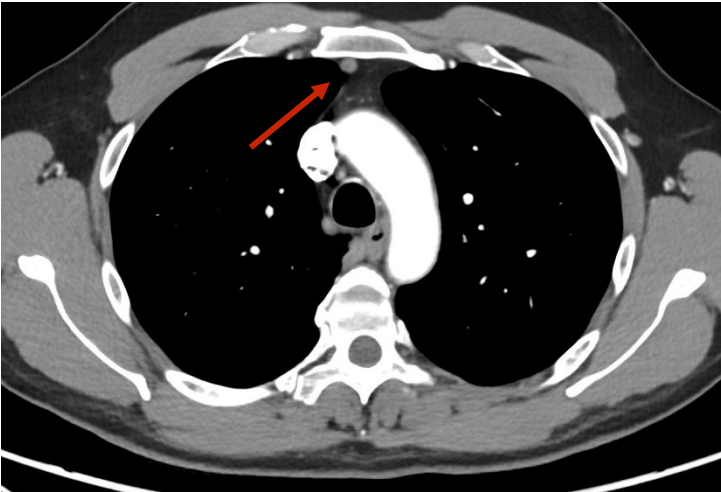


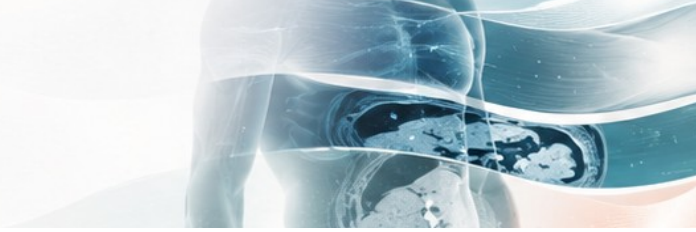
Si-NEN





Si-NEN





3. Gastrointestinal Neuroendocrine Tumors

Gupta A. CT detection of primary and metastatic ileal carcinoid tumor: rates of missed findings and associated delay in clinical diagnosis. Abdom Radiol (NY). 2019

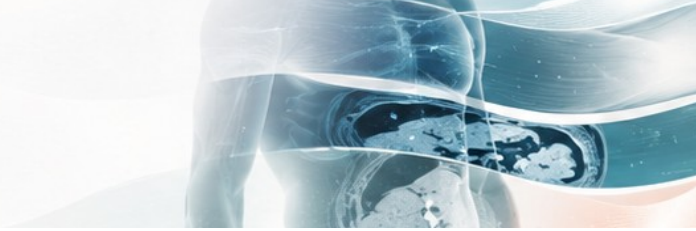
Lamarca A. ENETS 2024 guidance paper for the management of well-differentiated small intestine neuroendocrine tumours. J Neuroendocrinol. 2024

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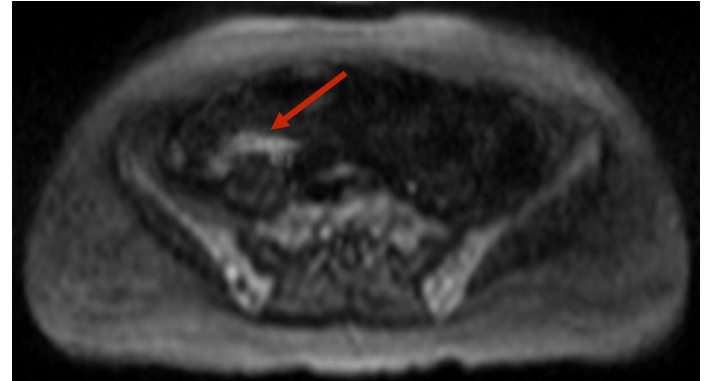
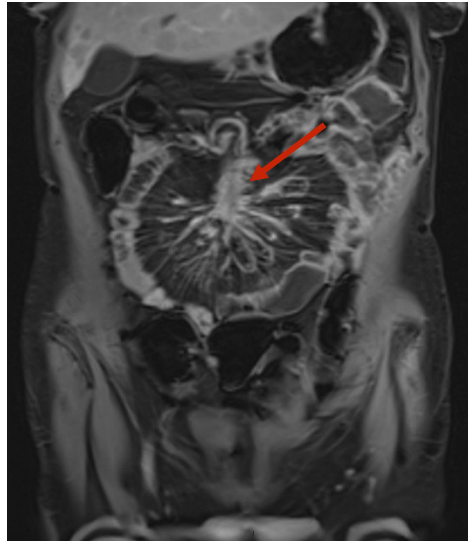
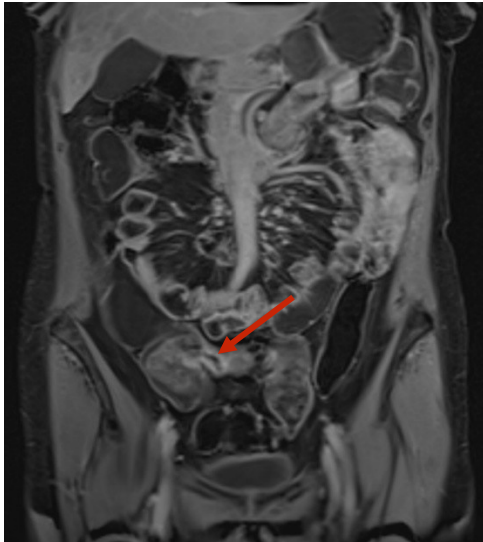
	CT enterography	MR enterography
Preparation	No solid food for 4–6 h. Still water allowed	No solid food for 4–6 h. Still water allowed
Oral contrast	1–1.5 L neutral contrast over 45–60 min	1–1.5 L biphasic contrast over 45–60 min
Antiperistaltic agent	Optional	Recommended before motion-sensitive sequences
Acquisition	Arterial ≈35 s, enteric ≈50 s, delayed ≈90 s	T2 FSE, SSFP, DWI/ADC and 3D fat-suppressed T1
Post-contrast imaging	Iodinated contrast with multiphasic acquisition	Dynamic T1: arterial, enteric and portal venous phases
Coverage	Thin sections and multiplanar reconstructions. Include abdomen, pelvis and liver	Assess the entire small bowel. Ensure complete liver coverage

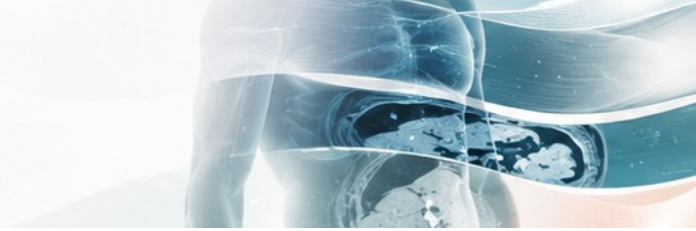


Martin S. Neuroendocrine neoplasm imaging: protocols by site of origin. Abdom Radiol (NY). 2022
Navin PJ. Imaging of Small-Bowel Neuroendocrine Neoplasms: AJR Expert Panel Narrative Review. AJR Am J Roentgenol. 2023



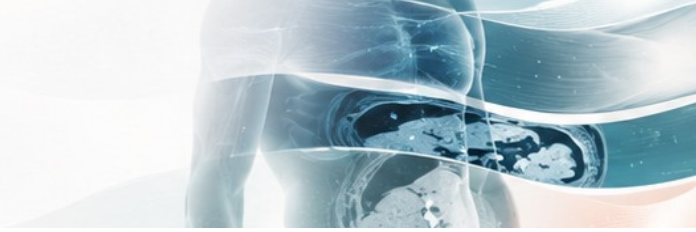
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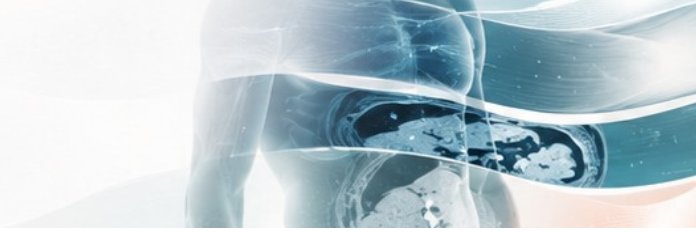


4. Metastatic disease and treatment response

CR	COMPLETE RESPONSE - Disappearance of all target lesions - Pathological lymph nodes <10 mm in short axis	
PR	PARTIAL RESPONSE ≥30% decrease in the sum of diameters from baseline	
SD	STABLE DISEASE Neither sufficient shrinkage for PR nor sufficient increase for PD	
PD	PROGRESSIVE DISEASE ≥20% increase in the sum of diameters from nadir, with an absolute increase ≥5 mm - OR appearance of new lesions	



4. Metastatic disease and treatment response



Take Home Messages



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