ORDINE
MEDICI CHIRURGHI
E ODONTOIATRI
DELLA PROVINCIA
DI BRESCIA

COMMISSIONE CULTURA
Coordinatore: Dott. Germano Bettoncelli

In collaborazione con

Fondazione Nadia Valsecchi

Convegno

DIAGNOSI E CURA DEI TUMORI PANCREATICI

Sala Conferenze Ordine Medici ed Odontoiatri - Via Lamarmora n. 167 (Palazzo il Diamante) - Brescia

19 maggio 2018 - ore 8.00

Programma

ore 8.00 ***Registrazione dei partecipanti***

ore 8.10 ***Saluti e introduzione***
Dott. OTTAVIO DI STEFANO - Presidente Ordine Medici ed Odontoiatri, Brescia
Dott. CARMELO SCARCELLA - Direttore Generale ATS Brescia

PRIMA PARTE
MODERATORI: Dott. ROBERTO FARFAGLIA
Prof. NAZARIO PORTOLANI

ore 8.20 ***Il ruolo delle Associazioni pazienti***
FEDERICA VALSECCHI - Fondazione Nadia Valsecchi Onlus
VIVIANA FERRARI - Associazione Nastro Viola
FRANCESCA GABELLINI - Associazione di Volontariato Oltre la Ricerca
MONICA ERSILIA ROZZONI - Associazione My Everest Onlus

ore 8.40 ***Epidemiologia del tumore del pancreas, cosa succede nel nostro territorio?***
Dott. MICHELE MAGONI

ore 9.00 ***Come riconoscere i primi sintomi?***
Dott. LUIGI VENERONI

ore 9.20 ***Come viene effettuata la diagnosi?***
Prof. LUIGI GRAZIOLI

ore 9.40 ***Chemio prima o chemio dopo l'intervento chirurgico?***
Dott. ALBERTO ZANIBONI

ore 10.00 ***La chirurgia del tumore al pancreas***
Dott. ALBERTO MANZONI - Dott. MARCO GARATTI

ore 10.20 ***Le complicanze della chirurgia***
Prof. GIAN LUCA BAIOCCHI

ore 10.40 ***Discussione***

ore 11.10 ***Coffee Break***

SECONDA PARTE
MODERATORI: Dott. LUCIO TAGLIETTI
Dott. NICOLA BASTIANI

ore 11.20 ***La Nutrizione Clinica nel perioperatorio delle neoplasie pancreatiche***
Dott. CLAUDIO MACCA

ore 11.40 ***Ruolo della sperimentazione clinica indipendente nella cura del cancro del pancreas***
Dott.ssa MARINA MACCHINI

ore 12.00 ***La biologia molecolare del tumore del pancreas***
Dott. VINCENZO CORBO

ore 12.20 ***L'assistenza domiciliare/cure palliative***
Dott.ssa GRAZIA RINALDIS

ore 12.40 ***Le esigenze dei pazienti: l'esperienza della Poliambulanza***
Dott. EDOARDO MATTEO ROSSO

ore 13.00 ***Discussione e Conclusioni***

ore 13.30 ***Verifica dell'apprendimento dei partecipanti***

Come viene effettuata la diagnosi?

19 Maggio 2018

Luigi Grazioli-Barbara Frittoli
ASST SPEDALI CIVILI BRESCIA
radiologia1@asst-spedalicivili.it

I tumori pancreatici

Pancreatic Solid and Cystic Neoplasms
Diagnostic Evaluation and Intervention

Mahmoud M. Al-Hawary, MD[a,*], Isaac R. Francis, MD[b], Michelle A. Anderson, MD, MSc[c]

KEYWORDS

• Pancreas • Neoplasms • Solid • Cystic • Imaging • Intervention

KEY POINTS

- Typical imaging techniques for the evaluation of pancreatic neoplasms include computed tomography, MR imaging, and, in selected cases, endoscopic ultrasound.
- High-quality dedicated imaging is essential for the diagnosis and assessment of pancreatic tumor extent, both of which are required to determine the best therapy for patients.
- Endoscopic ultrasound facilitates tissue or cyst fluid sampling in solid and cystic pancreatic neoplasms to help establish the diagnosis or narrow the differential diagnosis.
- The mainstay of treatment of pancreatic neoplasms is complete surgical resection when possible.
- Several noninvasive and invasive methods for treating solid and cystic pancreatic neoplasms are being investigated when surgery is not possible or is contraindicated.

Radiol Clin N Am 53 (2015) 1037–1048
http://dx.doi.org/10.1016/j.rcl.2015.05.005

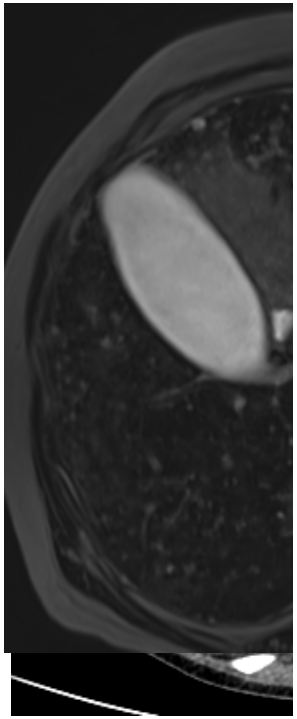
I tumori pancreatici cistici

JOP. J Pancreas (Online) 2016 Sep 08; 17(5):452-465.

RESULTS

The first task is to classify the cysts into neoplastic and non-neoplastic cysts **(Table 1)** and the second task is to study the imaging morphology of the pancreatic cysts **(Table 2; Figure 1)**. MDCT has an accuracy of 56–85% for characterization of cystic pancreatic lesions [2, 3, 4]. MRI together with MRCP is superior in characterizing the cystic lesions as it has excellent soft tissue contrast resolution and spatial resolution. Previous studies indicate that MDCT and MRI are comparable in identifying malignant behaviour of cystic pancreatic lesions [5]. 3D MRCP sequences can better identify the communication of cystic lesions with the main pancreatic duct and also the internal content of these lesions [6]. Secretin-enhanced MRCP is further advancement and refinement in MRCP technique for better study of ductal anatomy and identifying communication of pancreatic cystic lesions with the pancreatic duct [7].

I tumori pancreatici cistici



Tc senza r

RM senza
(colangio F

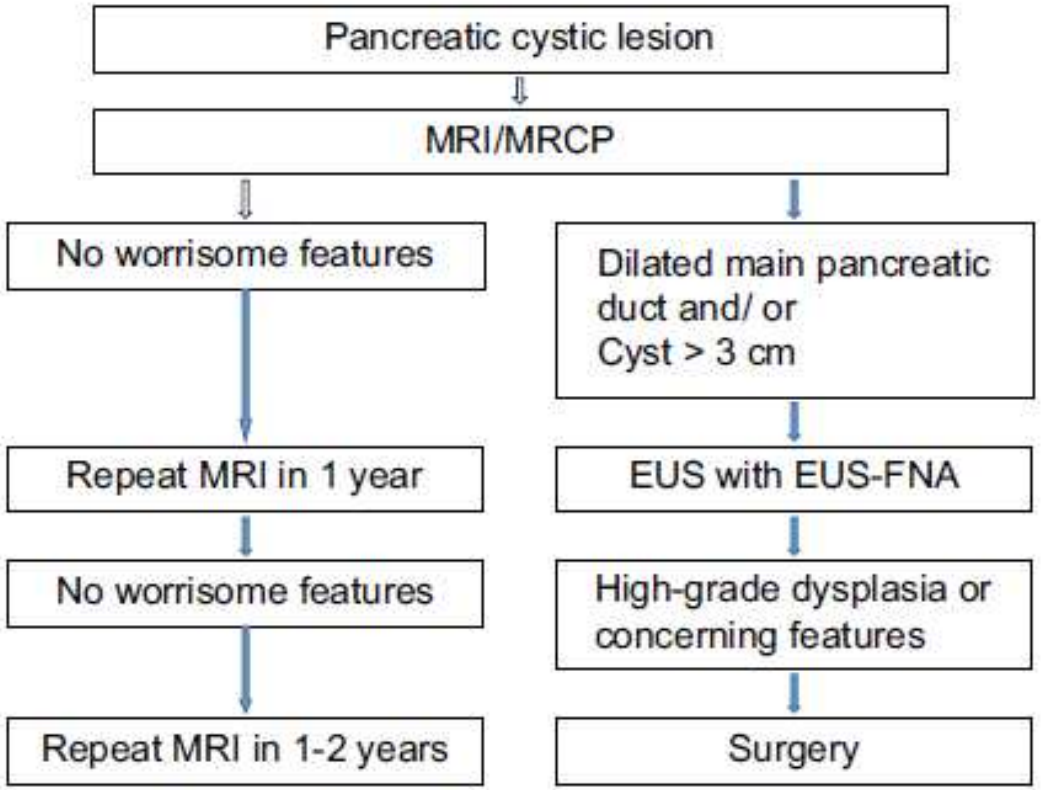
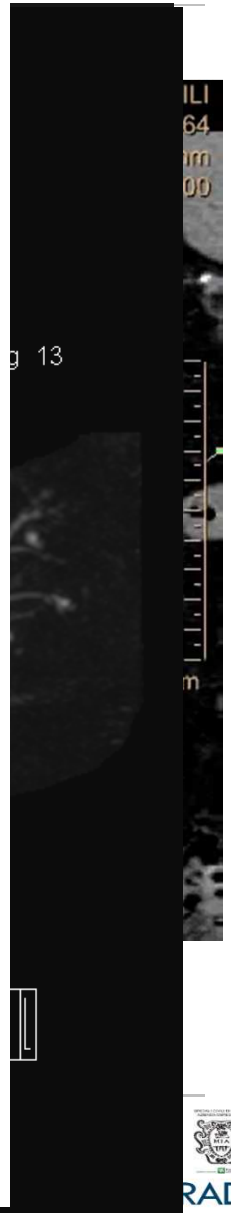


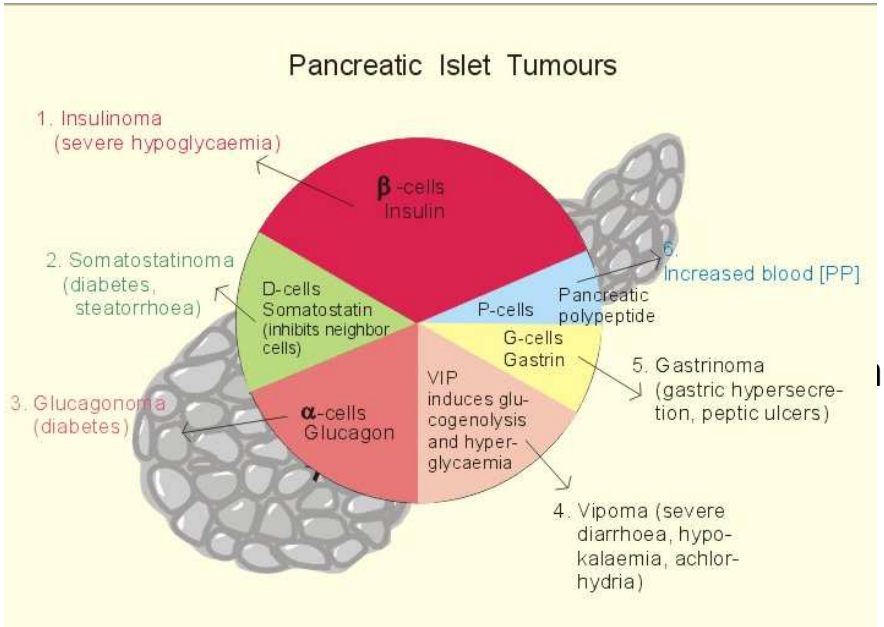
Figure 6 Simple algorithm for the follow up and treatment of pancreatic cystic lesions in accordance with recent AGA guidelines (simplified) [28] *MRI, magnetic resonance imaging; MRCP, magnetic resonance cholangiopancreatography; EUS, endoscopic ultrasound; FNA, fine-needle aspiration*



I tumori solidi del pancreas

PANCREAS ESOCRINO

borderline



pancreatoblastoma

solid-pseudopapillary carcinoma

miscellaneous carcinomas

PANCREAS ENDOCRINO

benign

insulinoma

non-functioning adenoma

borderline (uncertain malignant potential)

low-grade malignant/high-grade malignant

functioning or non-functioning tumors

TUMORI NON-EPITELIALI

benign soft tissue tumors

malignant soft tissue tumors

malignant lymphomas

LOCALIZZAZIONI SECONDARIE

TUMOR-LIKE LESIONS

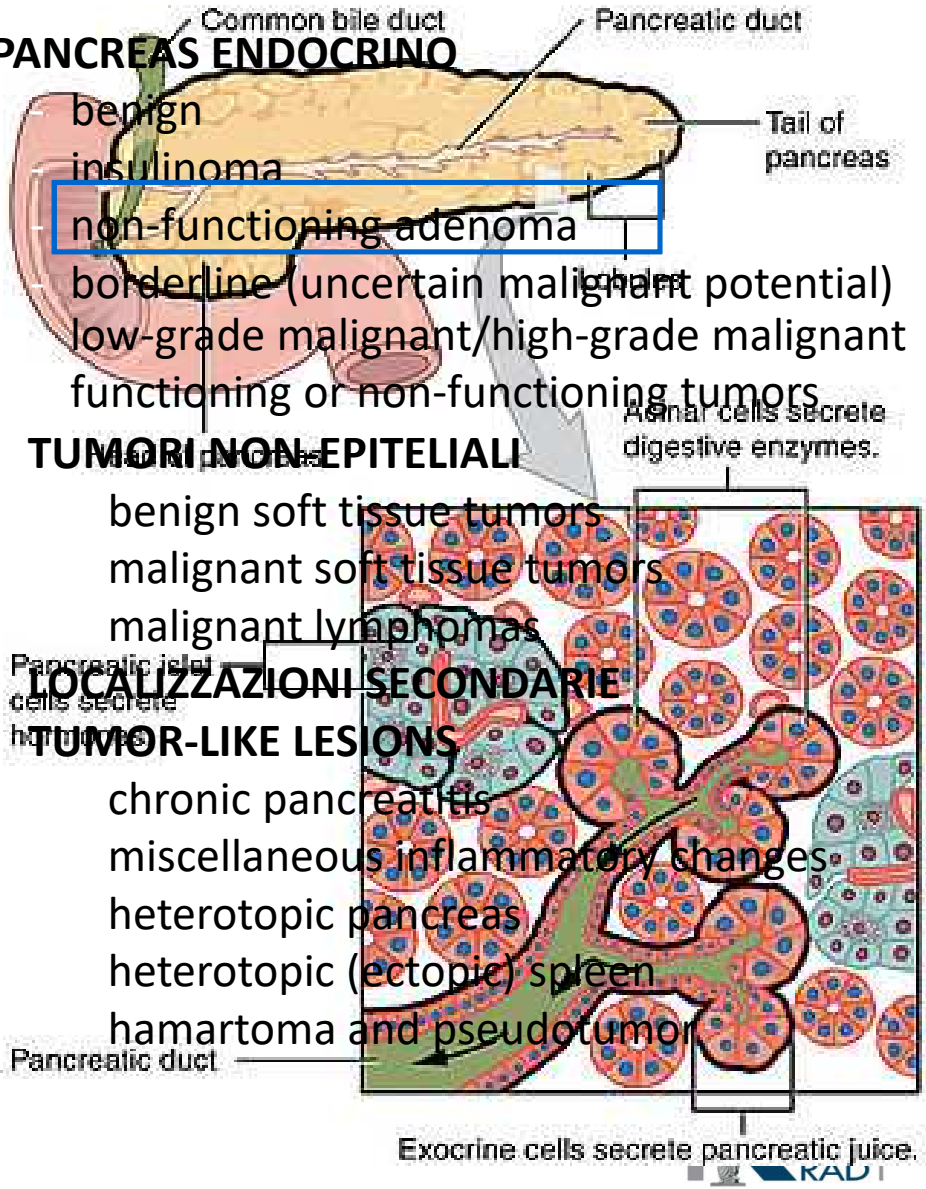
chronic pancreatitis

miscellaneous inflammatory changes

heterotopic pancreas

heterotopic (ectopic) spleen

hamartoma and pseudotumor

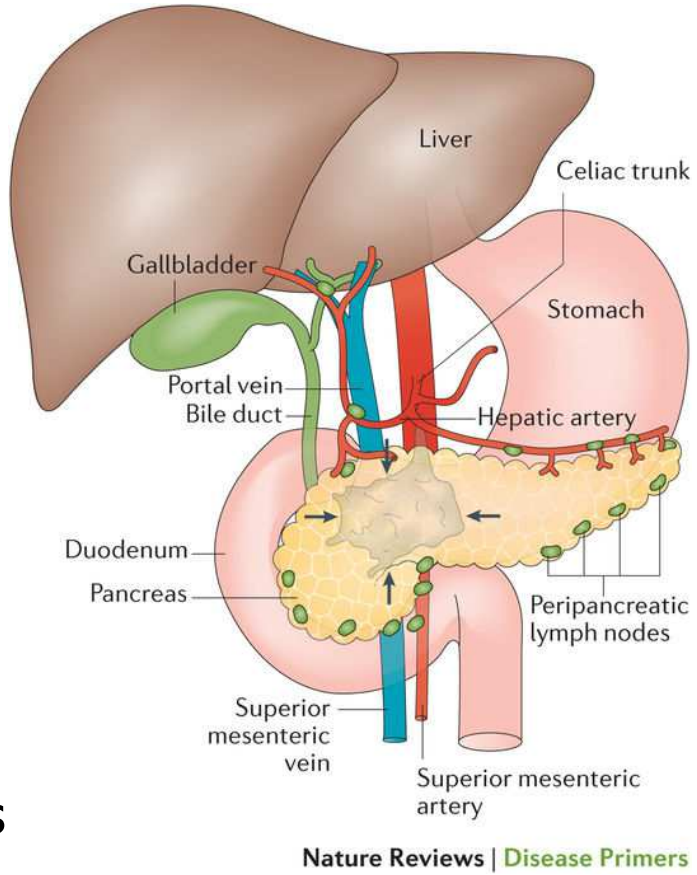


I tumori del pancreas

Con il termine "Tumore del pancreas" si intende generalmente l'**adenocarcinoma duttale**

Neoplasia epiteliale con differenziazione ghiandolare

- 60-70% testa
- 30% corpo-coda

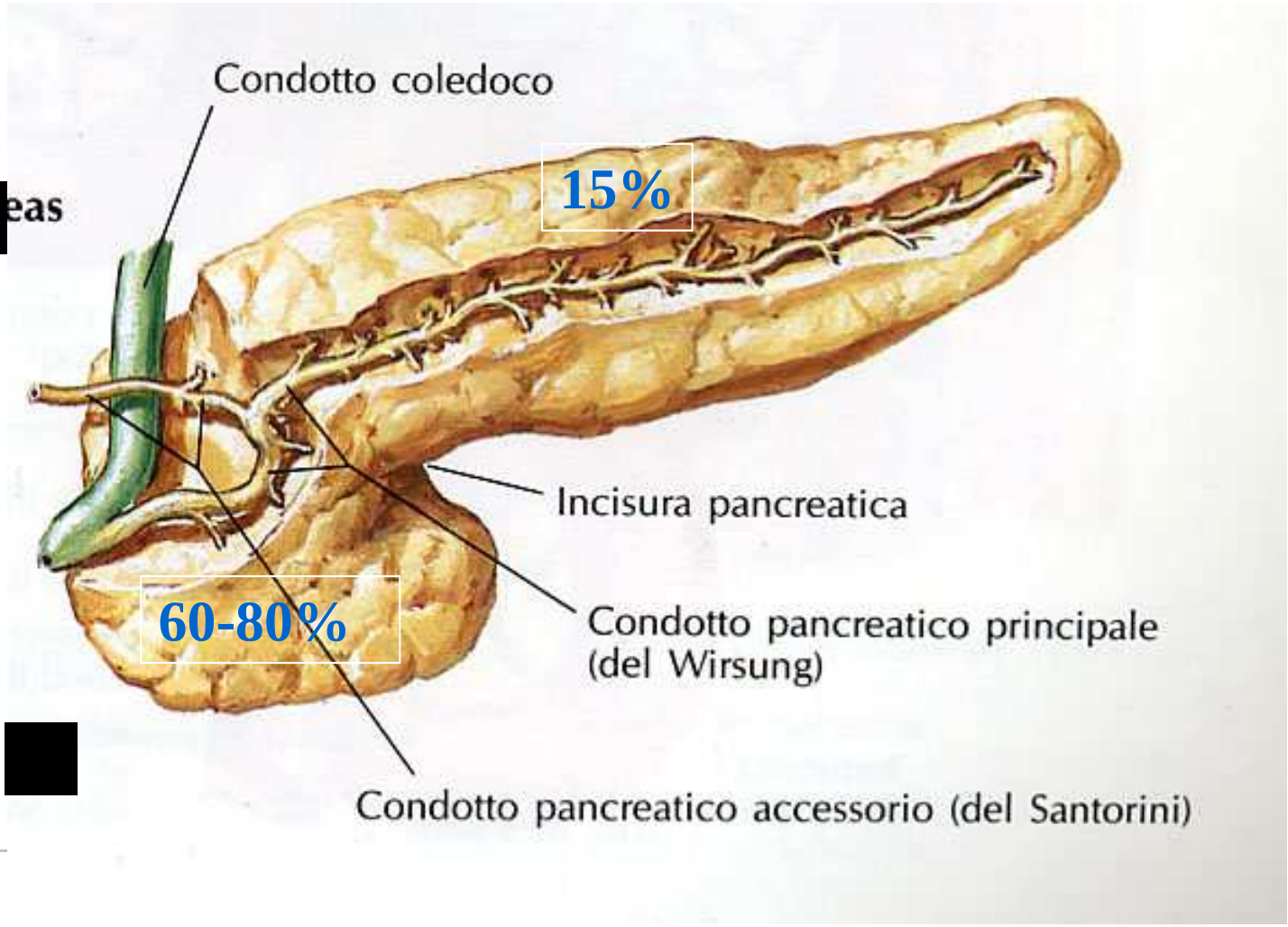


- 90% delle lesioni maligne del pancreas
- 80%-95% non resecabile/metastatico

Kloppel G. et al. 2000. Ductal adenocarcinoma of the pancreas

Classificazione-epidemiologia

La sede più frequente è rappresentata dalla testa del pancreas



Classificazione-epidemiologia

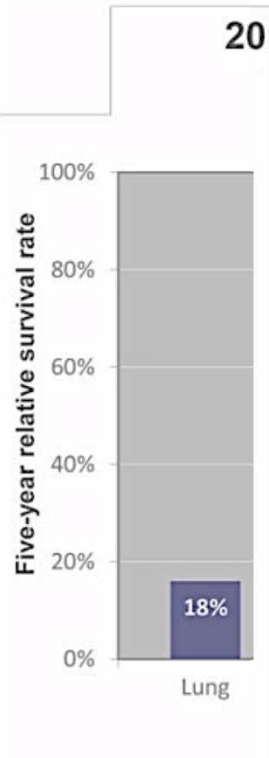


Table 1. Risk Factors for Pancreatic Cancer

Low increase (less than fivefold increase in risk)	Moderate increase (five- to 10-fold increase in risk)
Alcohol use (≥ four drinks per day)	*BRCA2* gene carrier
Body mass index (≥ 30 kg per m²)	Chronic pancreatitis
BRCA1 gene carrier	Cystic fibrosis
Chlorinated hydrocarbon exposure	Family history of pancreatic cancer in two first-degree relatives
Diabetes mellitus (type 2 for ≥ five years)	**High increase (more than a 10-fold increase in risk)**
Familial adenomatous polyposis	Familial atypical multiple mole melanoma
Family history of pancreatic cancer in one first-degree relative	Family history of pancreatic cance in at least three first-, second-, or third-degree relatives
Hereditary nonpolyposis colorectal cancer	Hereditary pancreatitis
Polycyclic aromatic hydrocarbon exposure	Peutz-Jeghers syndrome
Tobacco use	

Adapted with permission from BMJ Publishing Group Limited. Brand RE, Lerch MM, Rubinstein WS, et al.; Participants of the Fourth International Symposium of Inherited Diseases of the Pancreas. Advances in counseling and surveillance of patients at risk for pancreatic cancer. Gut. 2007;56(10):1461.

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circa il

Society,

Solo il 15–2
Sopravvive
~ 25–30%

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Evan L , A Multidisc ew
Am J Gastroenterol. 201

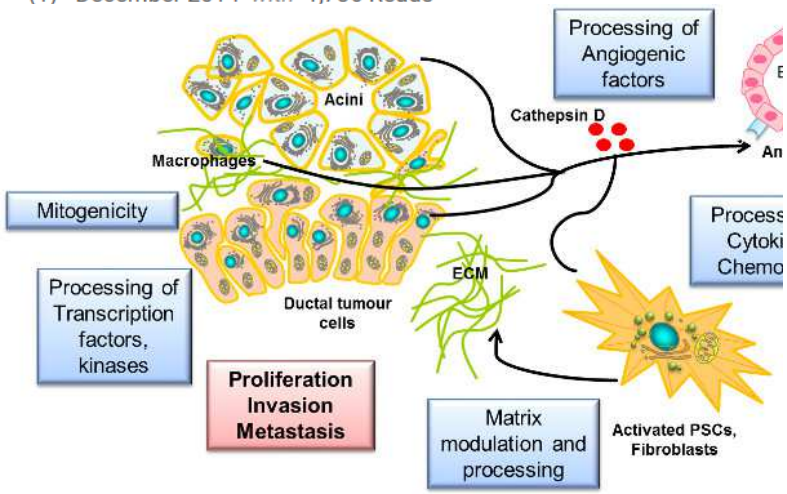
Come si sviluppa

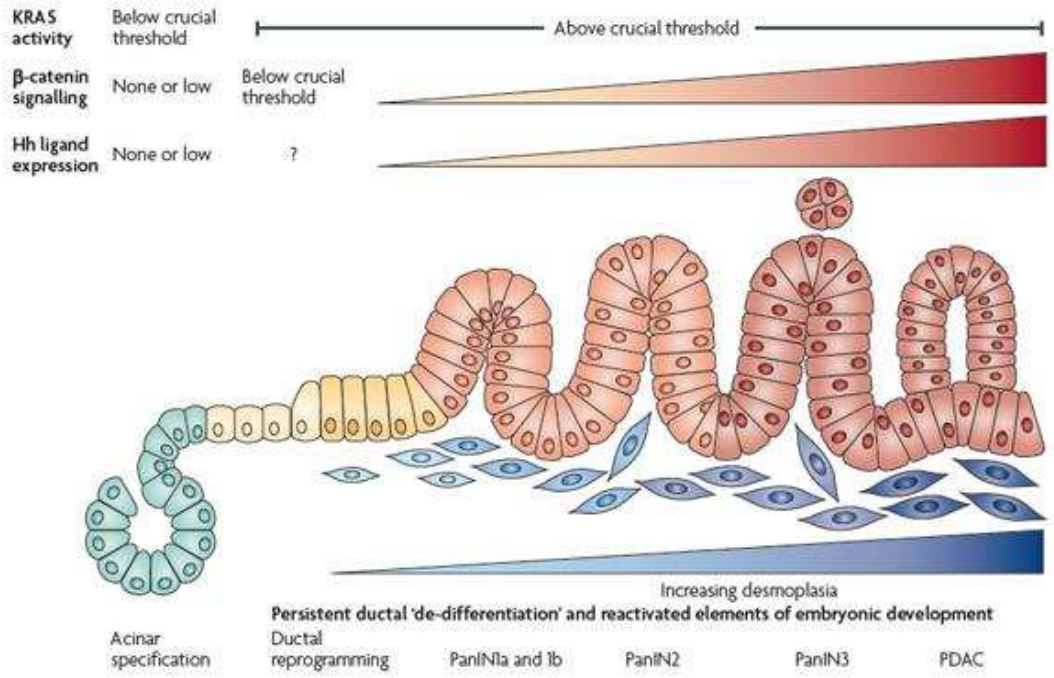
Review Article

KRAS, Hedgehog, Wnt and the twisted developmental biology of pancreatic ductal adenocarcinoma

John P. Morris IV, Sam C. Wang & Matthias Hebrok

Biophysica Acta (BBA) - Reviews on Cancer 1855
(1) · December 2014 *with* 1,736 Reads





Crucial temporal thresholds of developmental signalling pathways and KRAS activity allow pancreatic epithelial neoplasia - pancreatic ductal adenocarcinoma initiation and progression

Nature Reviews Cancer **10**, 683–695 (2010)
doi:10.1038/nrc2899

Published: 03 September 2010

Come si sviluppa

- PanIN è il principale precursore dell'adenoK duttale
- PanIN = Pancreatic Intra-epithelial Neoplasias
- PanINs sono microscopici (<5 mm) non visibili all'imaging
- Classificazione istologica: PanINs 1, 2 (basso grado) e 3 (alto grado)

Lesion type	Histological grade	Histological characteristics	Genetic pathways involved
PanIN-1	Low grade	Flat, micropapillary or papillary epithelial lesions composed of tall columnar cells. Minimal degree of atypia	KRAS activation
PanIN-2	Intermediate grade	Mostly papillary epithelial lesions with some nuclear abnormalities and rare mitoses. Moderate degree of atypia	Inactivation of the p16 tumor suppressor gene
PanIN-3	High grade	"Carcinoma-in-situ"; Papillary, micropapillary epithelial growths with cytonuclear abnormalities resembling non-invasive carcinoma (No basement membrane invasion)	Inactivation of the *TP53 and *DPC4 tumor suppressor genes

*TP53: Tumor Protein 53
*DPC4: Deleted in Pancreatic Cancer Locus 4

Audrey Vincent et al. Pancreatic cancer *Lancet* 2011

Come si «gestisce»

clinical practice guidelines

Annals of Oncology 26 (Supplement 5): v56–v68, 2015
doi:10.1093/annonc/mdv295

Cancer of the pancreas: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up†

M. Ducreux[1,2], A. Sa. Cuhna[2,3], C. Caramella[4], A. Hollebecque[1,5], P. Burtin[1], D. Goéré[6], T. Seufferlein[7], K. Haustermans[8], J. L. Van Laethem[9], T. Conroy[10] & D. Arnold[11], on behalf of the ESMO Guidelines Committee*

[1]*Département de médecine, Gustave Roussy, Villejuif;* [2]*Faculté de Médecine, Université Paul Brousse, Villejuif;* [4]*Département d'imagerie;* [5]*Département d'Innovation Thérapeut*
[7]*Department of Internal Medicine I, Ulm University Hospital Medical Center, Ulm, Germa*
[9]*Departement of Gastroenterology, Hôpital Erasme, Cliniques Universitaires de Bruxelle*
Lorraine, Vandoeuvre lés Nancy, France; [11]*Department of Medical Oncology, Tumor Bi*

REVIEWS

doi:10.1038/nrgastro.2016.144
Published online 9 Nov 2016

Imaging in pancreatic disease

Julien Dimastromatteo[1], Teresa Brentnall[2] and Kimberly A. Kelly[1]

Abstract | Pancreatic diseases, chronic pancreatitis, pancreatic cancer and diabetes mellitus, taken together, occur in >10% of the world population. Pancreatic diseases, as with other diseases, benefit from early intervention and appropriate diagnosis. Although imaging technologies have given clinicians an unprecedented toolbox to aid in clinical decision-making, advances in these technologies and development of molecular-based diagnostic tools could enable physicians to identify diseases at an even earlier stage and, thereby, improve patient outcomes. In this Review, we discuss and identify gaps in the use of imaging techniques for the early detection and appropriate treatment stratification of various pancreatic diseases, including diabetes mellitus, acute and chronic pancreatitis and pancreatic cancer. Imaging techniques discussed are MRI, CT, PET and ultrasonography. Additionally, the identification of new molecular targets for imaging and the development of contrast agents that are able to give molecular information in noninvasive radionuclear imaging and ultrasonography are emerging areas of innovation that could lead to increased diagnostic accuracy and improved patient outcomes.

Come si fa la diagnosi

Box 2 | **Imaging techniques glossary**

CT
Imaging procedure that uses special X-ray radiography equipment to create detailed pictures, or scans, of areas inside the body, also called computerized tomography and computerized axial tomography.

Confocal laser endomicroscopy (CLE)
Technique for obtaining real-time histology-like images from inside the human body.

Contrast-enhanced ultrasonography (CEUS)
Refers to use of intravenous contrast agents to improve visualization of the microvasculature and macrovasculature during an ultrasonographic assessment of organs.

Elastography
Imaging modality that maps the elastic properties of soft tissue.

Endoscopic retrograde cholangiopancreatography (ERCP)
Imaging procedure to visualize the pancreas or its ducts by X-ray radiography following injection of a contrast medium into the ducts at surgery via an endoscope.

Endoscopic ultrasonography (EUS)
Imaging procedure in which endoscopy is coupled with ultrasonography to visualize the internal organs.

Endoscopy
Nonsurgical procedure used to examine the digestive tract.

Endoscopy
Nonsurgical procedure used to examine the digestive tract.

Fluoroscopy
Real-time X-ray radiographic imaging that is especially useful for guiding diagnostic and interventional procedures.

Laparoscopy
Surgical intervention that uses a thin, lighted tube put through an incision in the belly to look at the abdominal organs.

Magnetic resonance cholangiopancreatography (MRCP)
A noninvasive imaging technique that uses MRI to obtain images of the biliary and pancreatic ducts.

MRI
Noninvasive imaging modality that uses a powerful magnetic field, radio frequency pulses and a computer to produce detailed pictures of organs, soft tissues, bone and virtually all other internal body structures.

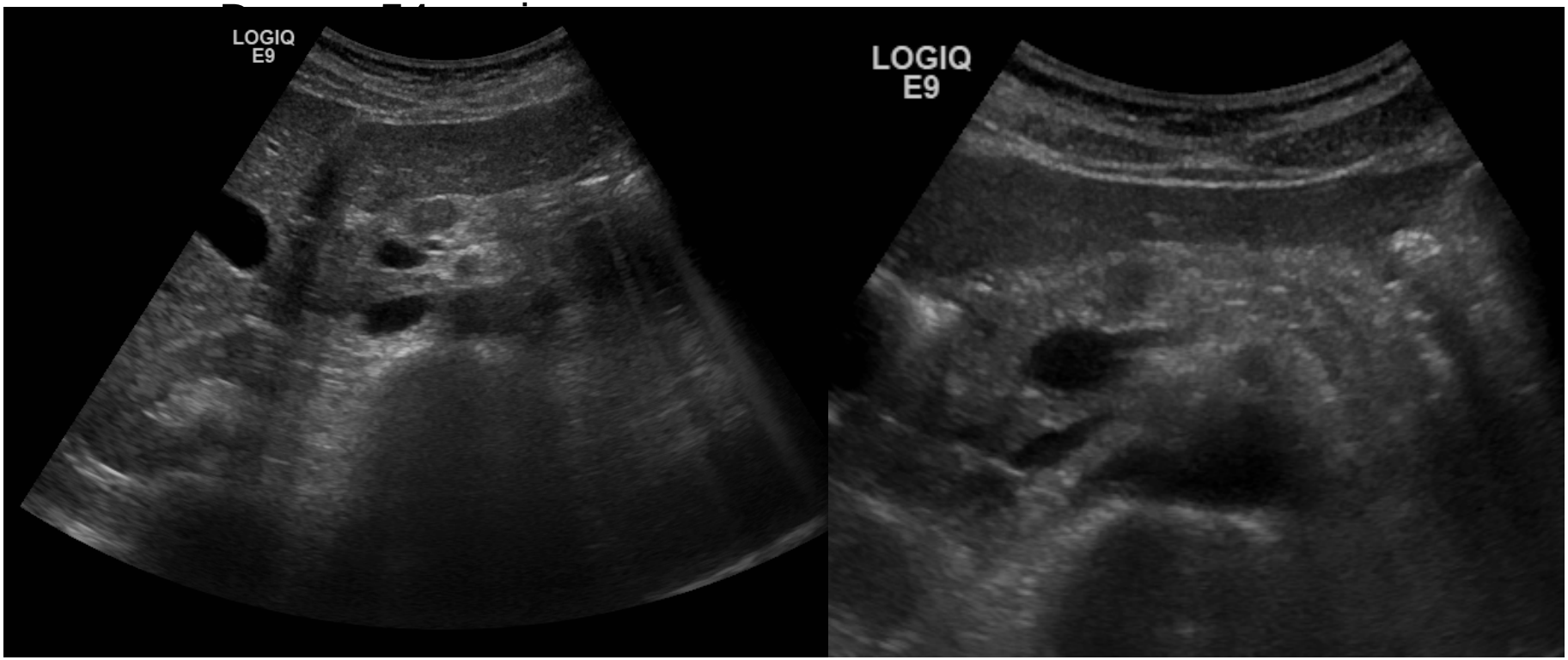
PET
Imaging technique that uses a radioactive substance (beta$^+$ photon, also called a positron) to look for disease in the body.

Single-photon emission computed tomography (SPECT)
Imaging technique that uses a radioactive substance (gamma photon) to look for disease in the body.

Ultrasonography
Imaging modality that uses high-frequency acoustic wave to image the body. Involves the use of a small transducer (probe) and ultrasound-conductive gel placed directly on the skin.

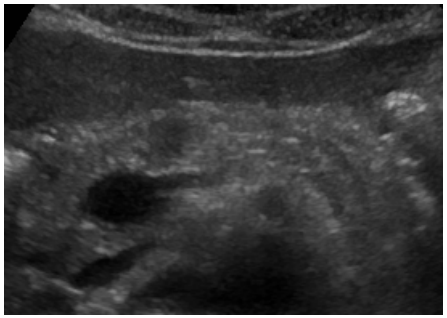
NATURE REVIEWS | GASTROENTEROLOGY & HEPATOLOGY
doi:10.1038/nrgastro.2016.144
Published online 9 Nov 2016

Come si fa la diagnosi: l'ecografia



Lesione IPOECOGENA

Come si fa la diagnosi: l'ecografia



US-B mode: sensibilità 50%-90%

Doppler

CEUS

Elastosonografia

Lee ES, Imaging diagnosis of pancreatic cancer: A state-of-the-art review *World J Gastroenterol* 2014

Come si fa la diagnosi: l'ecografia e la CEUS

ORIGINAL ARTICLE: Clinical Endoscopy

Differential diagnosis of small solid pancreatic lesions CME

Christoph Frank Dietrich, MD, PhD,[1,2] Anand Vasante Sahai, MD, PhD,[3] Mirko D'Onofrio, MD,[4]
Uwe Will, MD, PhD,[5] Paolo Giorgio Arcidiacono, MD, PhD,[6] Maria Chiara Petrone,
Michael Hocke, MD, PhD,[7] Barbara Braden, MD, PhD,[8] Eike Burmester, MD,[9] Kath
Adrian Săftoiu, MD, PhD,[11,12] Andre Ignee, MD,[2] Xin-Wu Cui, MD, PhD,[1,2] Sevastit
Andrej Potthoff, MD,[13] Julio Iglesias-Garcia, MD, PhD,[14] Pietro Fusaroli, MD, PhD,[1]
Christian Jenssen, MD[17]

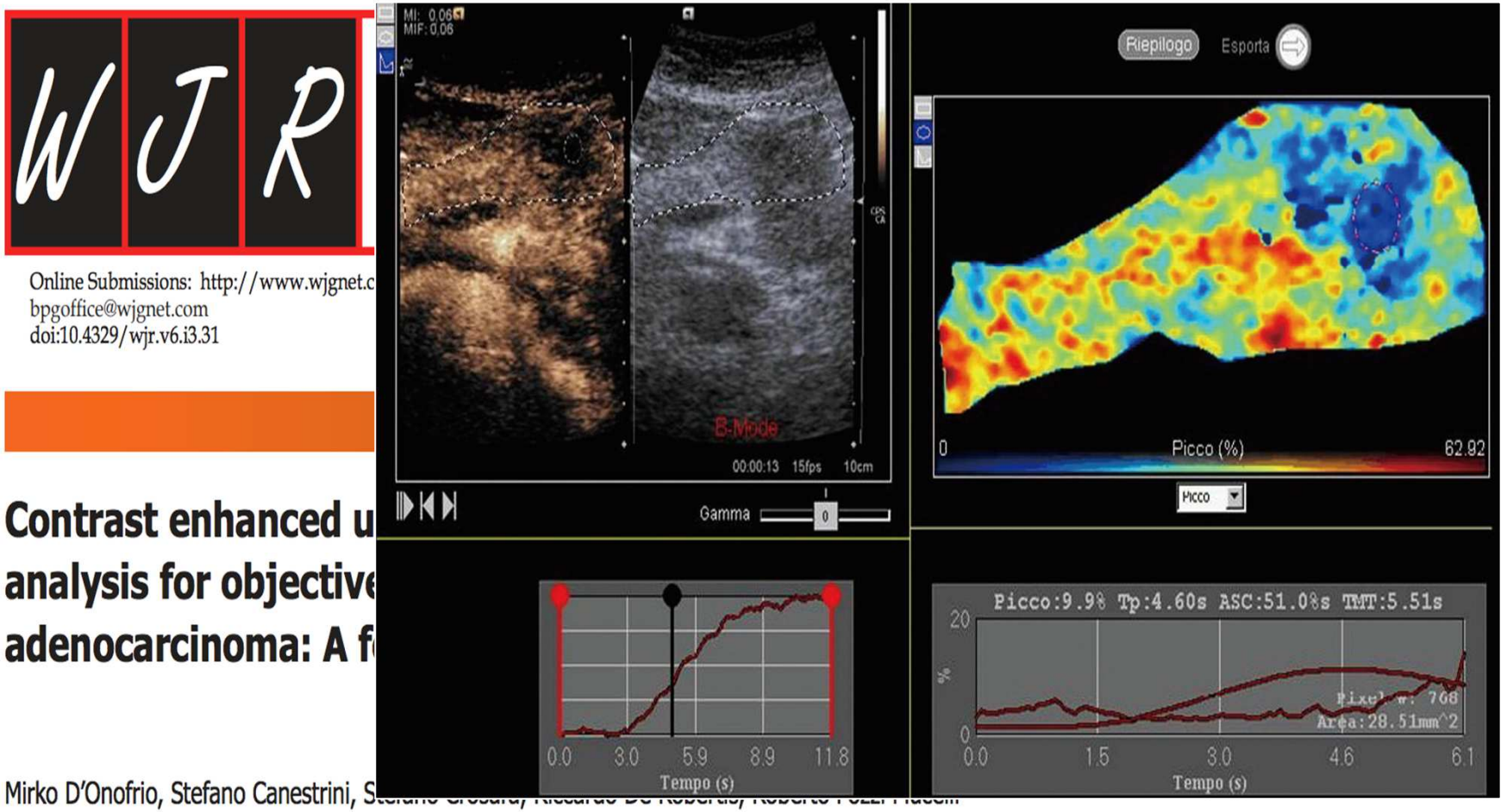
Ca. pancreas: 90% **marcatamente ipovascolarizzato**

Accuratezza nella caratterizzazione: 87.8%

D'Onofrio M Eur J Radiol 2012;81(4):630-8

	Sensibilità	Specificità
D'Onofrio Ultraschall Med 2014	0.89	**0.84**
Lin Med Ultrason 2016	0.90	**0.88**
Ran Medicine 2017	0.86	**0.75**

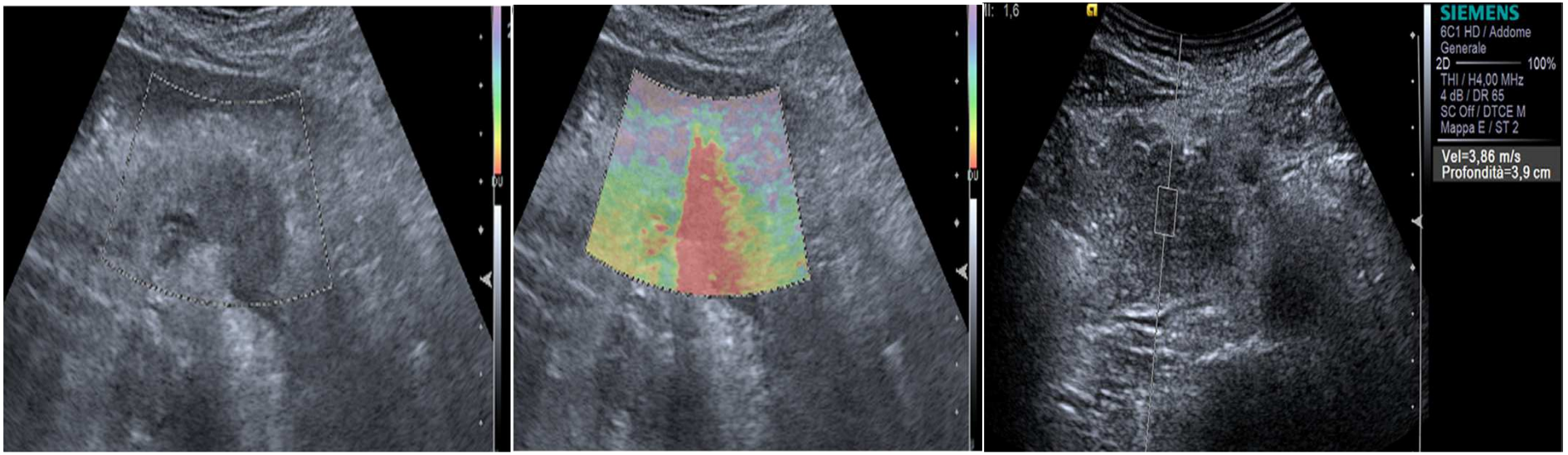
Come si fa la diagnosi: l'ecografia e la CEUS



Picco di enhancement

pancreas 33.6 % adenoK 17.2 %

Come si fa la diagnosi: l'elastosonografia



Pancreatology. 2016 Jan-Feb;16(1):106-9. doi: 10.1016/j.pan.2015.12.003. Epub 2015 Dec 21.

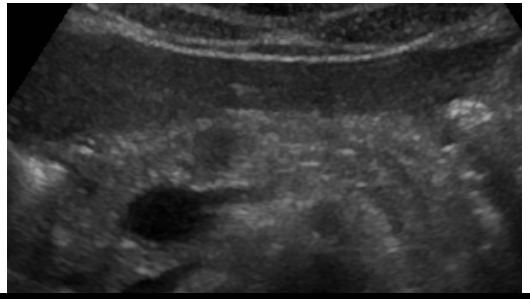
Acoustic radiation force impulse with shear wave speed quantification of pancreatic masses: A prospective study.

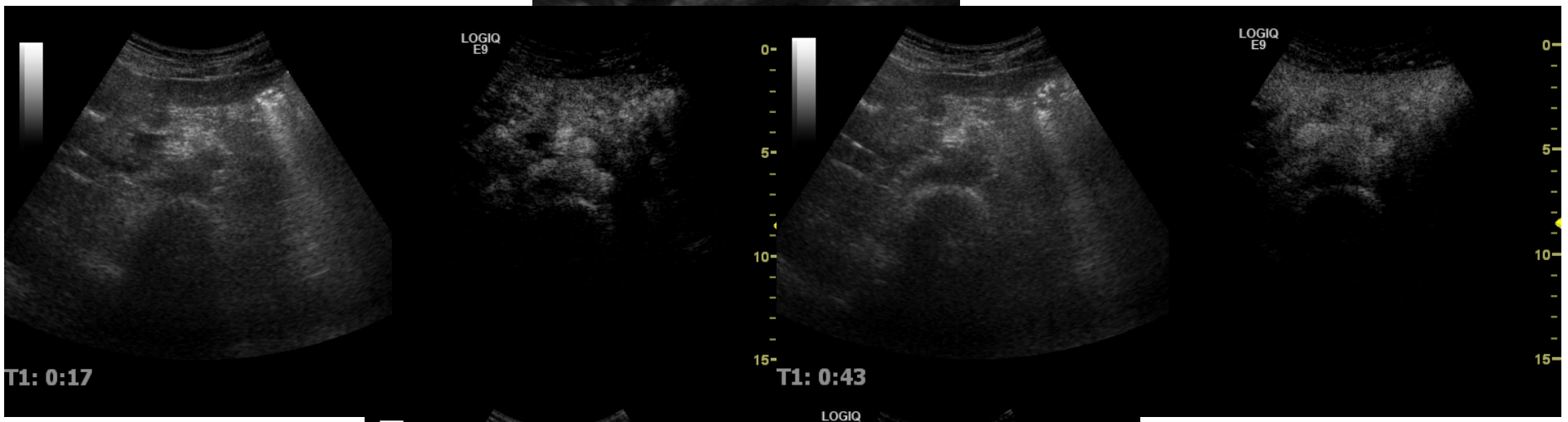
D'Onofrio M[1], De Robertis R[2], Crosara S[2], Poli C[2], Canestrini S[2], Demozzi E[2], Pozzi Mucelli R[2].

Pancreas sano: SWS 1.17 m/s

AdenoK: SWS 2.74 m/s

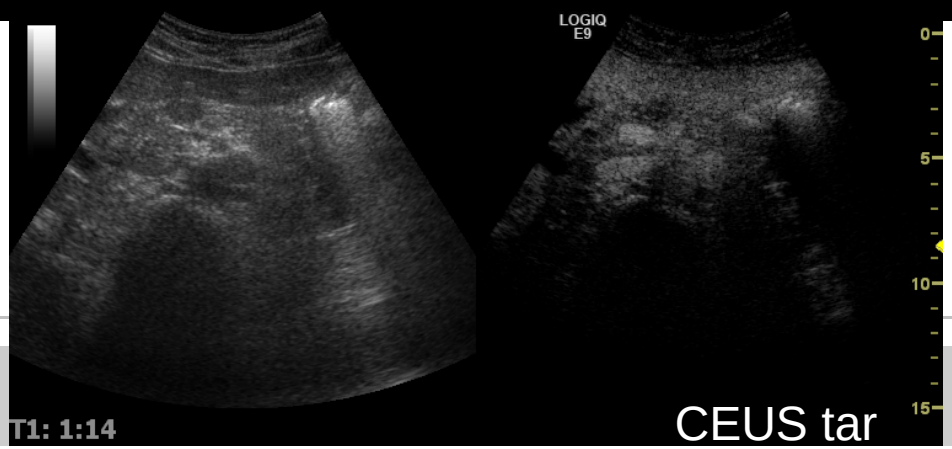
Come si fa la diagnosi: la CEUS





CEUS art

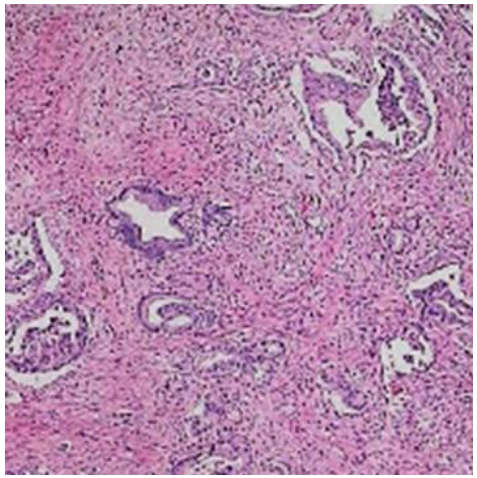
CEUS ven



CEUS tar

Come si fa la diagnosi

- Lesione nodulare ipoecogena scarsamente vascolarizzata sospetta per ca duttale
- Si consiglia TC con mdc per conferma diagnostica e stadiazione



ADENOK DUTTALE
TUBULI / GHIANDOLE NEO
CELL. CILINDRICHE O CUBOIDALI
STROMA FIBROSO IPOVASCOLARE

Struttura fibrosa - ridotta vascolarizzazione

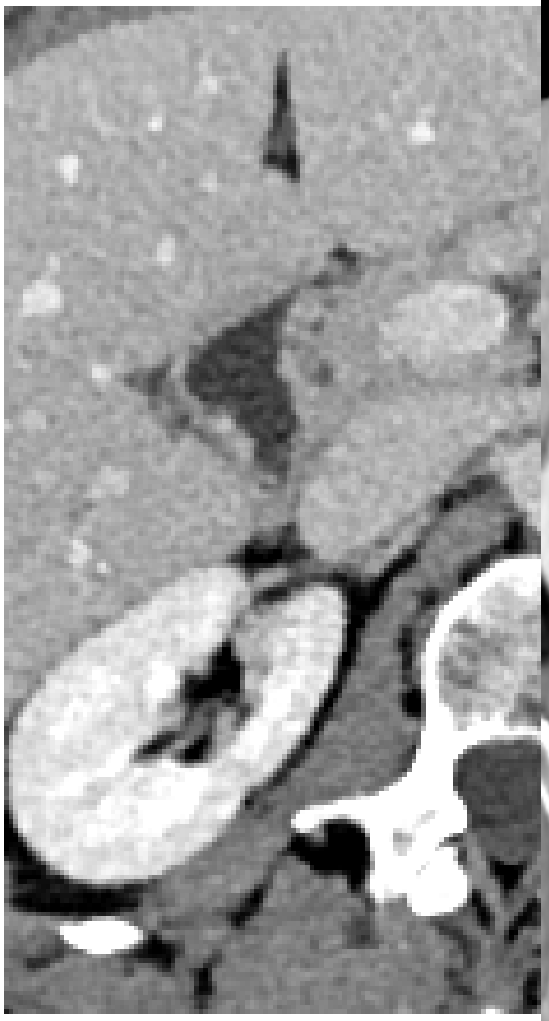
Come si fa la diagnosi in TC

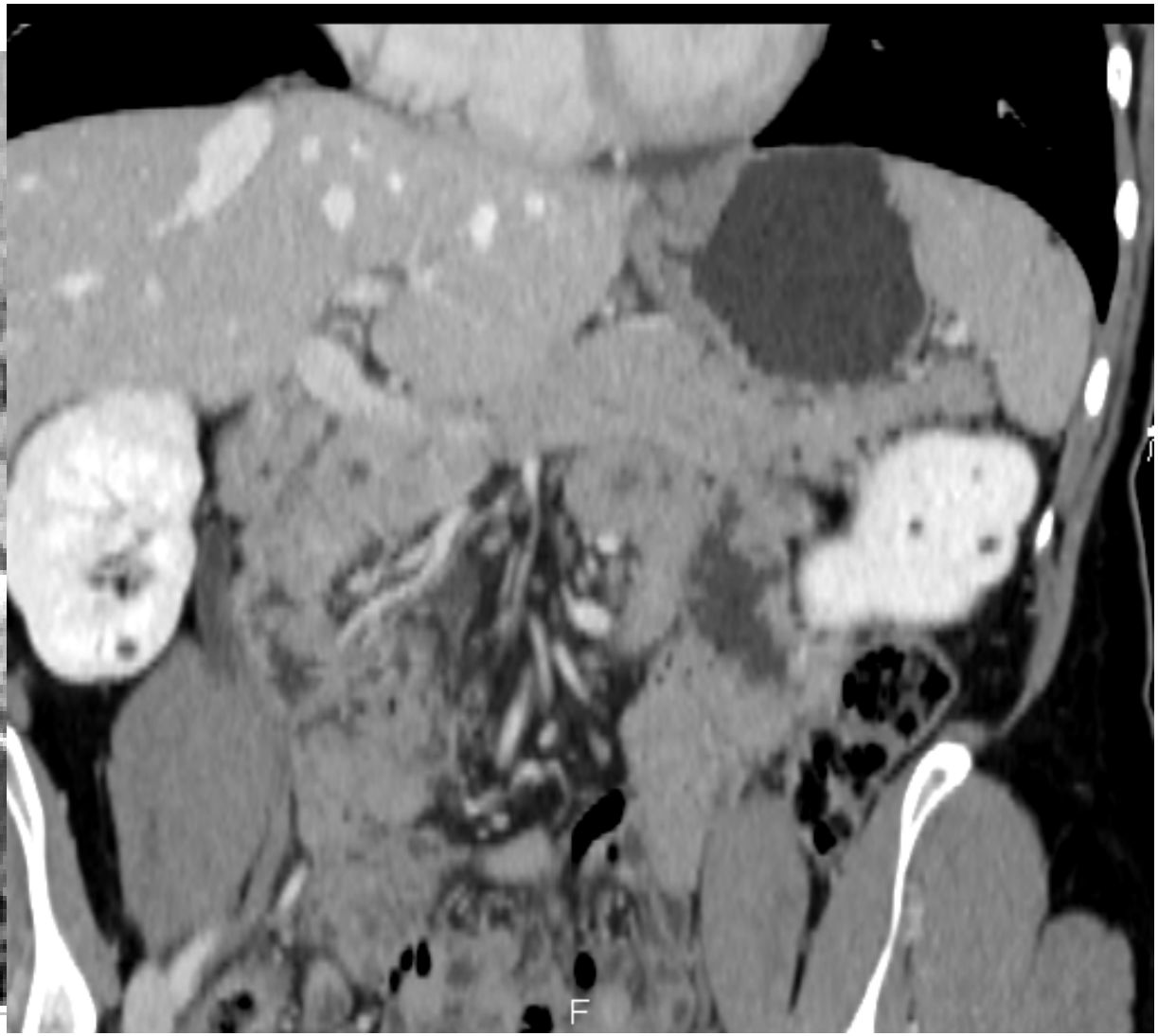
- Massa solida a margini irregolari
- Lesione "a scirro" – crescita perivascolare
- Ipodensità
- Ipovascolarizzazione, possibile enhancement tardivo

  Segni indiretti:

  - Perdita delle lobature pancreatiche
  - Dilatazione del DPP a monte
  - Atrofia parenchimale a monte
  - Dilatazione delle VB
- Infiltrazione vascolare
- Metastasi epatiche – Linfoadenopatie - Ascite

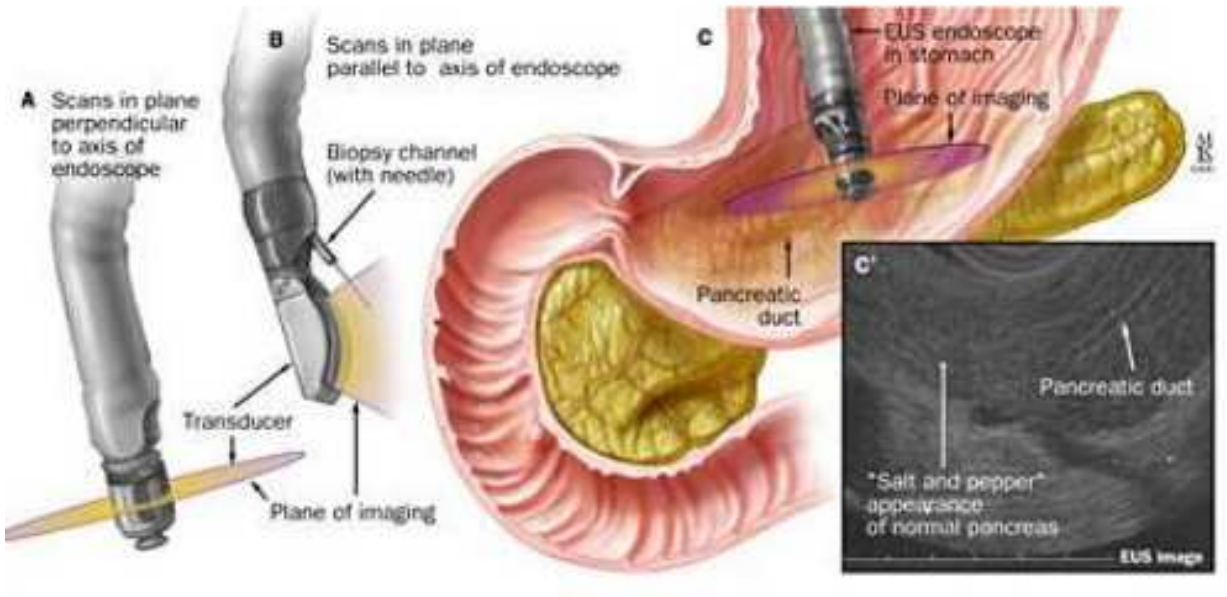
Come si sviluppa: la diagnosi precoce





La diagnosi: ECOENDOSCOPIA (EUS)

EUS



Esame citologico: adenocarcinoma **duttale**

La diagnosi istologica

Esame microscopico

1. **2.3.4.5.**

La lesione macroscopicamente descritta corrisponde istologicamente a proliferazione neoplastica epiteliale definita dai seguenti caratteri:

SEDE DELLA NEOPLASIA: corpo pancreatico.

DIMENSIONI DELLA NEOPLASIA: cm 1,5 (diametro massimo)

TIPO ISTOLOGICO: adenocarcinoma duttale.

GRADO ISTOLOGICO: G2 (moderatamente differenziato).

PRESENZA DI NEOPLASIA INTRADUTTALE (PANin): presente, diffusa, di tipo PANin 1-PANin 2-PANin 3.

INVASIONE LINFATICA/VENOSA: presente.

INVASIONE PERINEURALE: assente.

NECROSI: assente.

ESTENSIONE DELLA NEOPLASIA: neoplasia del diametro massimo compreso tra cm 1 e cm 2.

MARGINI DI RESEZIONE: tutti i margini di resezione sono liberi da infiltrazione neoplastica (a conferma di quanto espresso in corso di esame intraoperatorio)

Milza: indenne da infiltrazione neoplastica.

STATO LINFONODALE:

Linfonodi peripancreatici: n° 7, metastatici: n° 0.

Linfonodi perisplenici: n° 4, metastatici: n° 0.

Linfonodi peripancreatici (campione 2): 1 linfonodo metastatico

Linfonodi arteria epatica (campione 3): tessuto adiposo indenne da neoplasia

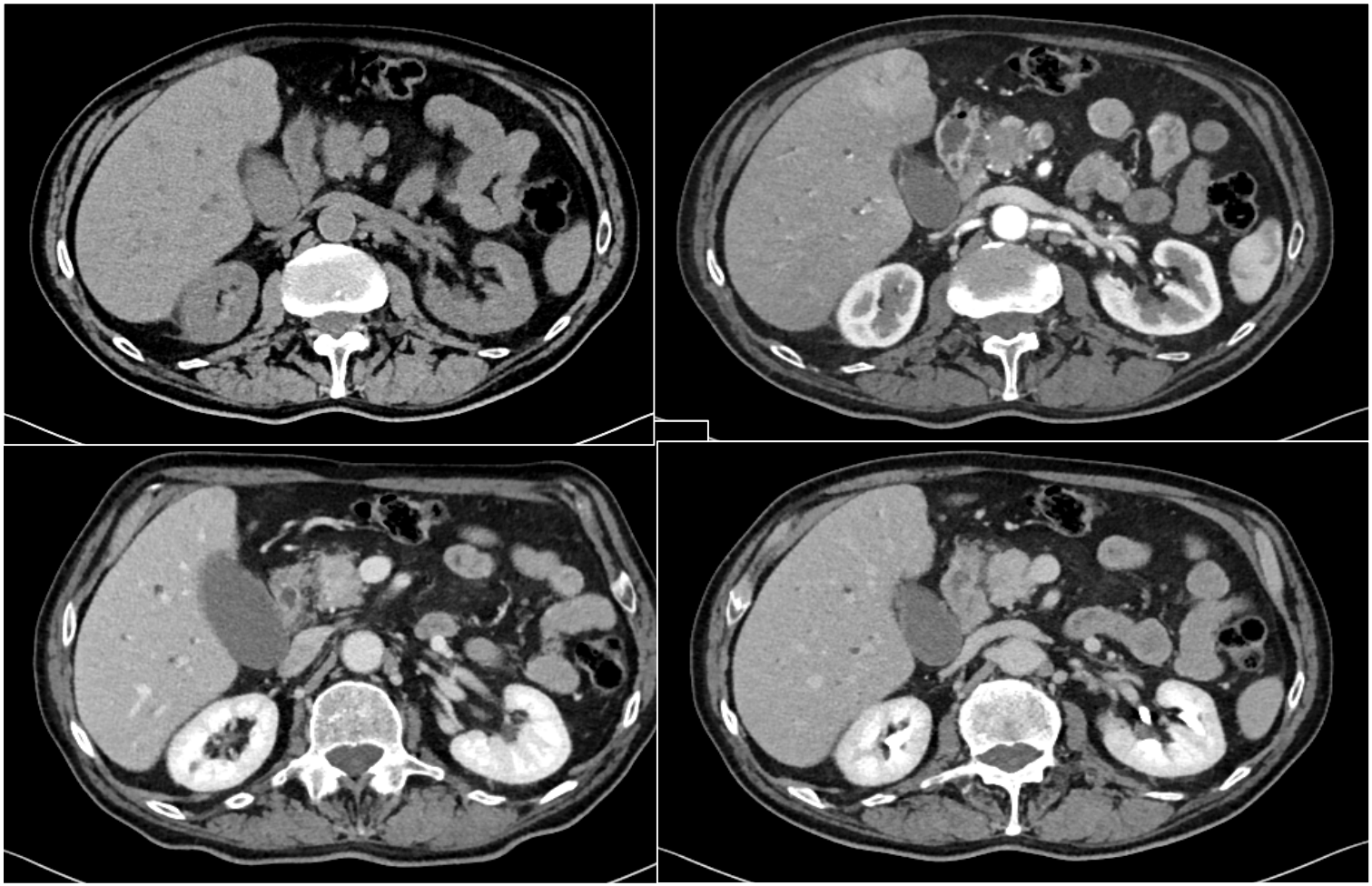
Linfonodi gastrica sinistra ed epatica (campione 4): linfonodi indenni da metastasi

Linfonodi retrocoledocici (campione 5): linfonodo indenne da metastasi.

STADIAZIONE (AJCC 8 Ed.): pT1cN1

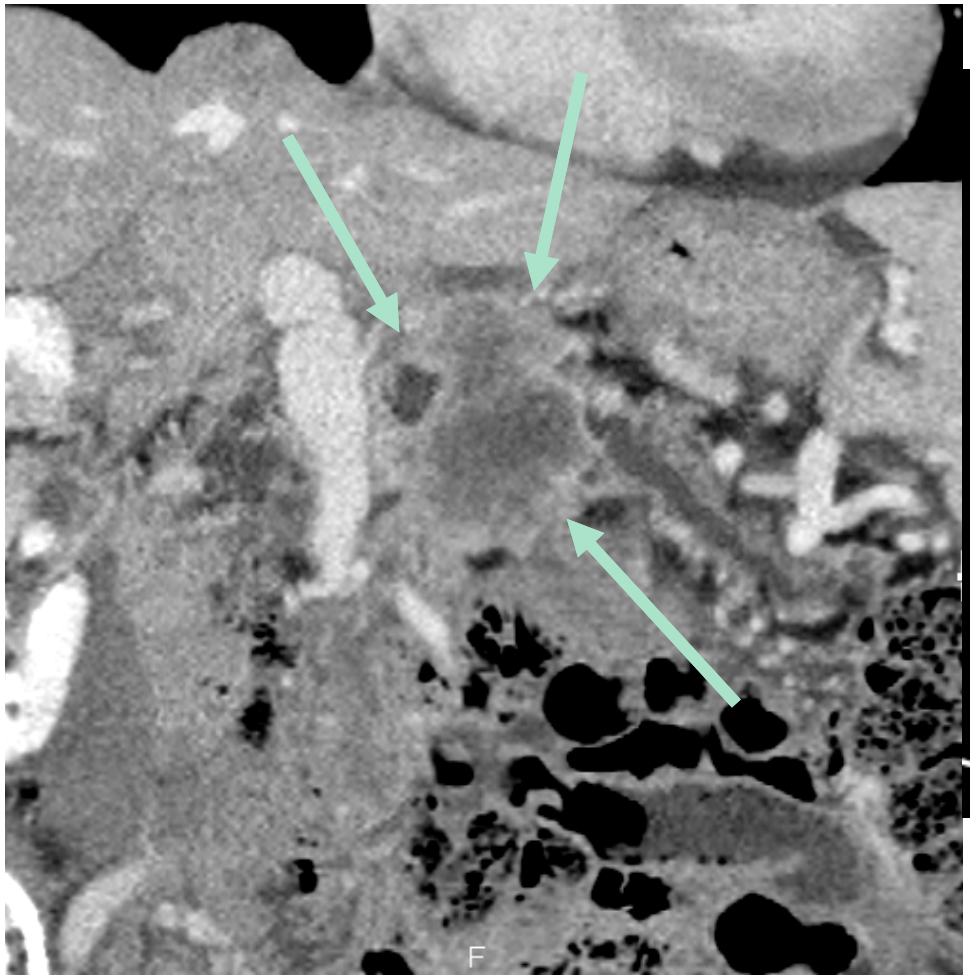
PARENCHIMA NON NEOPLASTICO: pancreatite cronica.

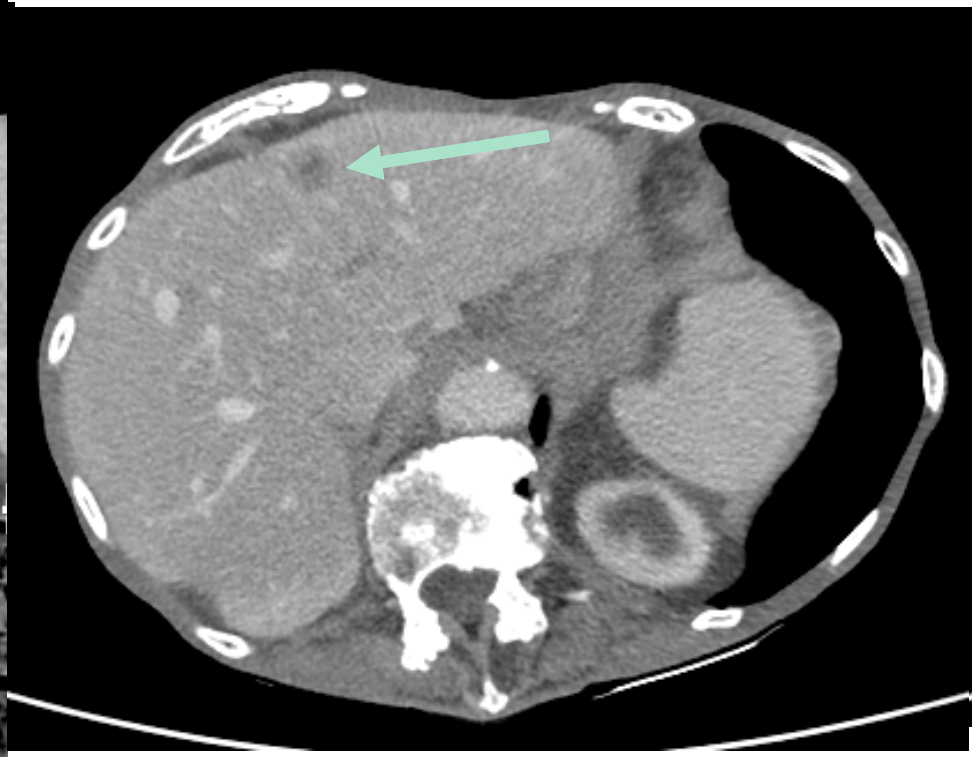
La diagnosi in TC



Massa solida ipovascolare infiltrante

La diagnosi e lo staging





MPR curva

La diagnosi: TC vs RM

CONCLUSION. MRI and CT had similar performance in the presurgical evaluation of pancreatic cancer.

Presurgical Evaluation of Pancreatic Cancer: A Comprehensive Imaging Comparison of CT Versus MRI

Fang-Ming Chen[1]
Jian-Ming Ni
Zhui-Yang Zhang
Lei Zhang
Bin Li
Chun-Juan Jiang

OBJECTIVE. The purpose of this study was to compare comprehensive CT and MRI in the presurgical evaluation of pancreatic cancer.

MATERIALS AND METHODS. Thirty-eight patients with pathologically proven pancreatic cancer were included in a retrospective study. CT with negative-contrast CT cholangiopancreatography and CT angiography (CTA) (CT image set) versus MRI with MRCP and MR angiography (MRI image set) were analyzed independently by two reviewers for tumor detection, extension, metastasis, vascular invasion, and resectability. These results were compared with the surgical and pathologic findings.

RESULTS. The rate of detection of tumors was higher with MRI than with CT but not significantly so (reviewer 1, $p = 1.000$; reviewer 2, $p = 0.500$). In the evaluation of vessel involvement, nodal status, and resectability, although CT had higher ROC AUC values than did MRI (reviewer 1, 0.913 vs 0.858, 0.613 vs 0.503, and 0.866 vs 0.774; reviewer 2, 0.879 vs 0.849, 0.640 vs 0.583, and 0.830 vs 0.815), the differences were not statistically significant ($p = 0.189$ vs 0.494, 0.328 vs 0.244, and 0.193 vs 0.813 for reviewers 1 and 2). In the evaluation of tumor extension and organ metastases in the 38 patients, correct diagnosis of one of two liver metastases was achieved with both image sets, one case of omental and one case of peritoneal seeding were underestimated, and one case of stomach invasion was overestimated.

CONCLUSION. MRI and CT had similar performance in the presurgical evaluation of pancreatic cancer.

Chen FM, AJR 2016

Pancreatic tumors: Imaging update 2015, International Journal of Surgery (2016)
DOI: 10.1016/j.ijsu.2015.12.053

La diagnosi e lo staging TC vs RM

Radiology. 2011 Aug;260(2):446-53. doi: 10.1148/radiol.11103548. Epub 2011 Jun 21.

Detection of pancreatic carcinoma and liver metastases with gadoxetic acid-enhanced MR imaging: comparison with contrast-enhanced multi-detector row CT.

Motosugi U[1], Ichikawa T, Morisaka H, Sou H, Muhi A, Kimura K, Sano K, Araki T.

- Identificazione:
  - Sensibiltà: TC 94-98% RM 96-98%
  - Specificità: TC 98% RM 98%

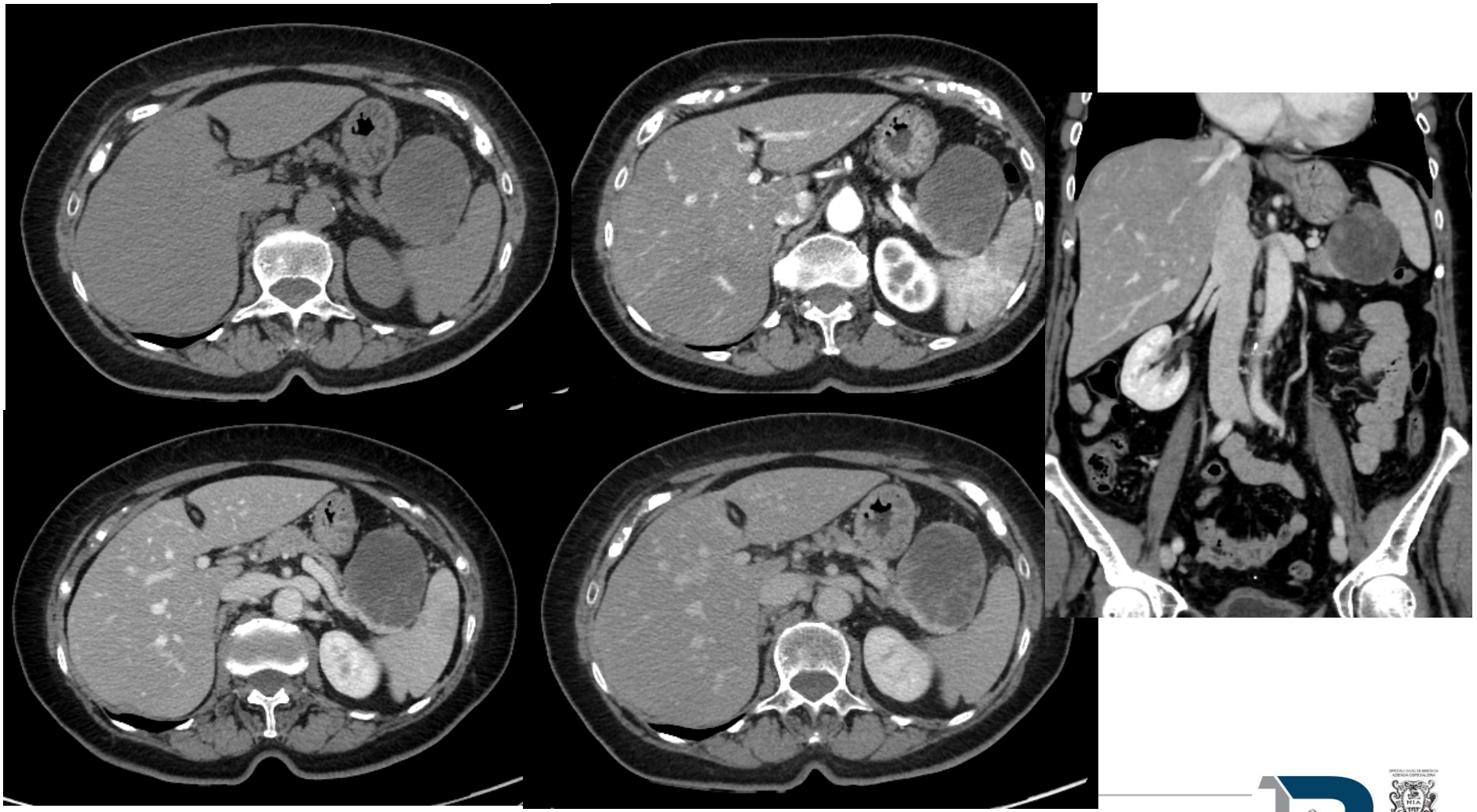
Pancreas. 2016 Jul;45(6):789-95. doi: 10.1097/MPA.0000000000000524.

Imaging Tests for the Diagnosis and Staging of Pancreatic Adenocarcinoma: A Meta-Analysis.

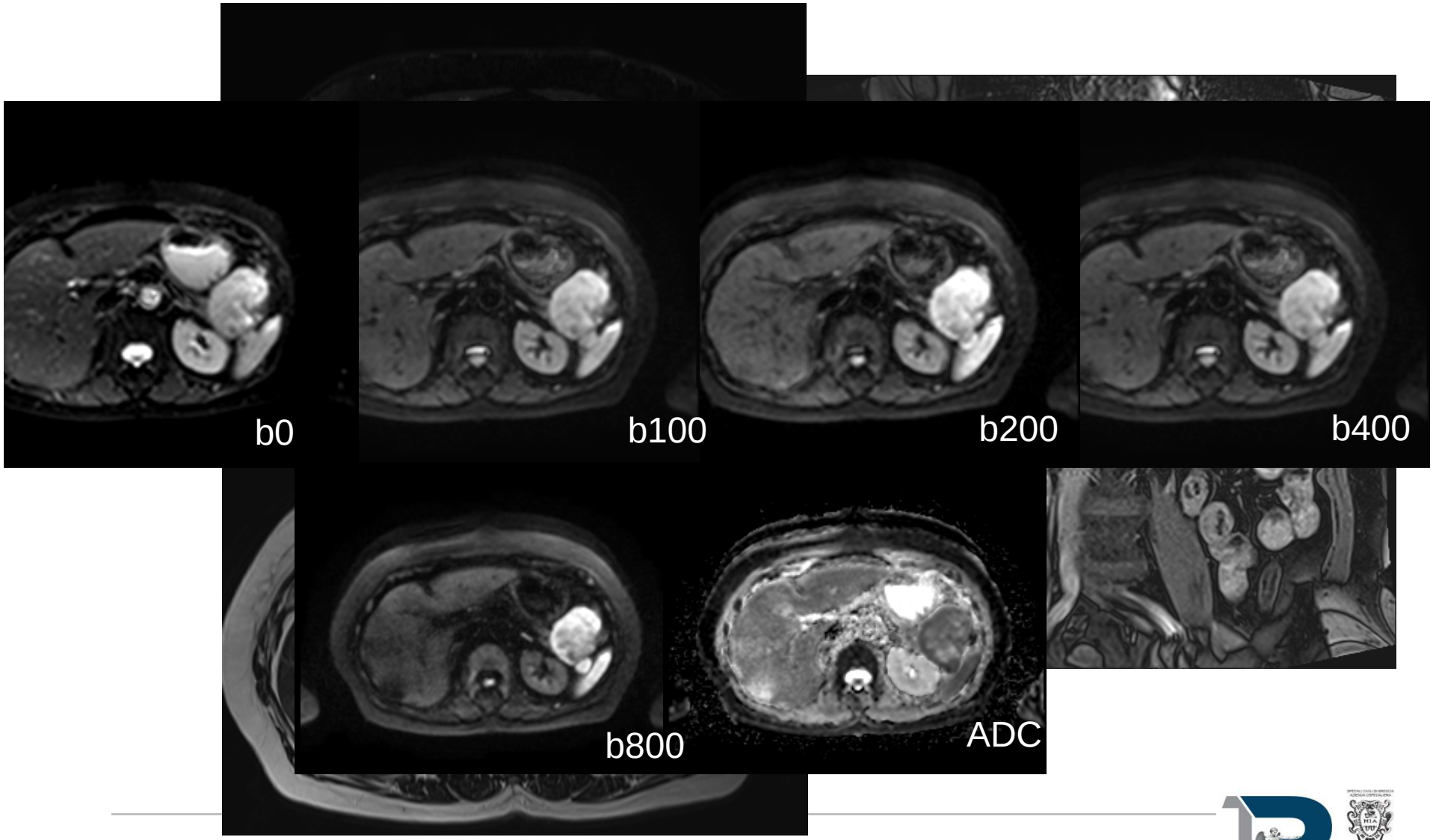
Treadwell JR[1], Zafar HM, Mitchell MD, Tipton K, Teitelbaum U, Jue J.

- Caratterizzazione:
  - Sensibilità: TC 89 % RM 89 %
  - Specificità: TC 90% RM 89%

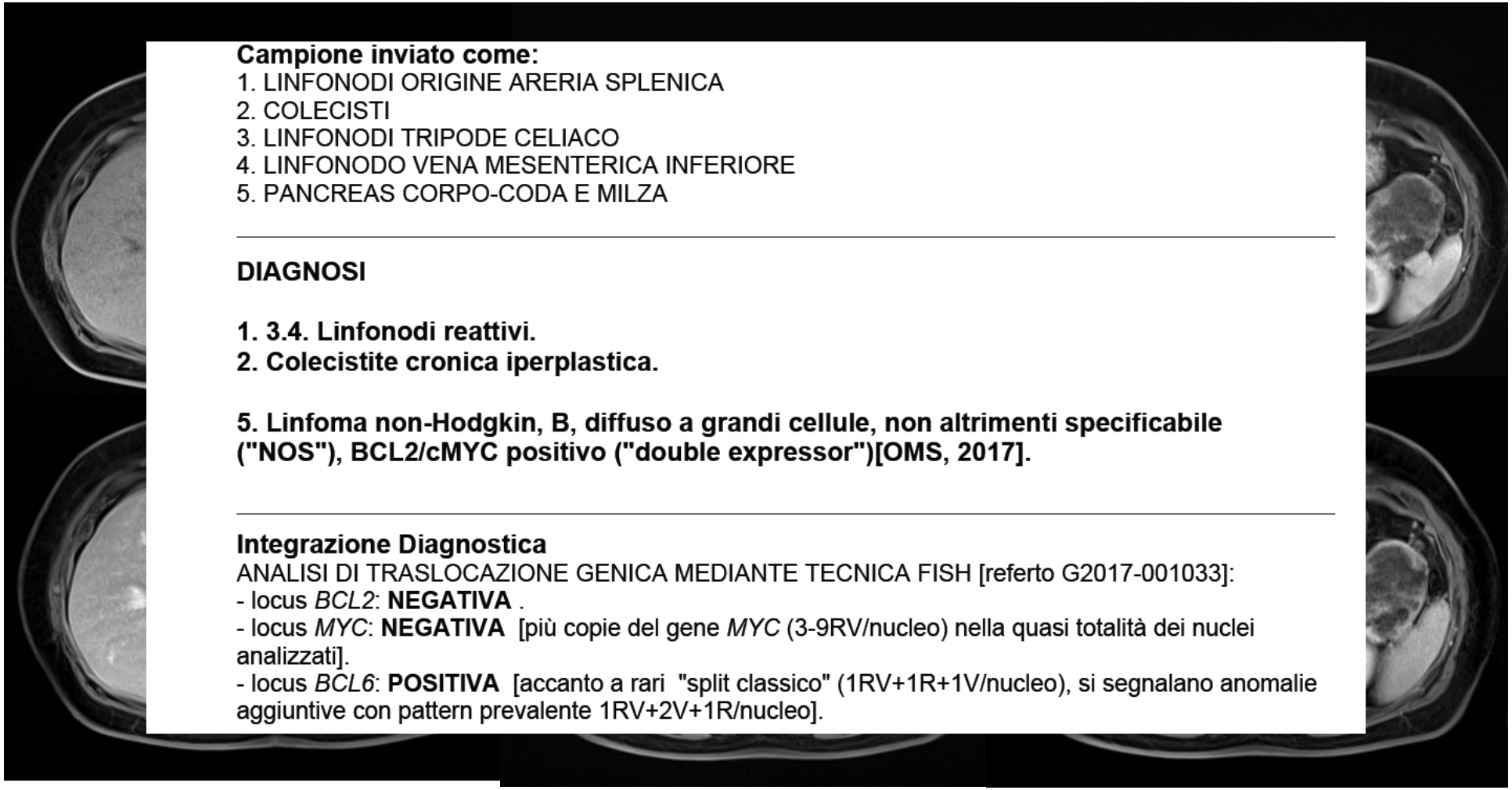
La diagnosi e lo staging TC vs RM



La diagnosi e lo staging TC vs RM



La diagnosi e lo staging TC vs RM



Campione inviato come:
1. LINFONODI ORIGINE ARERIA SPLENICA
2. COLECISTI
3. LINFONODI TRIPODE CELIACO
4. LINFONODO VENA MESENTERICA INFERIORE
5. PANCREAS CORPO-CODA E MILZA

DIAGNOSI

1. 3.4. Linfonodi reattivi.
2. Colecistite cronica iperplastica.

5. Linfoma non-Hodgkin, B, diffuso a grandi cellule, non altrimenti specificabile ("NOS"), BCL2/cMYC positivo ("double expressor")[OMS, 2017].

Integrazione Diagnostica
ANALISI DI TRASLOCAZIONE GENICA MEDIANTE TECNICA FISH [referto G2017-001033]:
- locus *BCL2*: **NEGATIVA** .
- locus *MYC*: **NEGATIVA** [più copie del gene *MYC* (3-9RV/nucleo) nella quasi totalità dei nuclei analizzati].
- locus *BCL6*: **POSITIVA** [accanto a rari "split classico" (1RV+1R+1V/nucleo), si segnalano anomalie aggiuntive con pattern prevalente 1RV+2V+1R/nucleo].

La diagnosi con DWI in RM: benigno vs maligno

- Identificazione
  - Se: 85%
  - Sp: 91%

Wu LM J Gastroenterol Hepatol 2012

- Caratterizzazione
  - Se: 86%
  - Sp: 82%

Niu X Chin Med J 2014

Table 1 Comparison of apparent diffusion coefficient values between different solid pancreatic neoplasms

Ref.	No. of patients	Field strength (T)	*b*-values (s/mm^2)	Mean ± SD ADC values (× 10^{-3} mm^2/s)	*P* value
Yao *et al*[18]	30 PDACs	3	0, 600	1.57 ± 0.26	< 0.001
	12 SPTs			1.05 ± 0.35	
	15 PanNETs			1.62 ± 0.41	
Barral *et al*[19]	18 malignant[1]	1.5	0, 400, 800	1.150[2]	< 0.05
	10 benign			2.493[2]	
Lee *et al*[33]	47 PDACs	1.5	0, 500, 1000	1.23 ± 0.18	NS
	6 SPTs			1.16 ± 0.36	
	5 PanNETs			1.30 ± 0.41	

[1]Including 13 PDACs; [2]Median. T: Tesla; ADC: Apparent diffusion coefficient; PDAC: Pancreatic ductal adenocarcinoma; SPT: Solid pseudopapillary tumor; PanNET: Pancreatic neuroendocrine tumor; NS: Not statistically significant.

De Robertis R World J Radiol 2015

La diagnosi con RM: benigno vs maligno

- **Pancreatite focale cronica**

  Manifestazione focale di pancreatite cronica

- **Pancreatite autoimmune focale**

Flogosi cronica inducente fibrosi riferibile al sistema dei dotti pancreatici e caratterizzata da un denso infiltrato di linfo-plasmacellule (produzione di IgG4).

- **Distofia cistica della parete duodenale**

Flogosi di tessuto eterotopico pancreatico situate nel muro duodenale (multiple micro-macrocisti nel contesto delle lamine muscolari)

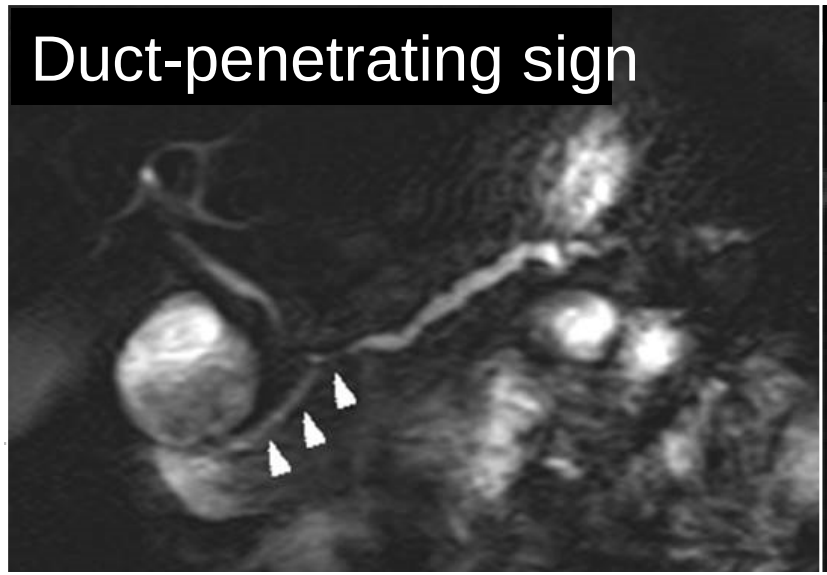
La diagnosi con RM: benigno vs maligno

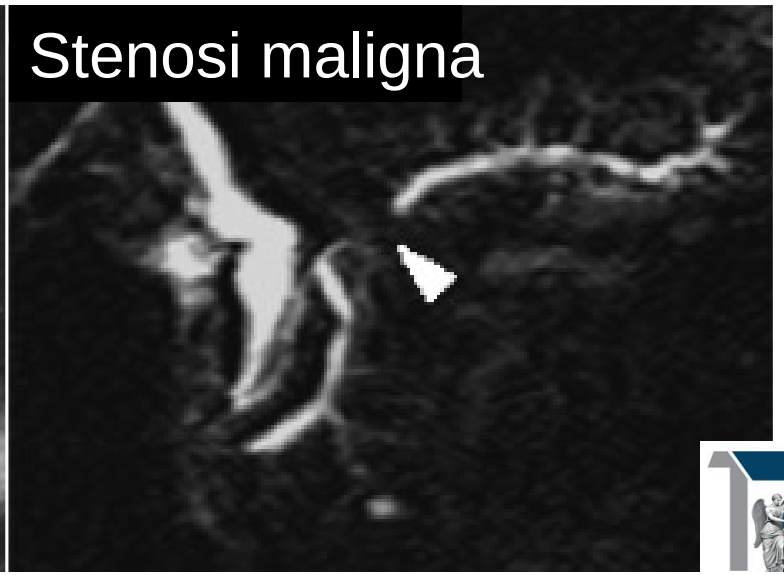
- **Mass-forming pancreatitis**
- Massa solida ipoecogena/ipodensa/ipointensa
- Dopo mdc: iper-iso rispetto al parenchima circostante

Radiology. 2001 Oct;221(1):107-16.

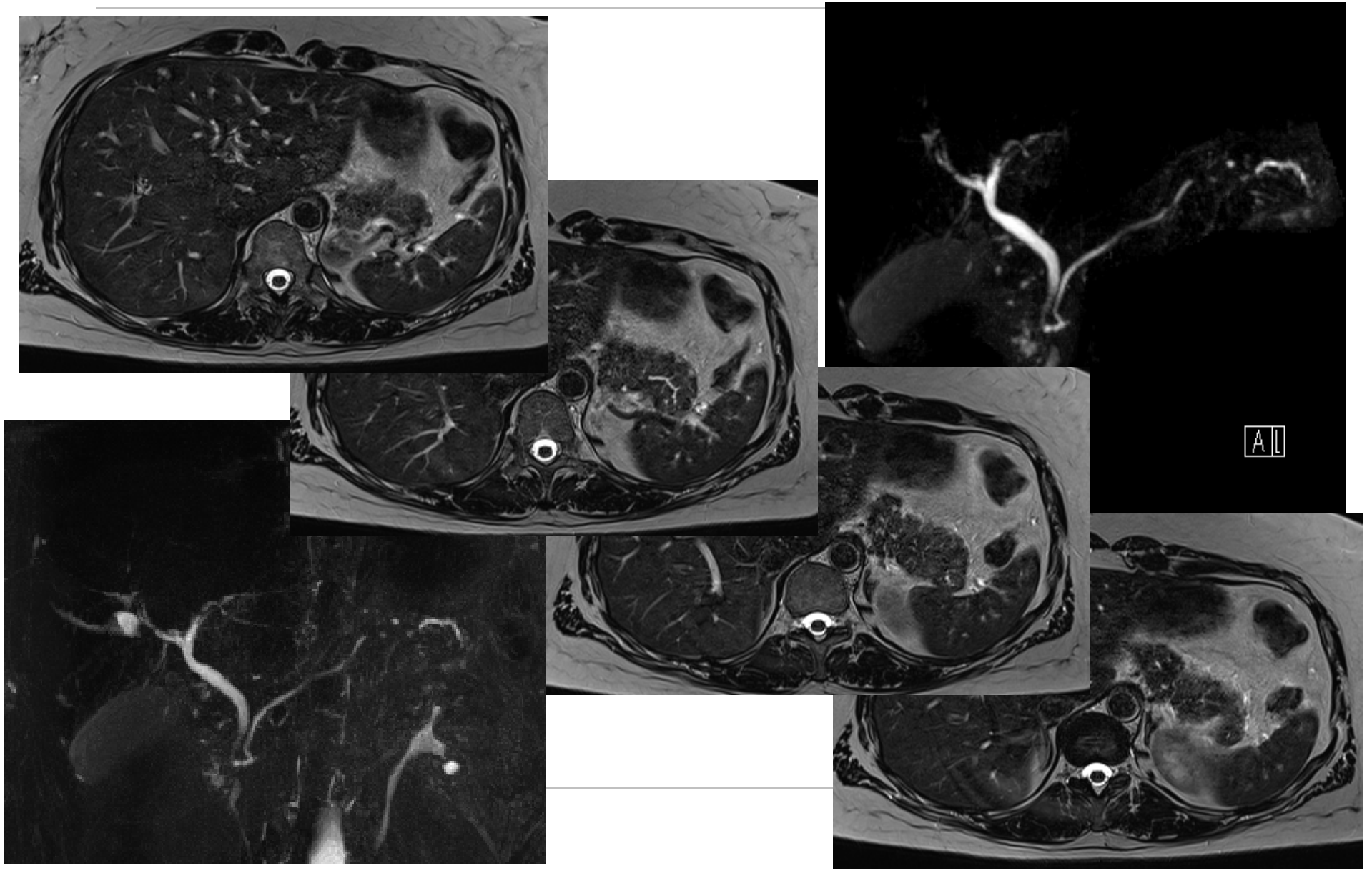
Duct-penetrating sign at MRCP: usefulness for differentiating inflammatory pancreatic mass from pancreatic carcinomas.

Ichikawa T[1], Sou H, Araki T, Arbab AS, Yoshikawa T, Ishigame K, Haradome H, Hachiya J.

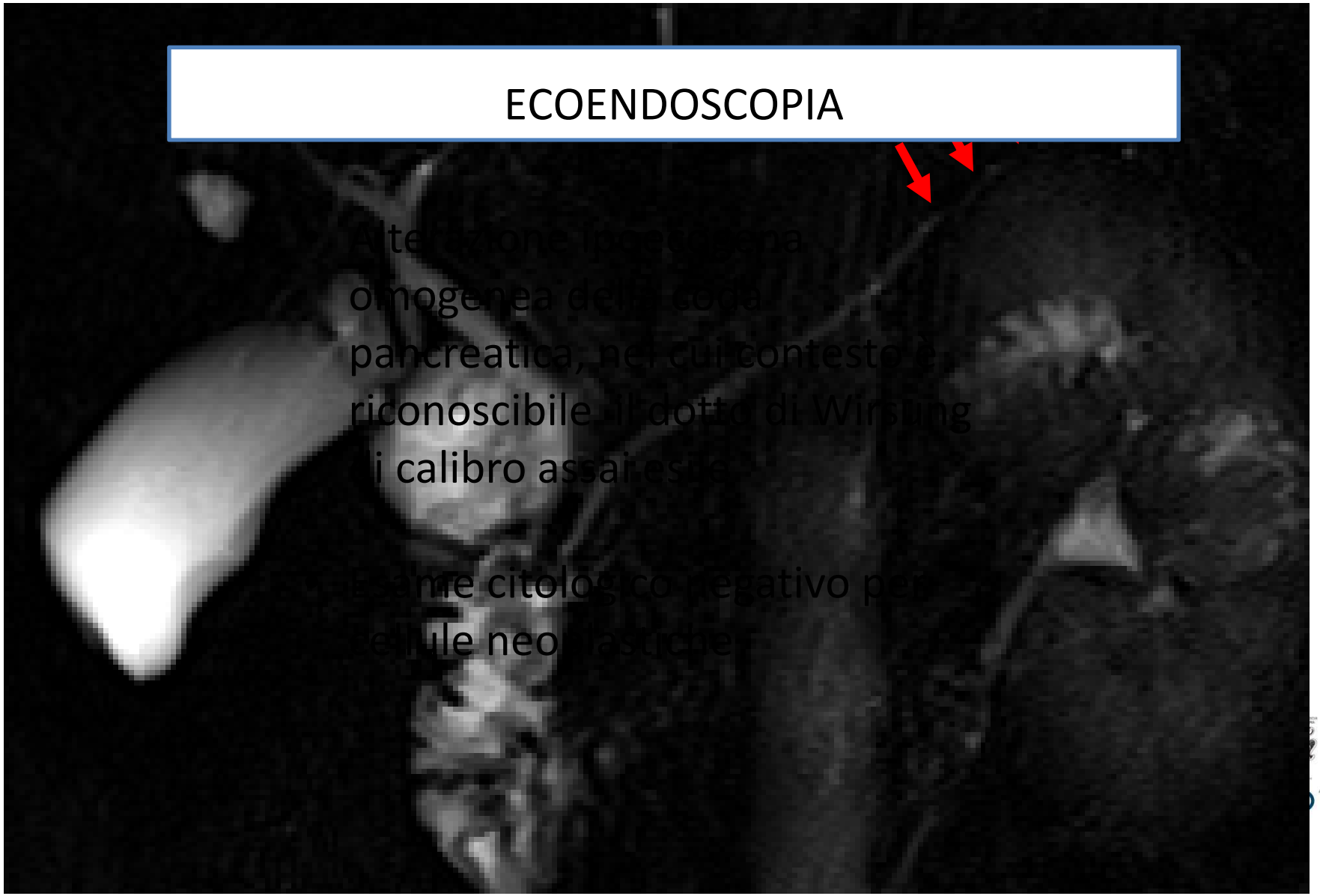




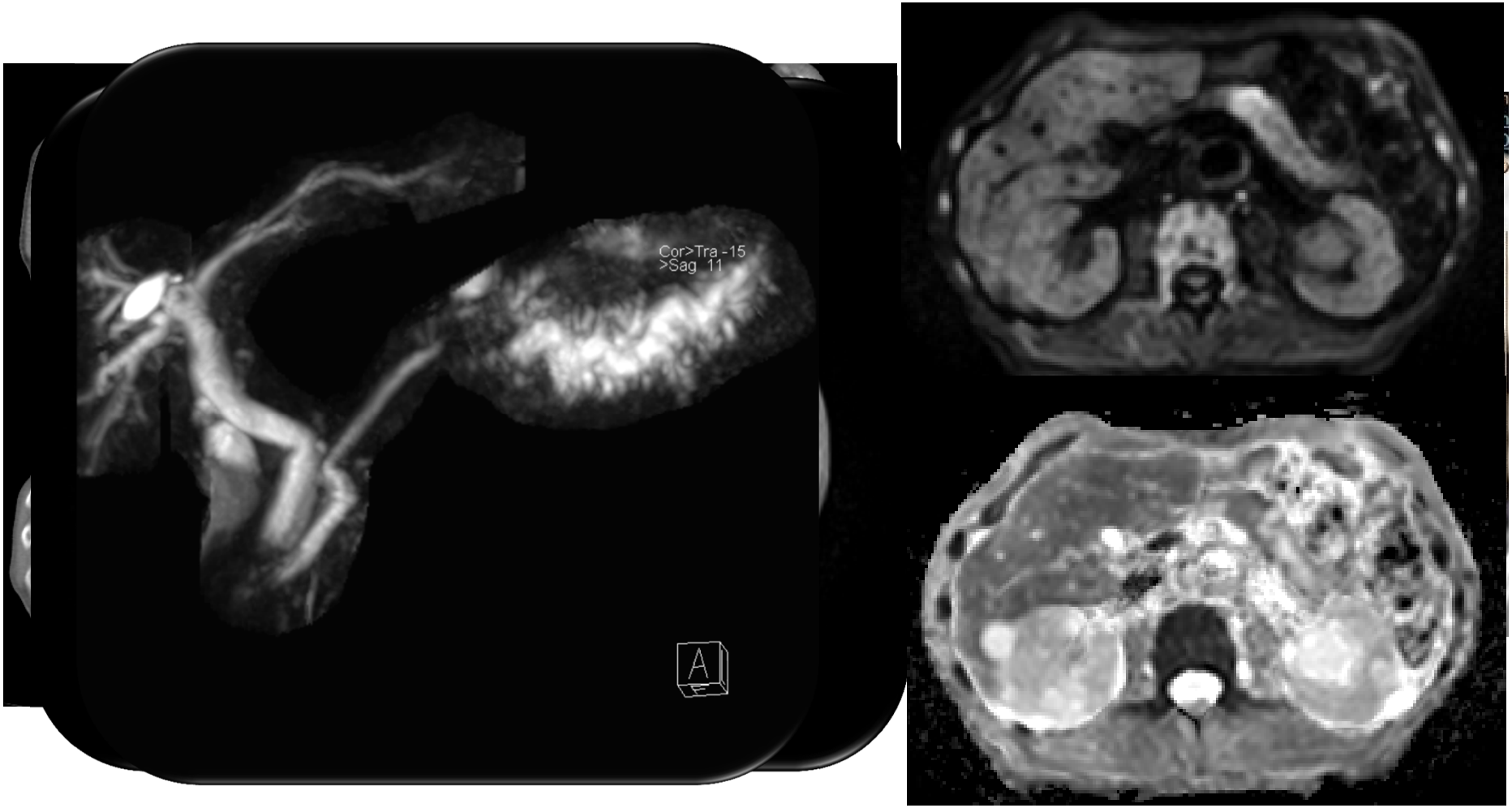
La diagnosi con RM: benigno vs maligno



Dopo 1 mese: COLANGIO-RM CON SECRETINA



La diagnosi con RM: benigno vs maligno



La diagnosi con PET-CT

Rev Esp Med Nucl Imagen Mol. 2014;33(3):159–164

Original article

Role of ^{18}F-Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography in diagnosis and management of pancreatic cancer; comparison with Multidetector Row Computed Tomography, Magnetic Resonance Imaging and Endoscopic Ultrasonography

N. Ergul[a,*], C. Gundogan[b], M. Tozlu[c], H. Toprak[d], H. Kadıoglu[e], M. Aydin[a], T.F. Çermik[b]

[a] *Department of Nuclear Medicine, Bezmialem Vakif University School of Medicine, Istanbul, Turkey*
[b] *Clinic of Nuclear Medicine, Istanbul Research and Training Hospital, Istanbul, Turkey*
[c] *Department of Gastroenterology, Bezmialem Vakif University School of Medicine, Istanbul, Turkey*
[d] *Department of Radiology, Bezmialem Vakif University School of Medicine, Istanbul, Turkey*
[e] *Department of Surgery, Bezmialem Vakif University School of Medicine, Istanbul, Turkey*

Criteri di resecabilità

Table 3. Definition of resectability according to NCCN guidelines [19]

Resectability status	Arterial	Venous
Resectable	No arterial tumour contact [coeliac axis (CA), superior mesenteric artery (SMA), or common hepatic artery (CHA)]	No tumour contact with the superior mesenteric vein (SMV), or portal vein (PV) or <180° contact without vein contour irregularity
Borderline resectable	Pancreatic head/uncinate process • Solid tumour with CHA without extension to coeliac axis or hepatic artery bifurcation allowing for safe and complete resection and reconstruction • Solid tumour contact with the SMA ≤180° • Presence of variant arterial anatomy (e.g. accessory right hepatic artery) and the presence and degree of tumour contact should be noted if present as it may affect surgical planning Pancreatic body/tail • Solid tumour contact with the CA of ≤180° • Solid tumour contact with the CA of >180° without involvement of the aorta and with intact and uninvolved gastroduodenal artery (some members prefer these criteria to be in the unresectable category)	• Solid tumour contact with the SMV or PV of >180°, contact of ≤180° with contour irregularity of the vein or thrombosis of the vein but with suitable vessels proximal and distal to the site of involvement allowing for safe and complete resection and vein reconstruction • Solid tumour contact with the inferior vena cava (IVC)
Unresectable	• Distant metastases Pancreatic head/uncinate process • Solid tumour contact with SMA >180° • Solid tumour contact with the CA >180° • Solid tumour contact with the first jejunal SMA branch Body and tail • Solid tumour contact with the SMA and CA • Solid tumour contact with the CA and aorta	Pancreatic head/uncinate process • Unreconstructible SMV/PV due to tumour involvement or occlusion (can be due to tumour or bland thrombus) • Contact with most proximal draining jejunal branch into SMV Body and tail • Unreconstructible SMV/PV due to tumour involvement or occlusion (can be due to tumour or bland thrombus)

Radiol Clin N Am 53 (2015) 1037–1048
http://dx.doi.org/10.1016/j.rcl.2015.05.005

Diagnosi e Management

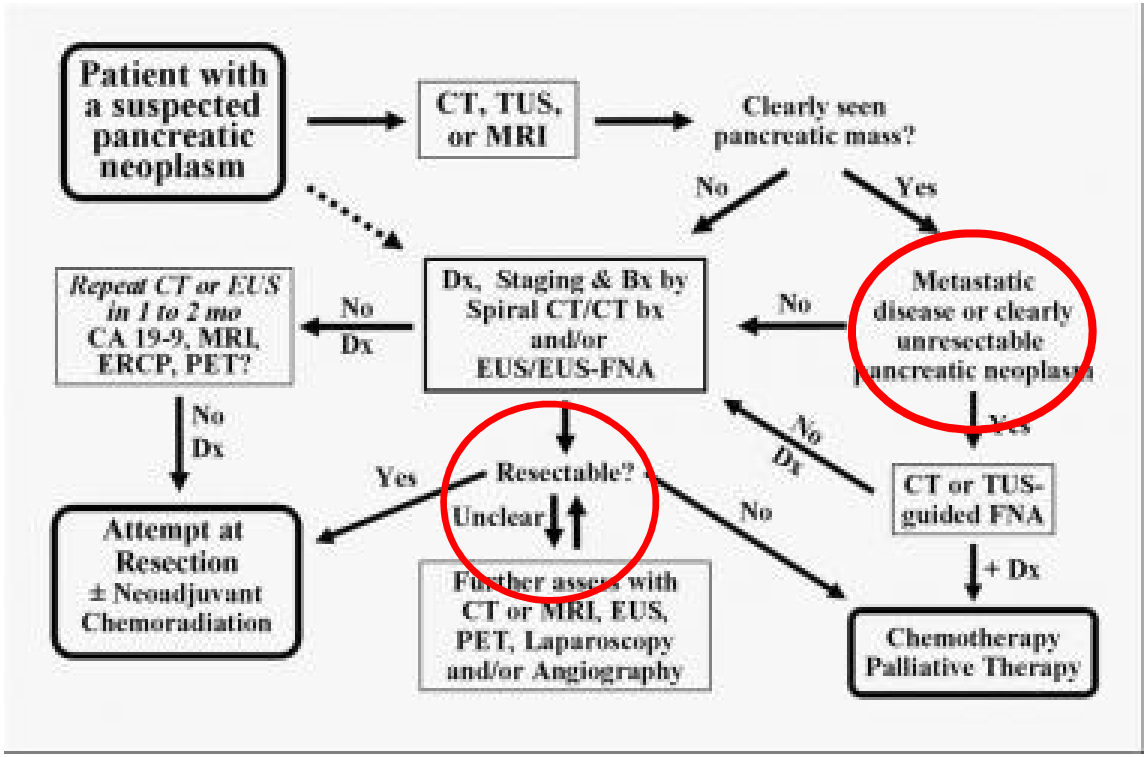


Table 3

TNM Staging of Pancreatic Adenocarcinoma

Primary Tumor (T)

T1	Tumor limited to pancreas, size ≤ 2 cm in greatest dimension
T2	Tumor limited to pancreas, size > 2 cm in greatest dimension
T3	Tumor infiltration (extension) into duodenum, bile duct, papilla, or peripancreatic tissue (retroperitoneal and mesenteric fat, mesocolon, greater/lesser sac, and peritoneum)
T4	Tumor infiltration (extension) into stomach, spleen, colon, or adjacent large vessels (portal vein, superior mesenteric vessels, celiac trunk, hepatic artery, but not splenic vessels)

Regional Lymph Nodes (N)

N0	No regional lymph node metastasis
N1	Regional lymph node metastasis
pN1a	Metastasis in a single regional lymph node
pN1b	Metastasis in multiple regional lymph nodes

Distant Metastases (M)

M0	No distant metastasis
M1	Distant metastasis

Stage Grouping

Stage	T	N	M
I	1	0	0
	2	0	0
II	3	0	0
III	1	1	0
	2	1	0
	3	1	0
IVA	4	Any	0
IVB	Any	Any	1

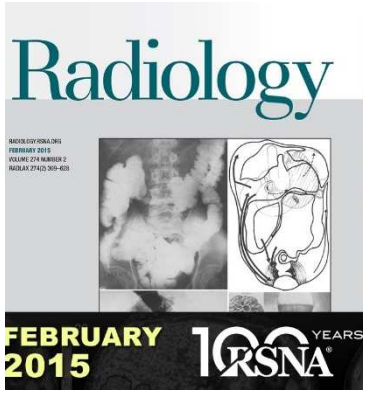
Adapted from Fleming ID, Cooper JS, Henson DE, et al (eds): *AJCC Cancer Staging Manual*, 5th ed. Philadelphia, Lippincott-Raven, 1997.

Gastroenterology 2014;146:291–304

CONSENSUS STATEMENT

Pancreatic Ductal Adenocarcinoma Radiology Reporting Template: Consensus Statement of the Society of Abdominal Radiology and the American Pancreatic Association[1]

Diagnosi e Management

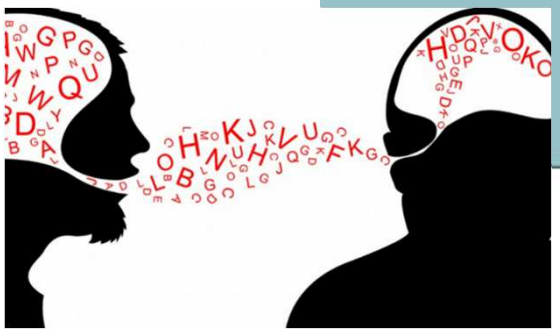


Olga R. Brook, MD
Alexander Brook, PhD
Charles M. Vollmer, MD
Tara S. Kent, MD
Norberto Sanchez, MD
Ivan Pedrosa, MD

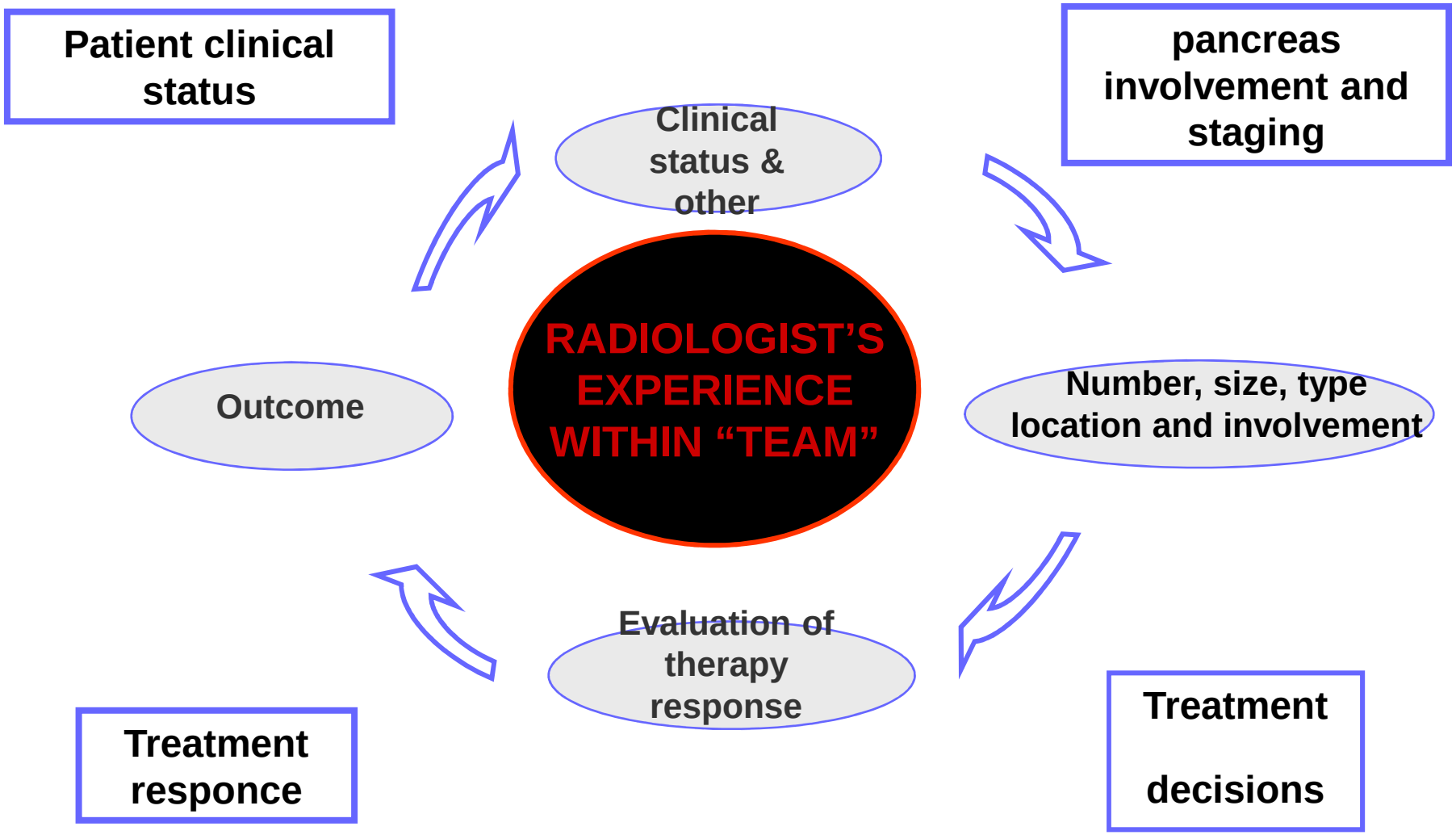
Structured Reporting of Multiphasic CT for Pancreatic Cancer: Potential Effect on Staging and Surgical Planning[1]

Radiology

Conclusion: Structured reporting of pancreatic multiphasic CT provided superior evaluation of pancreatic cancer and facilitated surgical planning. Surgeons were more confident regarding decisions about tumor resectability when they reviewed structured reports before review of multiphasic CT images.



Diagnosi e Management

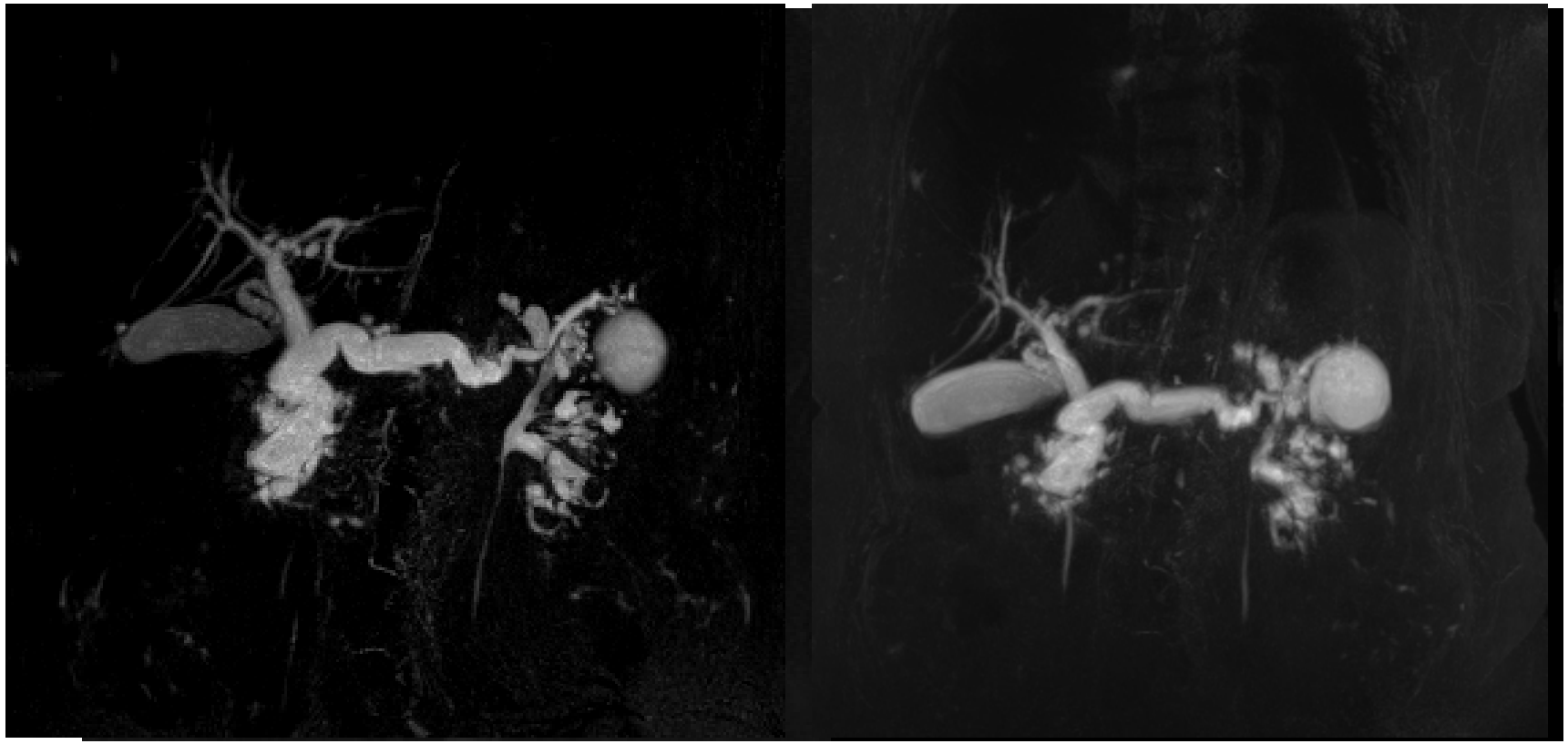


Take home messages

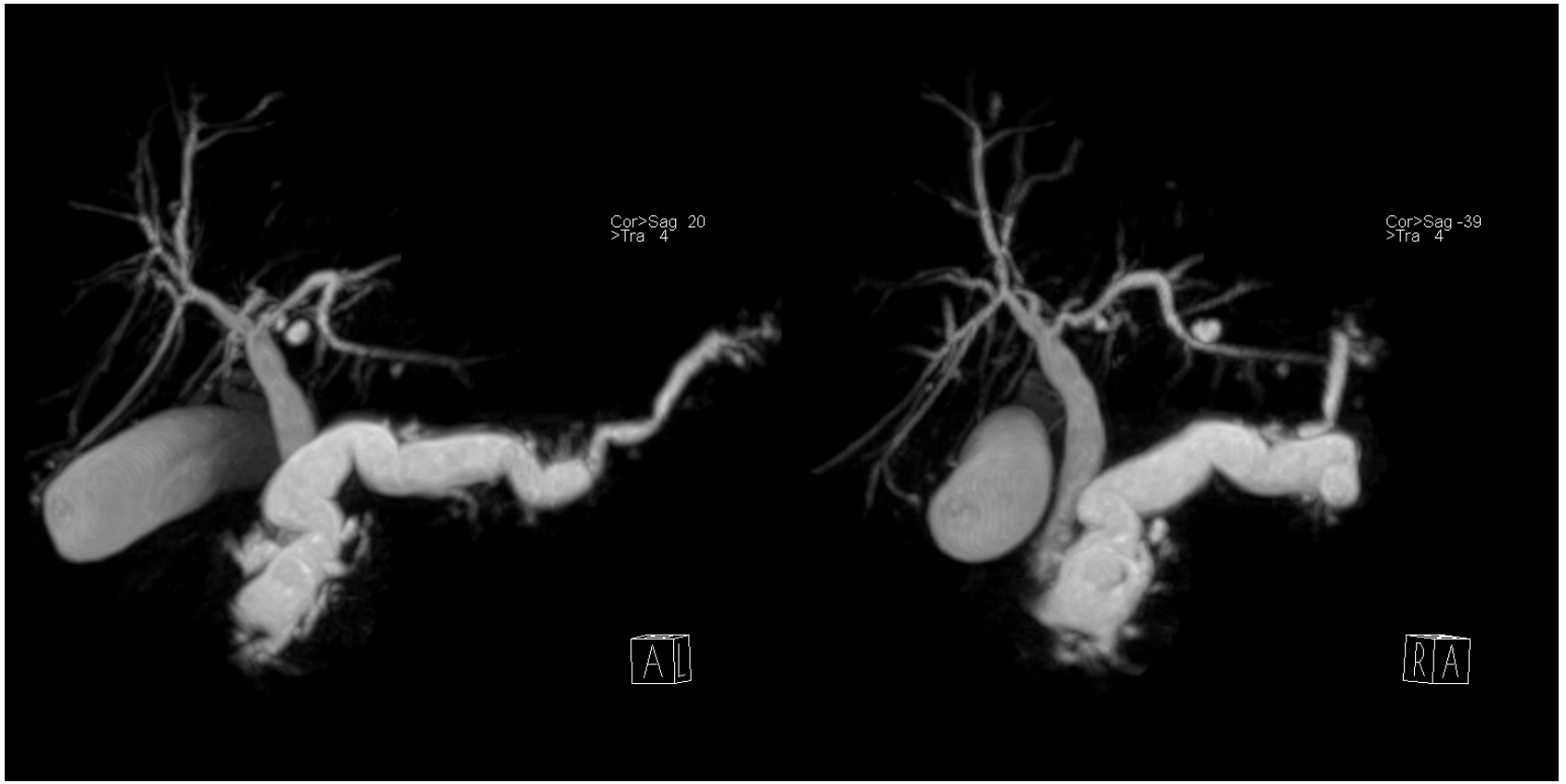
- Lesioni cistiche: RM
- Lesioni solide
- Diagnosi: ECOGRAFIA
- Caratterizzazione: CEUS/TC
- Casi difficili (maligno vs benigno): RM
- Tipizzazione cito/istologica: ECOENDOSCOPIA
- Stadiazione: TC (RM per eventuali lesioni secondarie epatiche)
- Team multidisciplinare

radiologia1@asst-spedalicivili.it

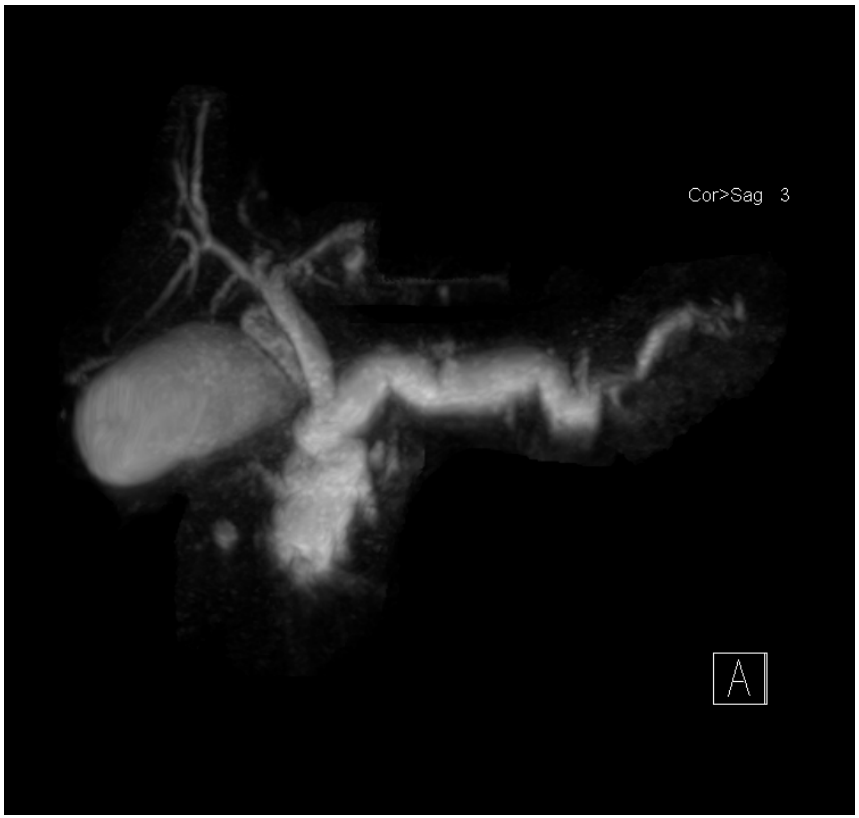
Caso clinico 3

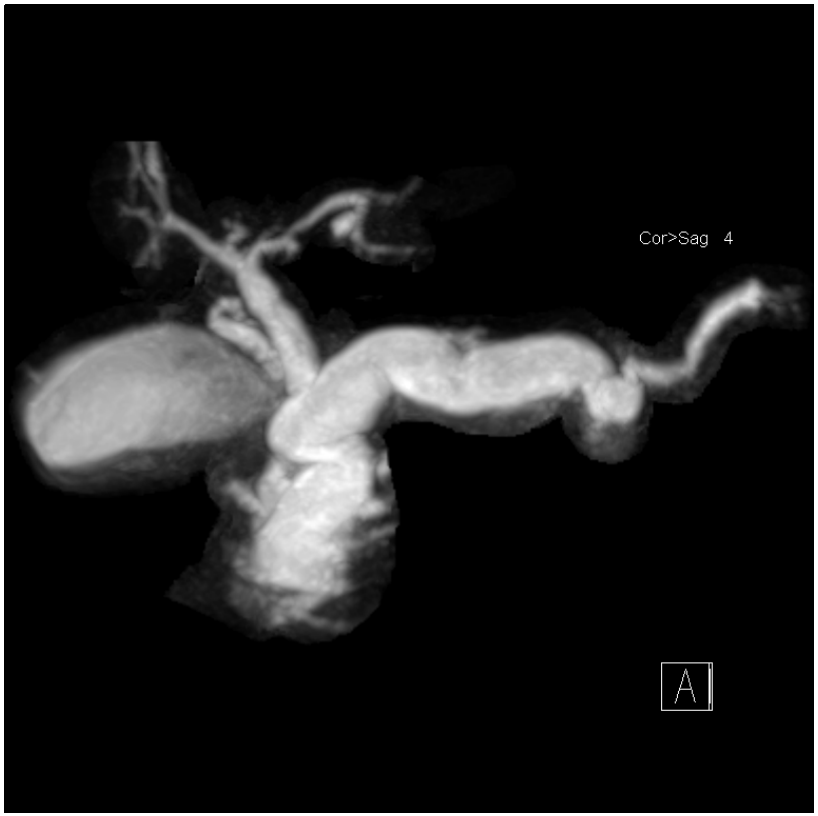


2012 2011 2014



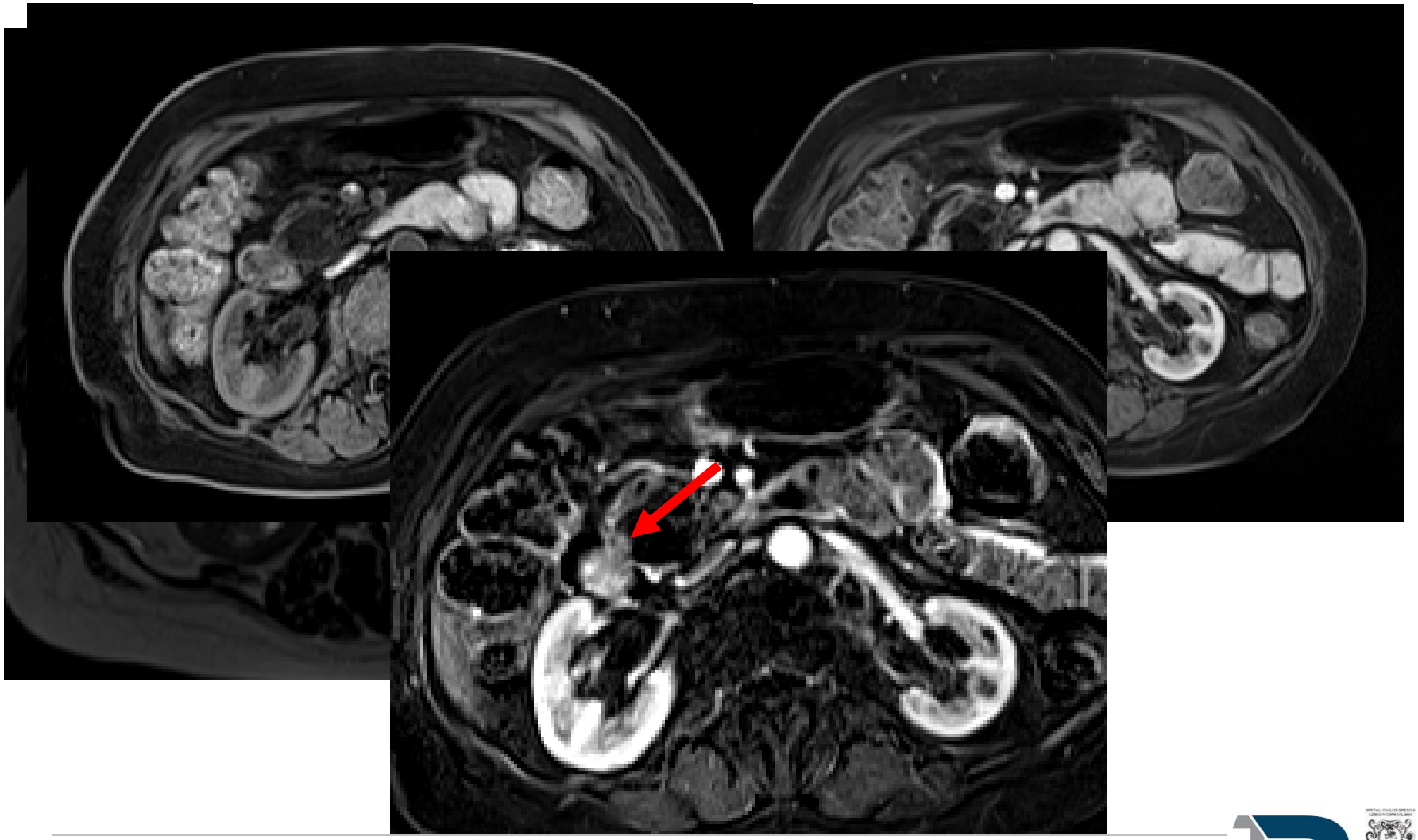
2015

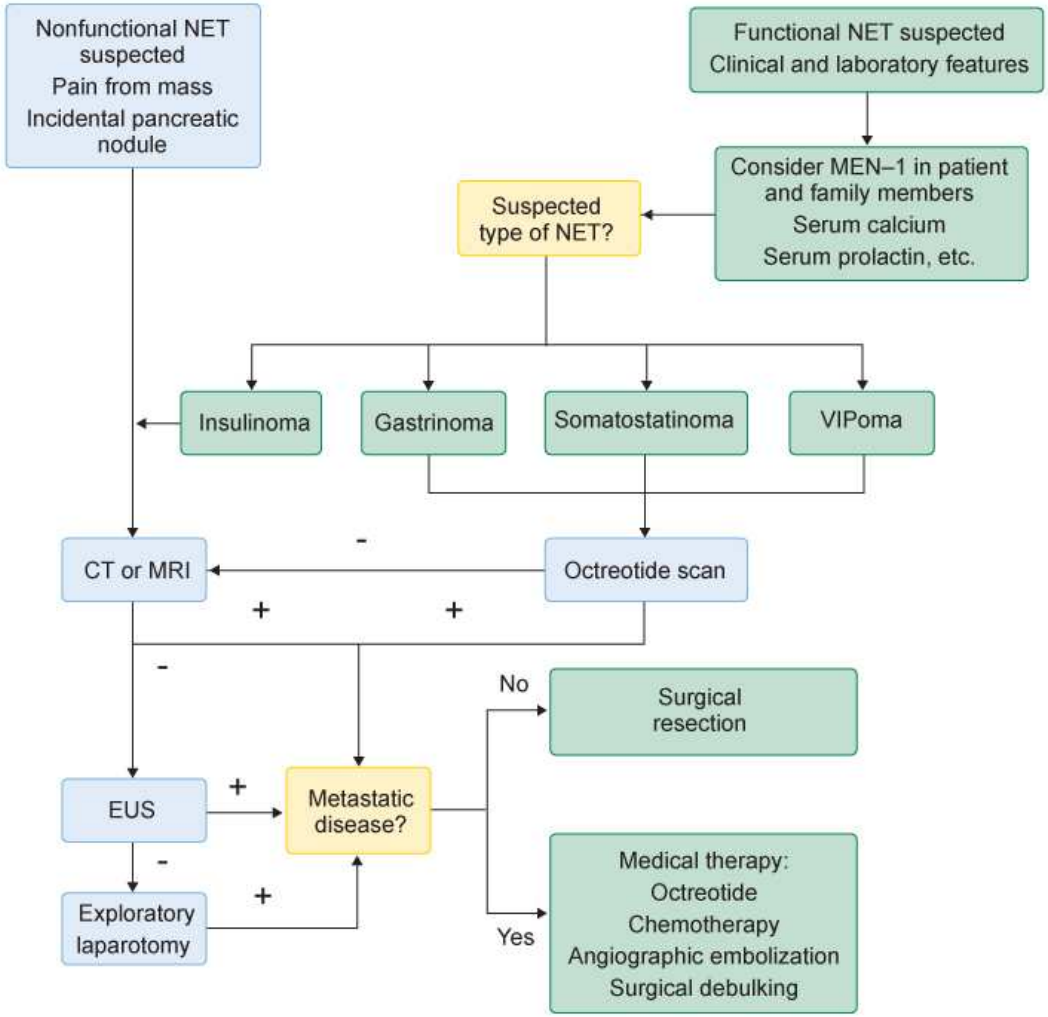




2016

2017: 18 vs 13 mm




Nonfunctional NET suspected
Pain from mass
Incidental pancreatic nodule
Functional NET suspected
Clinical and laboratory features
Consider MEN–1 in patient and family members
Serum calcium
Serum prolactin, etc.
Suspected type of NET?
Insulinoma
Gastrinoma
Somatostatinoma
VIPoma
CT or MRI
Octreotide scan
-
+
+
-
No
Surgical resection
EUS
+
Metastatic disease?
-
Exploratory laparotomy
+
Yes
Medical therapy:
Octreotide
Chemotherapy
Angiographic embolization
Surgical debulking