Cystic lesions of the pancreas (*neoplasms)*

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Fellows weekend 2023

UCT PAH

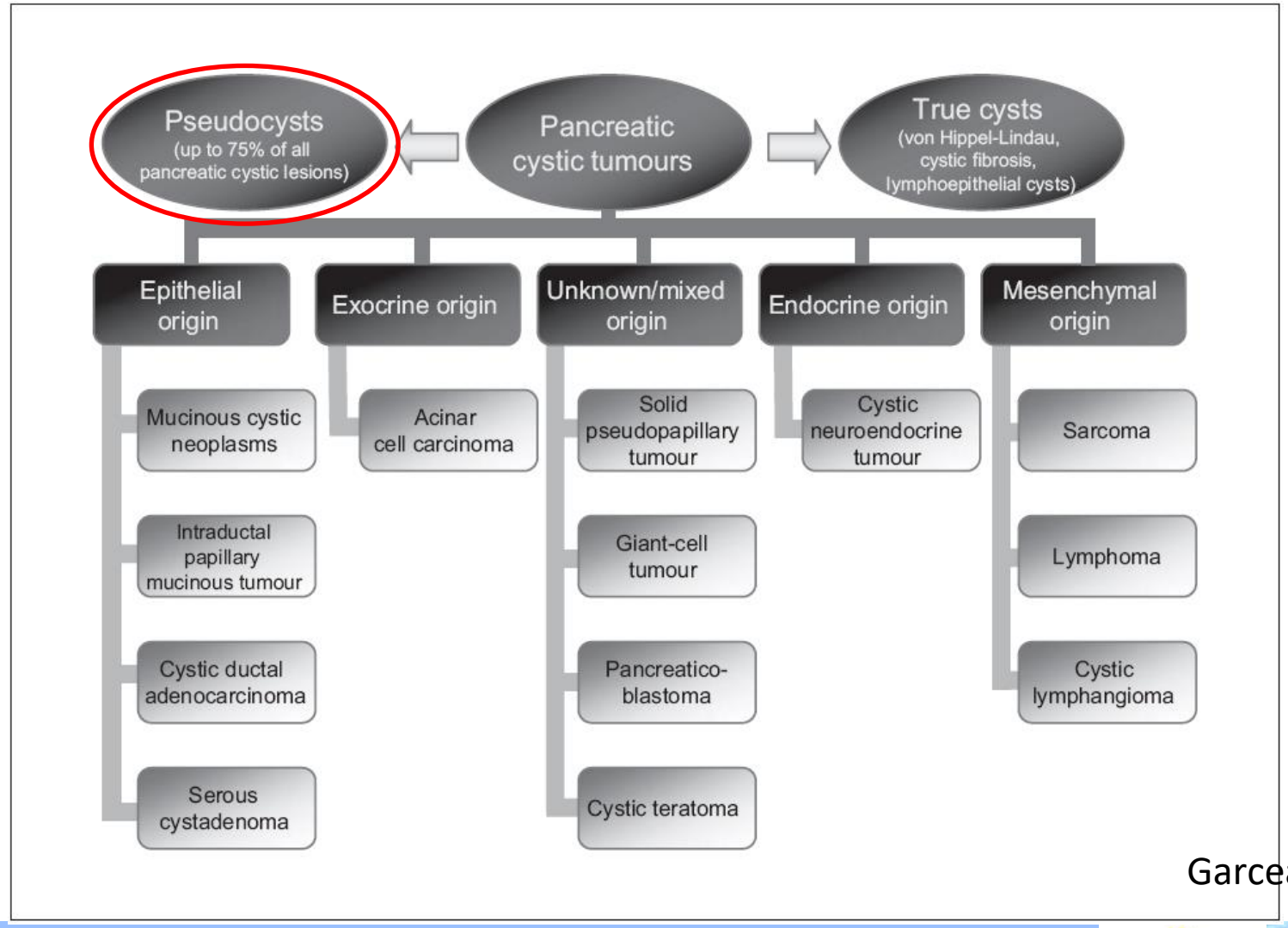
Digestive Diseases Centre

SPES BONA

Introduction

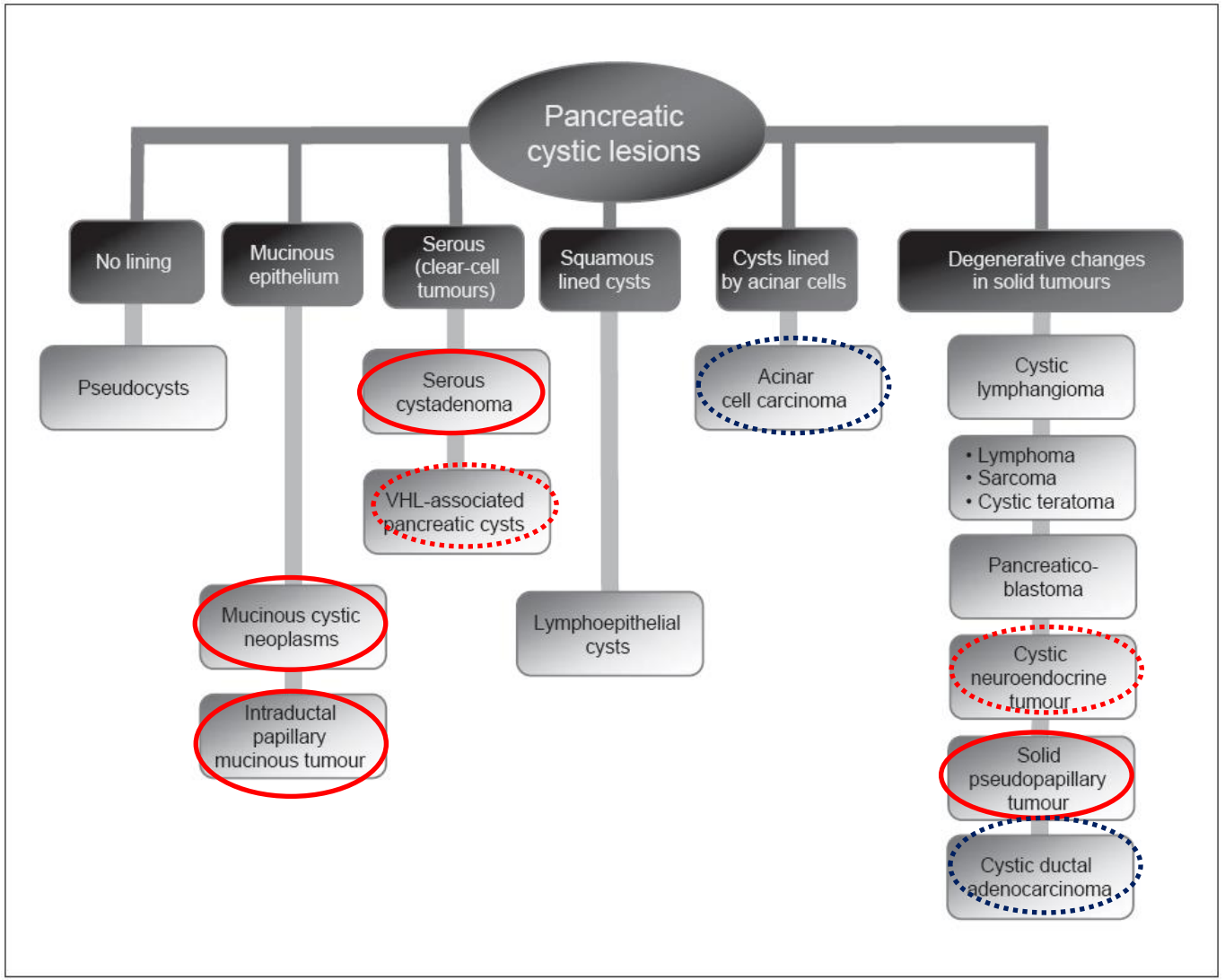
- Increased use of cross sectional imaging, including in preventive screening of healthy individuals, has increased the detection of PCN's
- MRI has the greatest sensitivity, detecting lesions in 2.4 – 49.1% of individuals; This correlates with autopsy studies which have a similar detection rate of up to 50%.
- Concern relates to the potential for malignant change and intervening timeously vs avoiding unnecessary surgery
  - ↑ age correlates with presence of PCN;
  - DM has been suggested to have causative link with IPMN, esp with insulin use (OR 6.03); 10-45% of pt's with IPMN have DM;
  - pt's with chr pancreatitis have ↑ of IPMN
  - Pt' with IPMN are at increased risk of PDAC

Introduction



Garcea G Pancreatology 2008

Introduction



Garcea G Pancreatology 2008

Clinical features and pathological behaviour

Characteristics	SCN	MCN	MD/MT-IPMN	SB-IPMN	SPN	cNET
Age of presentation	Variable, usually 5th to 7th decade	Variable, usually 5th to 7th decade	Variable, usually 5th to 7th decade	Variable, usually 5th to 7th decade	2nd to 3rd decade	Variable, usually 5th to 6th decade
Gender distribution	70% female	90–95% female	Equal	Equal	90% female	Equal
Clinical presentation	Incidental finding, abdominal pain, mass effect	Incidental finding, abdominal pain or malignancy-related	Incidental finding, jaundice, pancreatitis, exocrine insufficiency, malignancy-related	Incidental finding, jaundice, pancreatitis, malignancy-related	Incidental finding, abdominal pain, mass effect	Incidental finding (usually nonfunctioning), abdominal pain, mass effect
Typical imaging characteristics	Microcystic (honeycomb appearance)	Unilocular, macrocystic	Dilated pancreatic duct or dilated pancreatic duct with dilated side branches	Dilated side branches	Solid and cystic mass	Solid and cystic mass, hypervascular
Connection or involvement with main pancreatic duct	No	No	Yes	Yes	No	No
Solitary or multifocal	Solitary	Solitary	Solitary/multifocal	Solitary/multifocal	Solitary	Solitary
Malignant potential[a]	Negligible	10–39%	36–100% (Mean 62%)	11–30%	10–15%	10%

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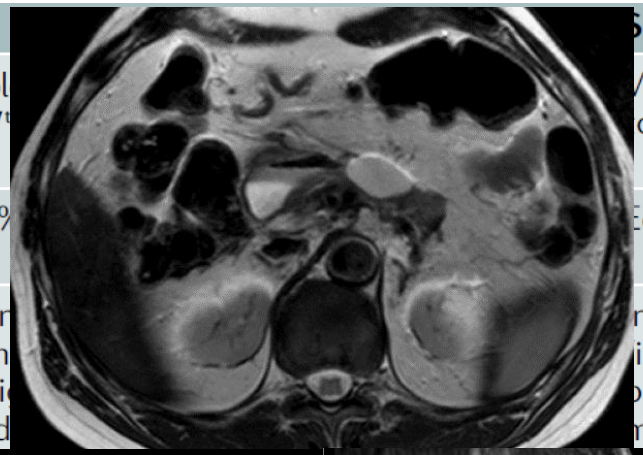

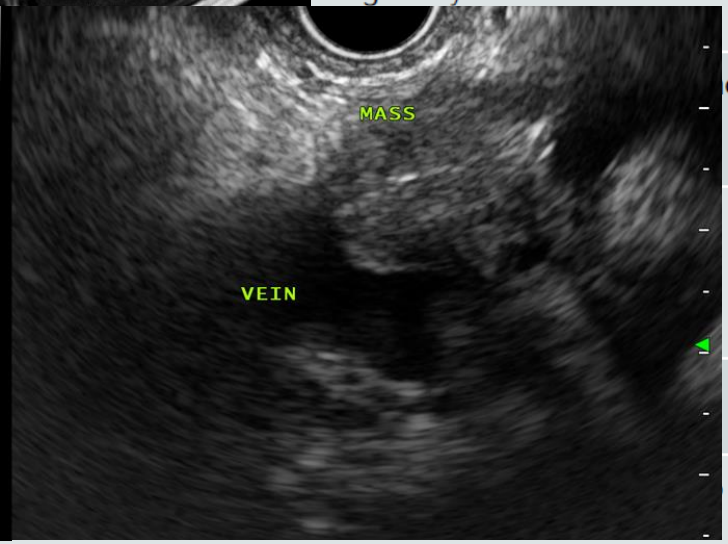

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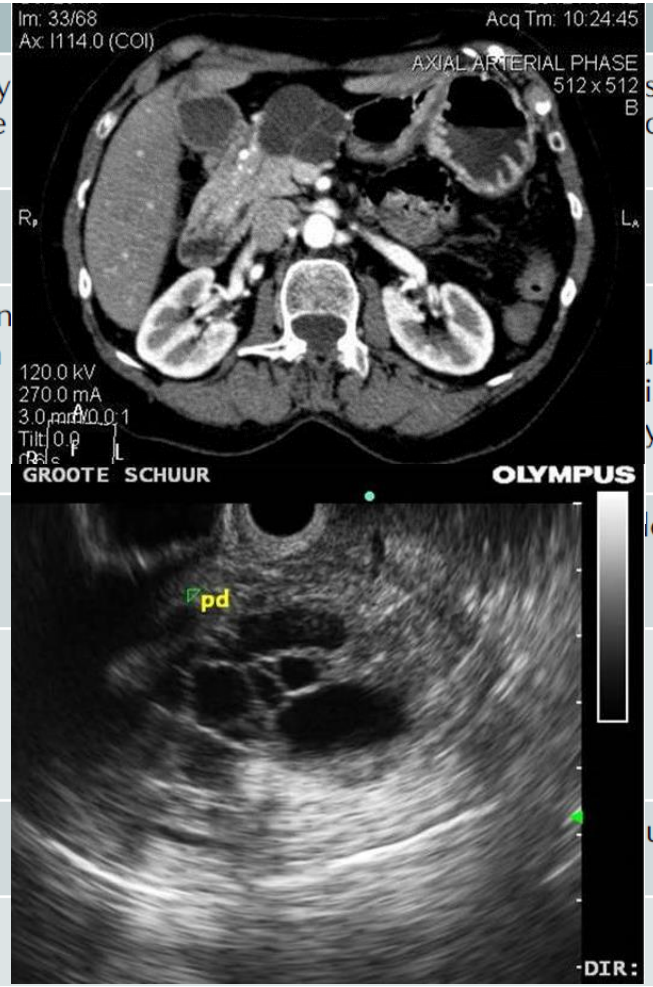

May be macroscystic, have central scar with calcification

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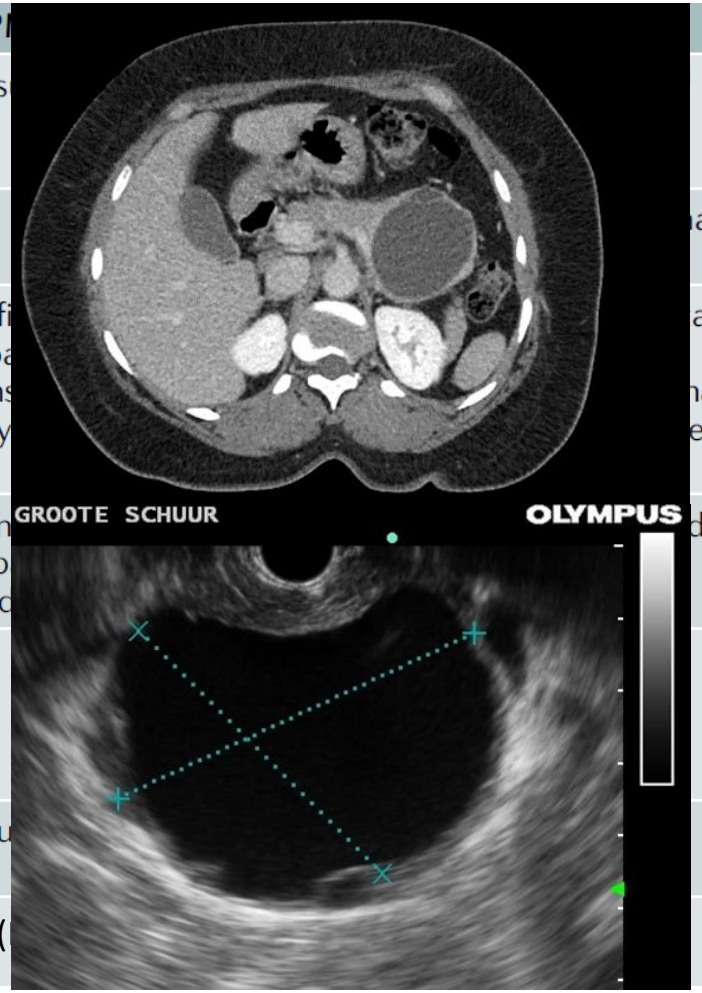

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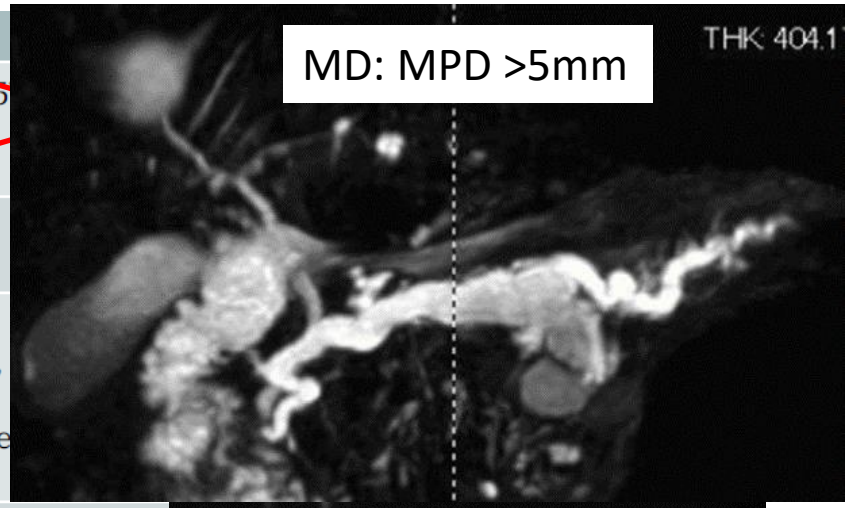

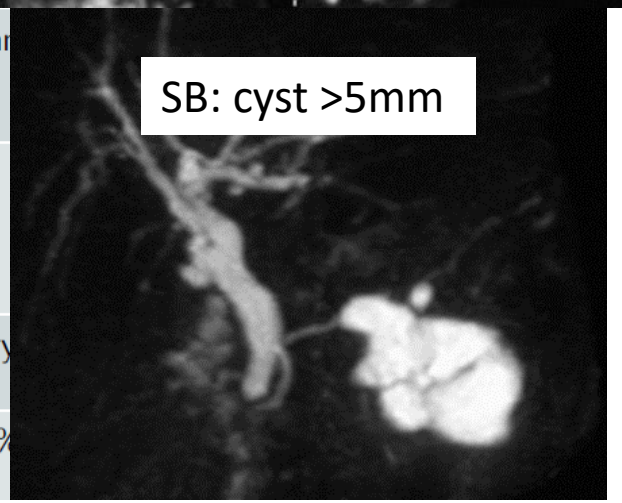

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Guidelines

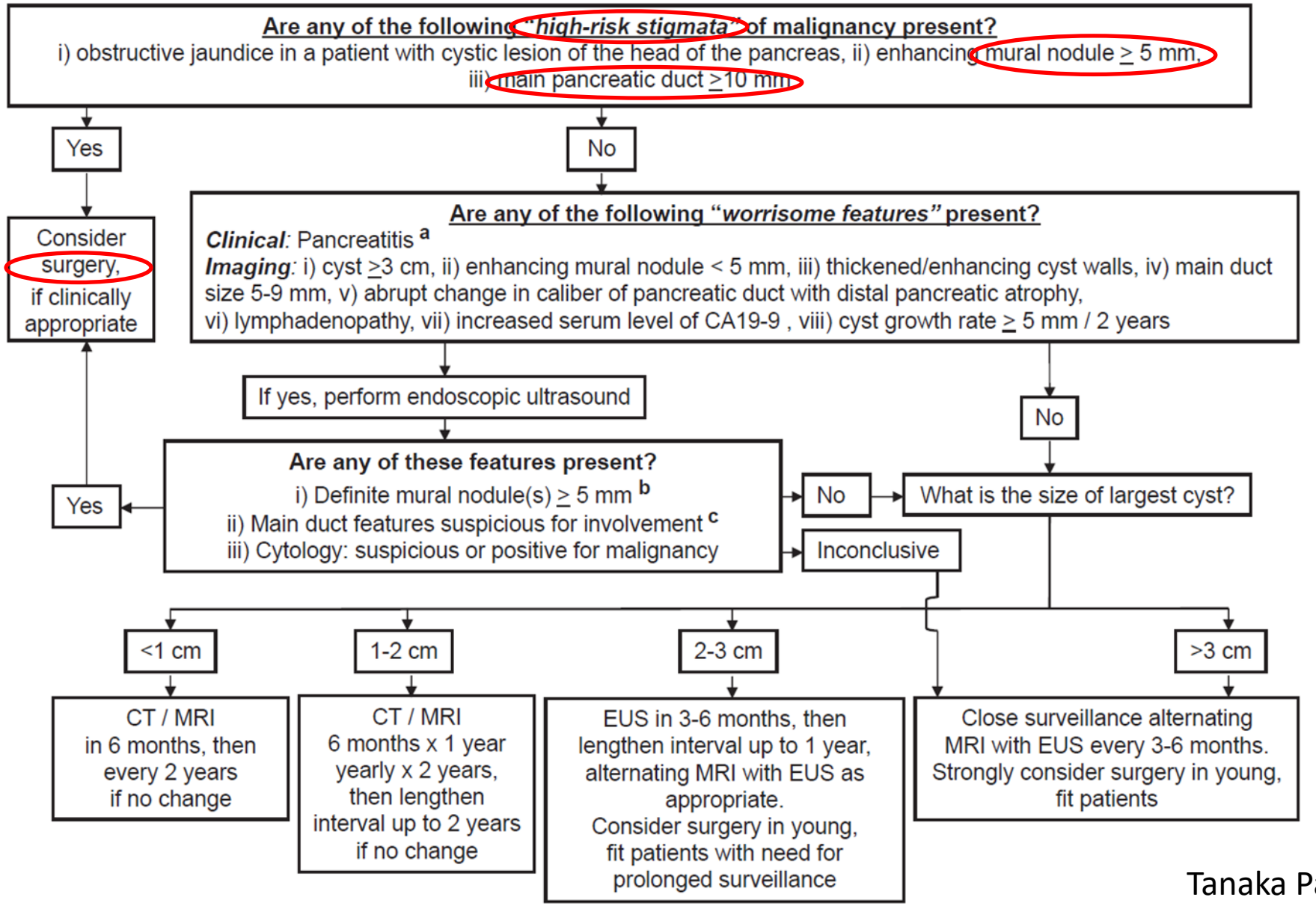
AGA SECTION

American Gastroenterological Association Institute Guideline on the Diagnosis and Management of Asymptomatic Neoplastic Pancreatic Cysts

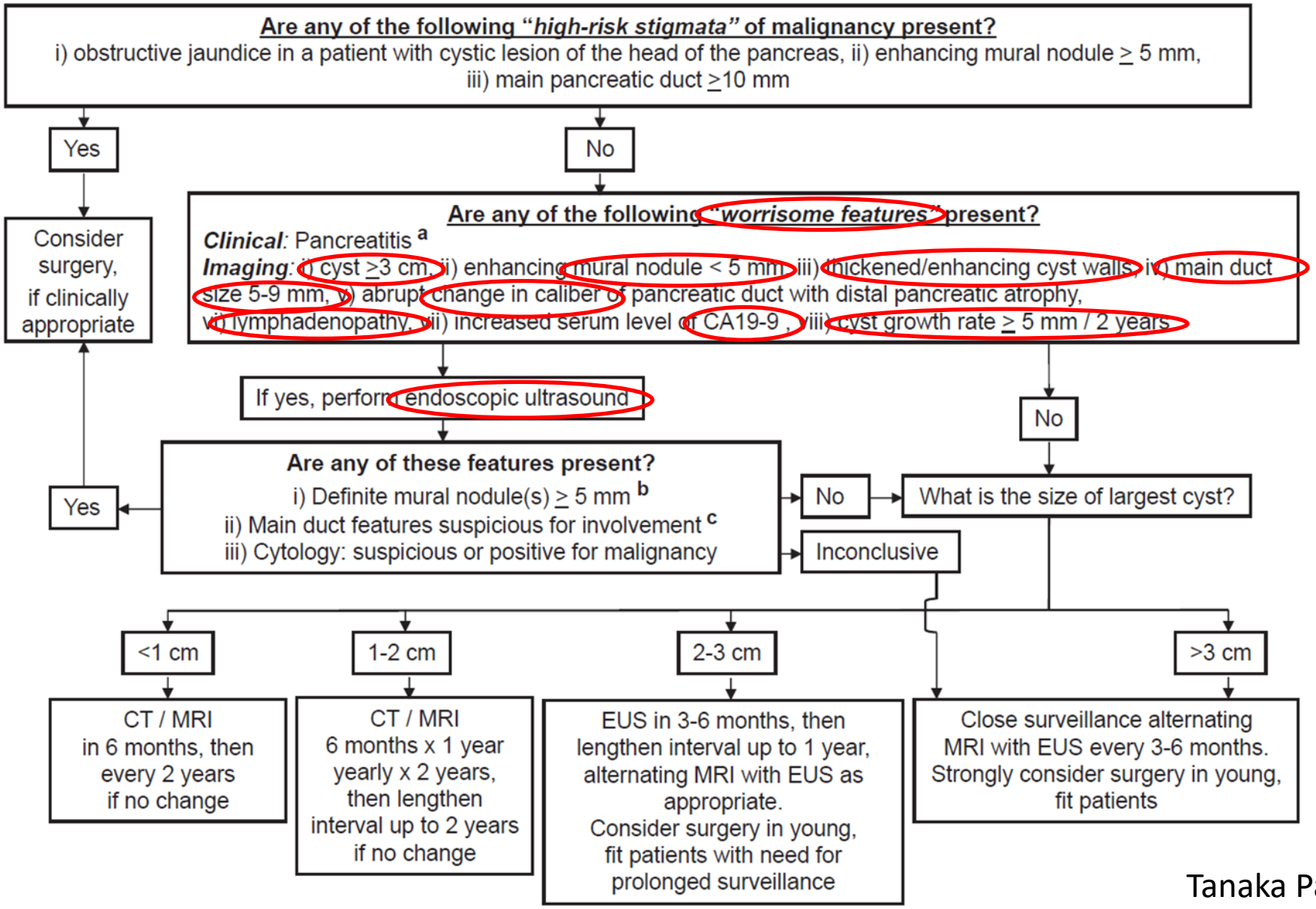
Revisions of international consensus Fukuoka guidelines for the management of IPMN of the pancreas

European evidence-based guidelines on pancreatic cystic neoplasms

Vege Gatroenterology 2015
Tanaka Pancreatology 2017
Eur Study Grp Gut 2018



Tanaka Pancreatology 2017



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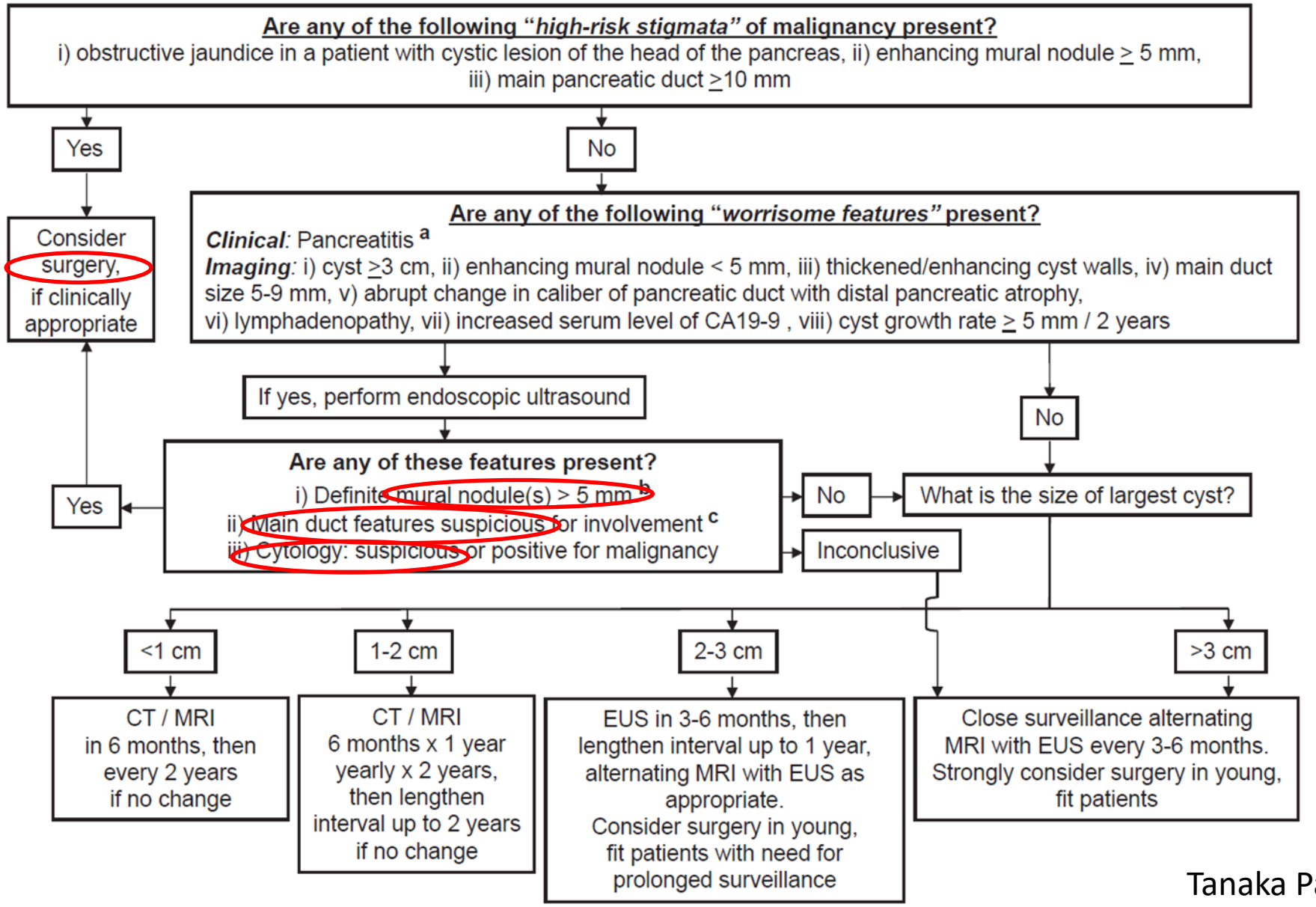

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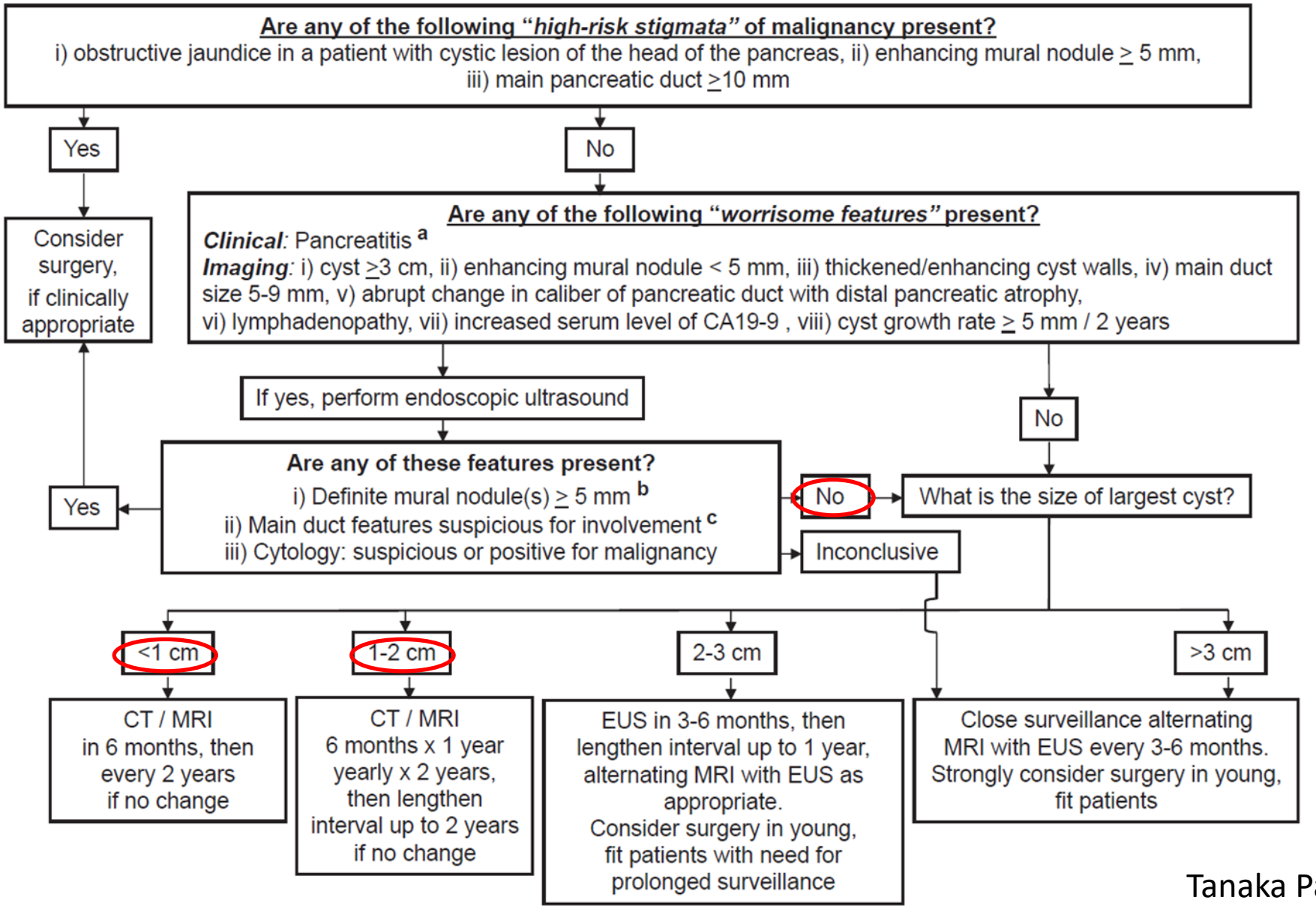

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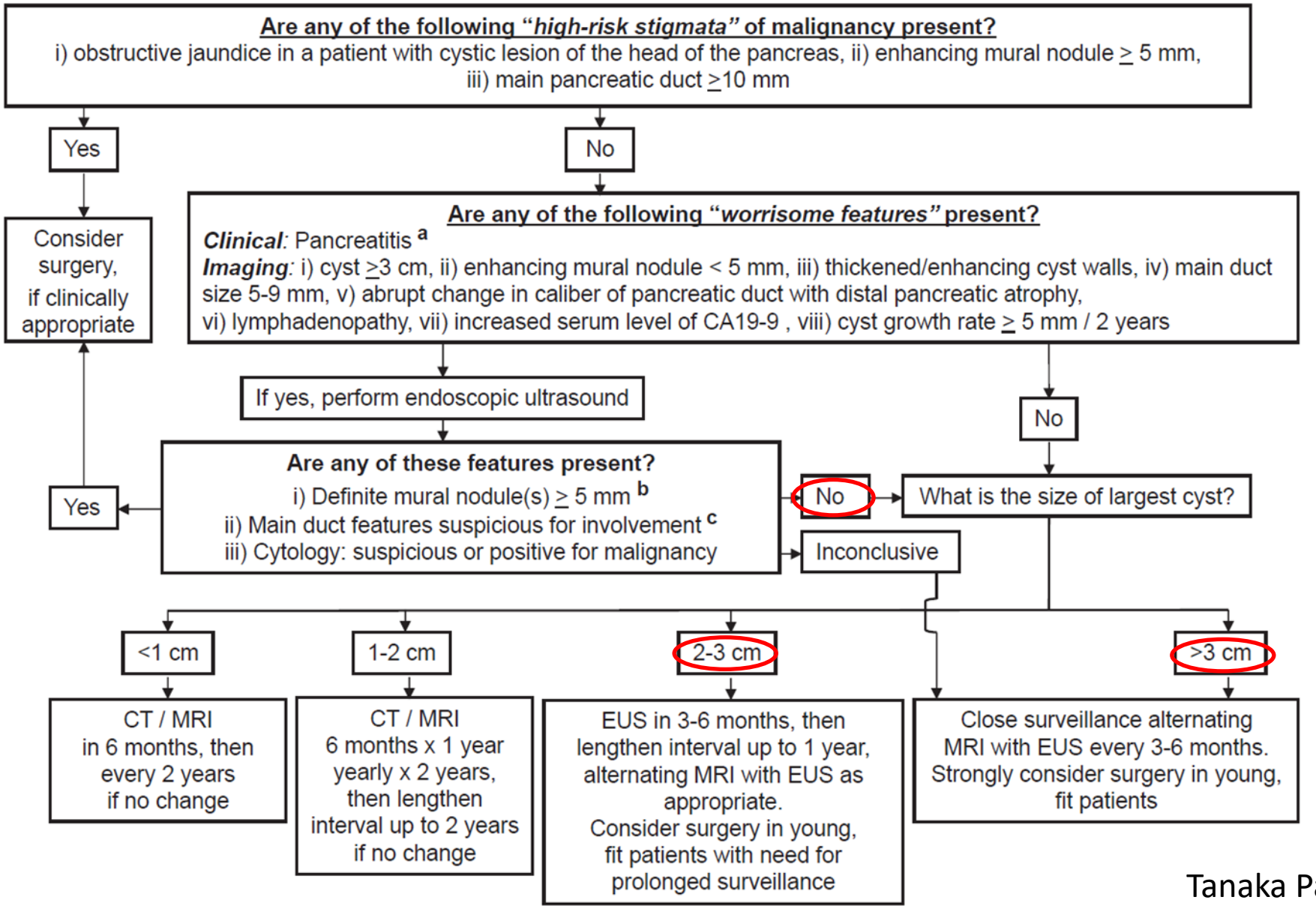

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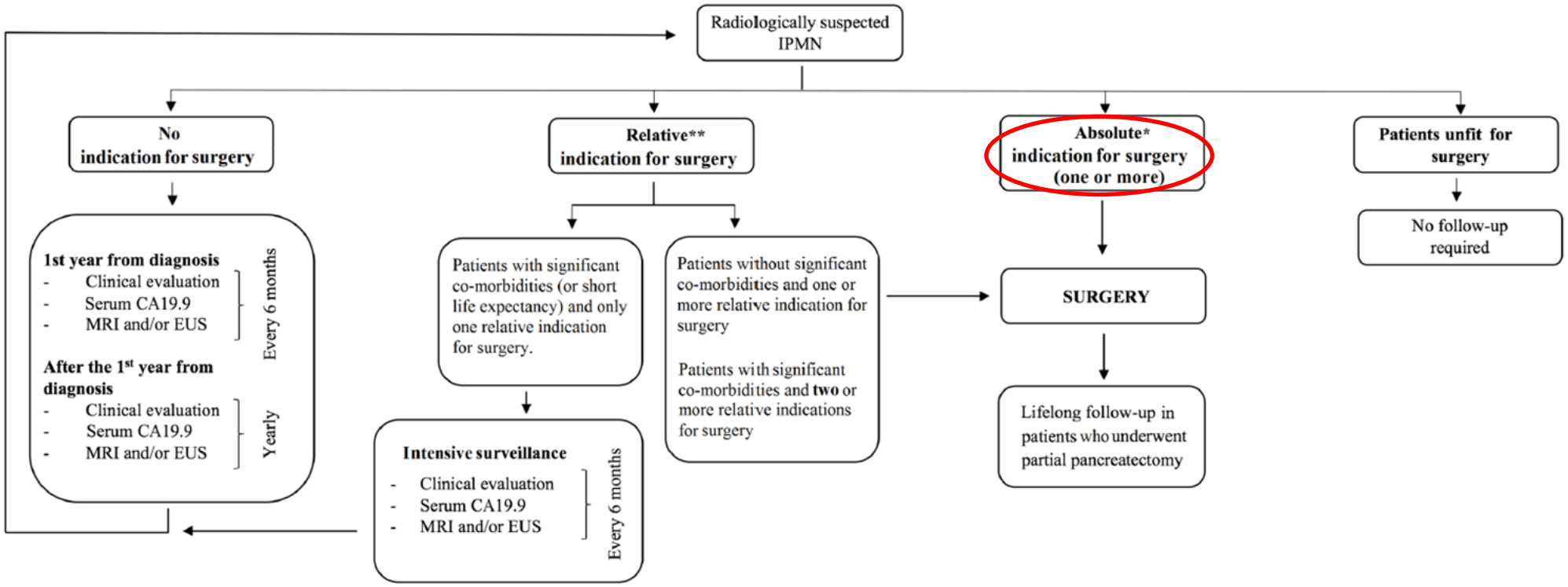
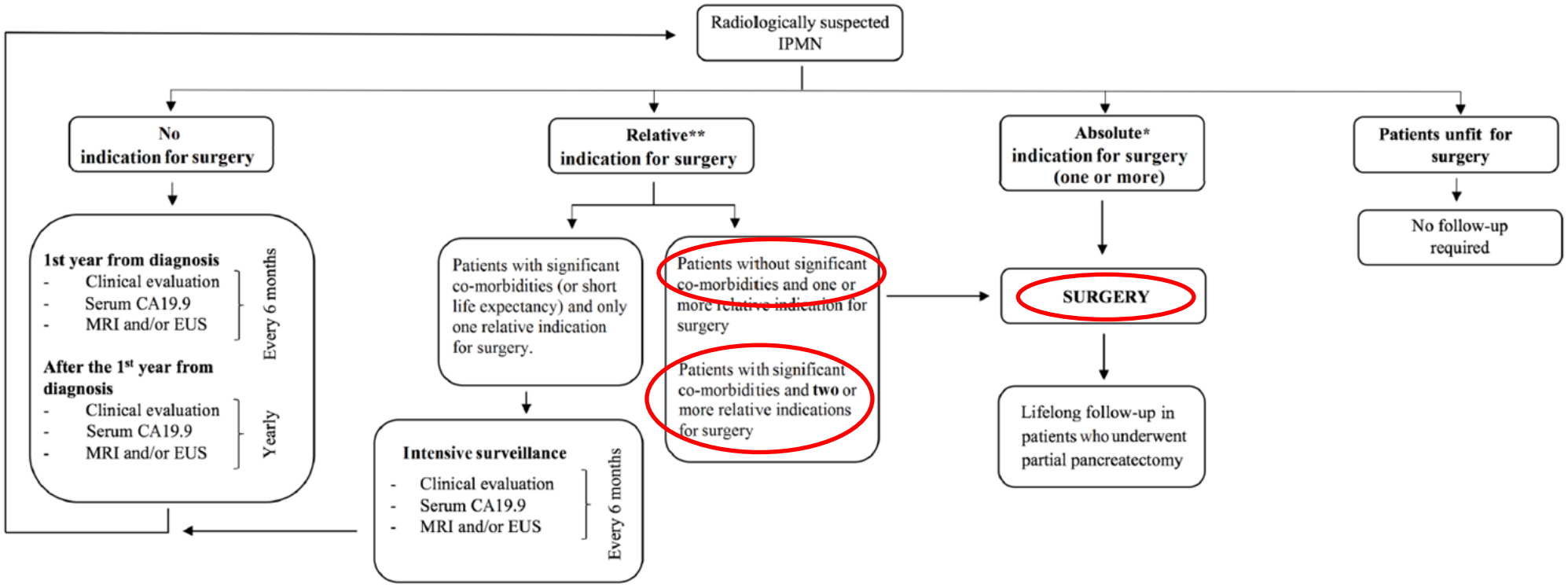


Table 3 Absolute and relative indications for surgery in IPMN

Absolute indications	Relative indications
Positive cytology for malignancy/HGD	Grow-rate ≥5 mm/year
Solid mass	Increased levels of serum CA 19.9 (>37 U/mL)*
Jaundice (tumour related)	MPD dilatation between 5 and 9.9 mm
Enhancing mural nodule (≥5 mm)	Cyst diameter ≥40 mm
MPD dilatation ≥10 mm	New onset of diabetes mellitus
	Acute pancreatitis (caused by IPMN)
	Enhancing mural nodule (<5 mm)

Eur Study Grp Gut 2018



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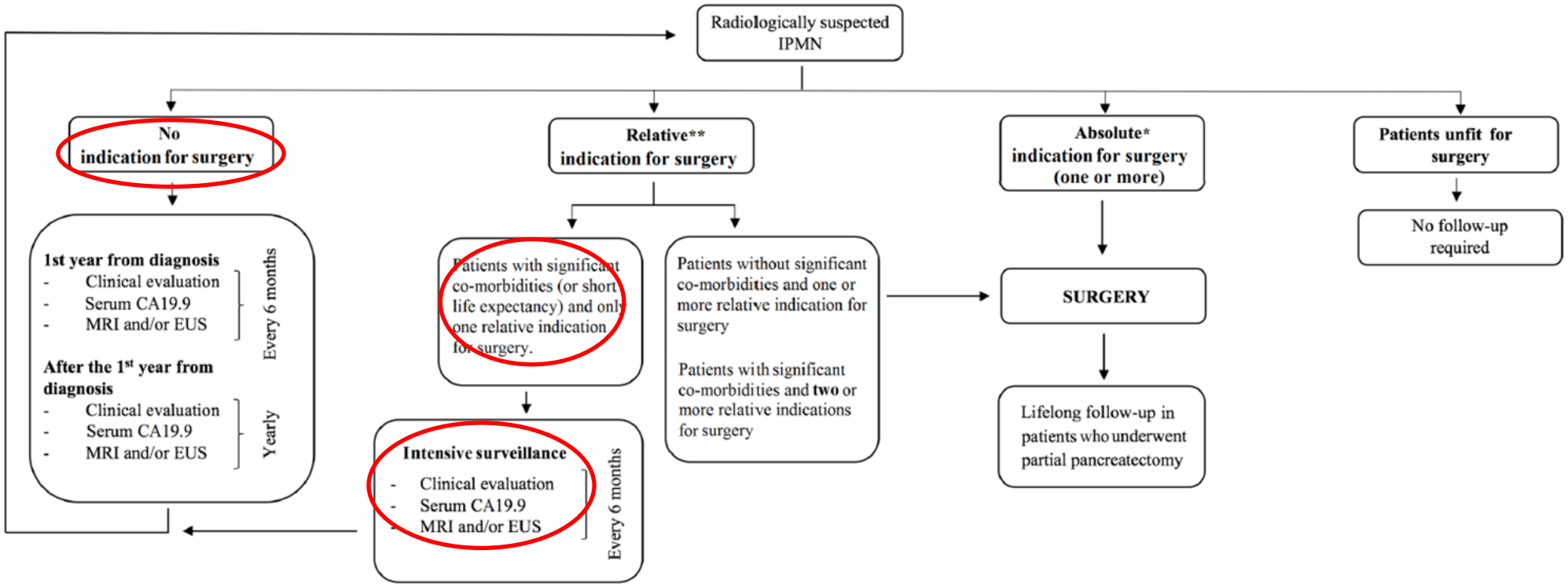

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Guideline	Cyst type	Absolute indications for surgery[a] / High risk stigmata	Relative indications for surgery[b] / worrisome features
2015 AGA[48]	MCN	• MCN	–
	IPMN	• PD ≥5 mm (on MRI and EUS) and solid component or cytology positive for malignancy	–
2017 IAP[3]	MCN	• MCN	–
	IPMN	• Cytology suspicious or positive for malignancy • Jaundice (tumour-related) • Enhancing mural nodule (≥5 mm) • PD dilatation ≥10 mm	• Growth rate ≥5 mm over 2 years • Increased levels of serum CA19-9 • PD dilatation between 5 and 9 mm • Cyst diameter ≥30 mm • Acute pancreatitis (caused by IPMN) • Enhancing mural nodule (<5 mm) • Abrupt change in diameter of PD with distal pancreatic atrophy • Lymphadenopathy • Thickened or enhancing cyst walls
2018 European[4]	MCN	• Cyst diameter ≥40 mm • Enhancing mural nodule • Symptoms (that is jaundice (tumour-related), acute pancreatitis (caused by MCN), new-onset diabetes mellitus)	–
	IPMN	• Positive cytology for malignancy or high-grade dysplasia • Solid mass • Jaundice (tumour-related) • Enhancing mural nodule (≥5 mm) • PD dilatation ≥10 mm	• Growth rate ≥5 mm per year • Increased levels of serum CA19-9 (>37 U/mL)[c] • PD dilatation between 5 and 9.9 mm • Cyst diameter ≥40 mm • New-onset diabetes mellitus • Acute pancreatitis (caused by IPMN) • Enhancing mural nodule (<5 mm)

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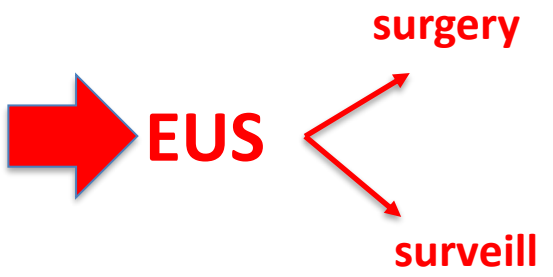

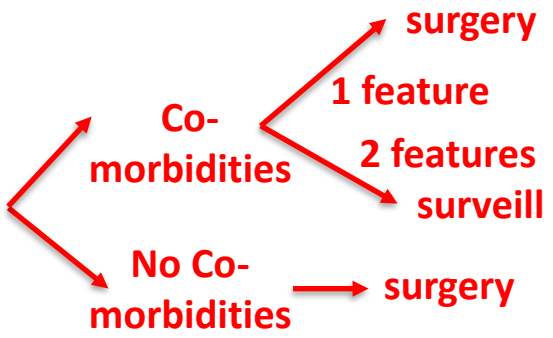

Indications for EUS

2015 AGA[48] guideline

- At least two of the following concerning features:
  - Cyst diameter >30 mm
  - Nodule
  - PD dilatation

2017 IAP[3] guideline

- Growth rate ≥5 mm over 2 years
- Increased levels of serum CA19-9
- PD dilatation between 5 and 9 mm
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- Lymphadenopathy
- Thickened/enhancing cyst walls

2018 European[4] guideline

- EUS–(FNA) should only be performed when the results are expected to change clinical management.
- EUS–(FNA) is recommended if the PCN has either clinical or radiological features of concern identified during the initial investigation or surveillance

Indications for EUS

2015 AGA[48] guideline

- At least two of the following concerning features:
  - Cyst diameter >30 mm
  - Nodule
  - PD dilatation

2017 IAP[3] guideline

during the initial investigation or surveillance

Diagnostic difficulty / alternatives

Limitations in cross sectional imaging

- ***Detecting nodules***
- ***Differentiating types of cyst (multi-cystic, septations)***

Value of tissue

- **Detecting HGD**
- **Detecting malignancy where neo-adj Rx might be appropriate**
- **Role of IPMN subtypes**

Indications for EUS

2015 AGA[48] guideline

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  - Cyst diameter >30 mm
  - Nodule
  - PD dilatation

2017 IAP[3] guideline

during the initial investigation or surveillance

Diagnostic difficulty / alternatives

		Immunohistochemical expression								
Subtype	**Morphology**	**MUC1**	**MUC2**	**MUC5AC**	**MUC6**	**CDX2 or CK20**	**HEPAR**	**Percentage of IPMN**	**Percentage invasive progression**	**Type of adenocarcinoma**
Gastric	Thick finger-like papillae	–	–	+	+	–	–	46–63	10	Tubular (79%)
Intestinal	Villous papillae	–	+	+	–	+	–	18–36	40	Colloid > tubular
Pancreato-biliary	Complex thin branching papillae	+	–	+	+	–	–	7–18	68	Tubular (82%)
Oncocytic	Complex thick branching papillae with intracellular and intraepithelial lumina	+	–	+	+	–	+	1–8	50	Tubular > colloid

Detecting malignancy where neo-adj Rx might be appropriate

- **Role of IPMN subtypes**

Optimal cross-sectional imaging

J Gastrointest Surg (2008) 12:101–109
DOI 10.1007/s11605-007-0367-9

AHPBA ANNUAL MEETING

CT vs MRCP: Optimal Classification of IPMN Type and Extent

Joshua A. Waters · C. Max Schmidt · Jason W. Pinchot · Patrick B. White · Oscar W. Cummings · Henry A. Pitt · Kumar Sandrasegaran · Fatih Akisik · Thomas J. Howard · Attila Nakeeb · Nicholas J. Zyromski · Keith D. Lillemoe

Abdominal Radiology

Published online: 31 August 2016

Abdom Radiol (2017) 42:521–530
DOI: 10.1007/s00261-016-0883-8

CrossMark

MDCT vs. MRI for incidental pancreatic cysts: measurement variability and impact on clinical management

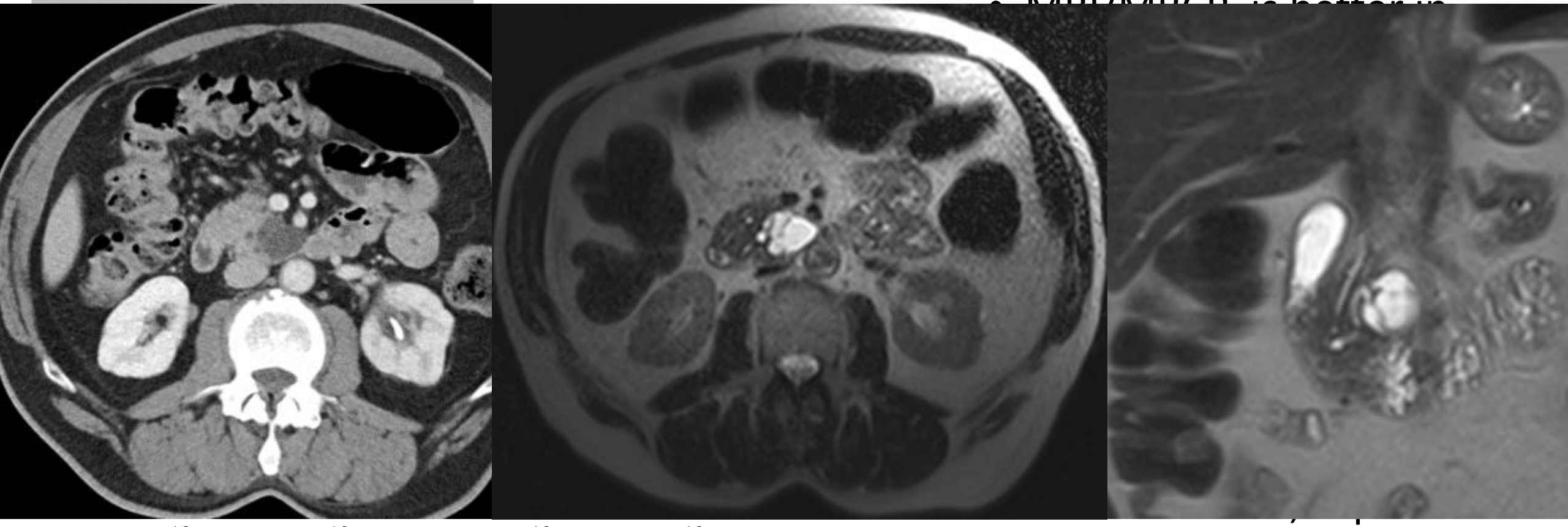
Johannes Boos,[1,2] Alexander Brook,[1,2] Christina M. Chingkoe,[1,2] Trevor Morrison,[1,2] Koenraad Mortele,[1,2] Vassilios Raptopoulos,[1,2] Ivan Pedrosa,[3] Olga R. Brook[1,2]

- MRI/MRCP is better in terms of accurate sizing, detecting ductal communication, estimating main duct involvement and identification of SB cysts
- Some debate around mural nodules, septations

Optimal cross-sectional imaging

J Gastrointest Surg (2008) 12:101–109
DOI 10.1007/s11605-007-0367-9

- MRI/MRCP is better in



Johannes Boos,[1,2] Alexander Brook,[1,2] Christina M. Chingkoe,[1,2] Trevor Morrison,[1,2]
Koenraad Mortele,[1,2] Vassilios Raptopoulos,[1,2] Ivan Pedrosa,[3] Olga R. Brook[1,2]

Endoscopic ultrasound

Pancreatology 22 (2022) 136–141

Sensitivity of CT, MRI, and EUS-FNA/B in the preoperative workup of histologically proven left-sided pancreatic lesions

Myrte Gorris [a, b, 1], Quisette P. Janssen [c, 1], Marc G. Besselink [b], Bram L.J. van den Broek [c], Casper H.J. van Eijck [c], Marjon J. van Gils [d], Bas Groot Koerkamp [c], Femke Struik [e], Lydi M.J.W. van Driel [f], Jeanin E. van Hooft [g, *]

World J Gastroenterol 2017 May 7; 23(17): 3184-3192

Comparison of endoscopic ultrasound, computed tomography and magnetic resonance imaging in assessment of detailed structures of pancreatic cystic neoplasms

- EUS-FNA/B is the most sensitive diagnostic modality and is better able to correctly classify cystic neoplasms
- EUS has a better nodule and septation detection rate
- EUS is best in visualising the pancreatic duct

Endoscopic ultrasound

Pancreatology 22 (2022) 136–141

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Casper H.J. van Eijck [c], Marjon J. van Gils [d], Bas Groot Ko
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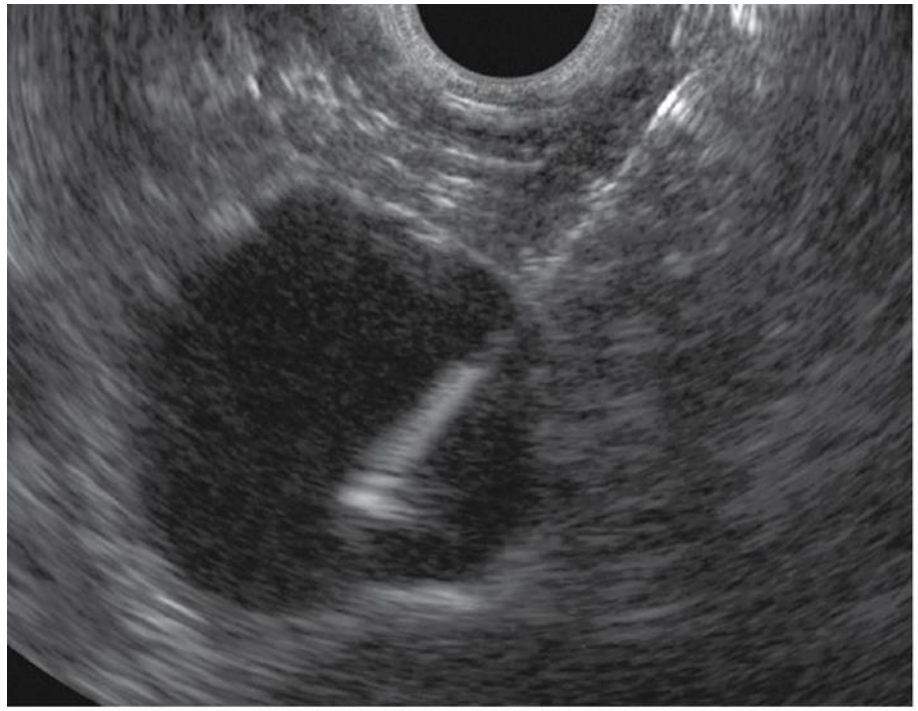
Endoscopic ultrasound

- FNA
  - **FNAB cytology**
    - Sensitivity 68-88%
  - Fluid analysis
    - **Cytology** – sensitivity 30%
    - **Mural biopsy**
    - **Tumour markers**
      - **CEA – 192ng/ml (20ng/ml)**
      - **glucose**
      - CA72-4, CA15-3
    - Enzymatic
      - **Amylase** – ductal communication
    - Molecular DNA analysis
      - K-ras, p53, telomerase, VHL, RNF43, GNAS, CTNNB1
    - Mucin expression
      - MUC1, 5AC



Conclusions

- Incidental pancreatic cystic lesions remain a diverse and potentially complex group of conditions with variable implications
- The challenge remains balancing malignant risk against subjecting patients to unnecessary surgery
- MRI/MRCP is the preferred cross-sectional imaging modality
- EUS may hold some added advantage however there is not yet consensus on it's precise role; certainly it can offer
  - Additional diagnostic clarity
  - Additional information in cases where decision-making is difficult

Conclusions

- Guidelines are in agreement regarding high risk features that are clear indications for surgery
- There is not yet consensus on evaluation and management of relative risk / worrisome lesions
  - Individualised based on
    - degree of suspicion for a sinister lesion – EUS may play a role
    - patient's general health / co-morbidities
  - Role of MDT