

ESTS recommendations

CT screening for Lung Ca



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Faculty disclosure

Conflict of Interest :

NONE !



Screening:

the ice-breaker!



The NLST logo, featuring the letters "NLST" in a large, dark blue serif font. The letters are framed by four yellow curved lines that resemble a stylized smile or a protective shield. Below the logo, the text "National Lung Screening Trial" is written in a dark blue serif font, and "National Cancer Institute" is written in a smaller dark blue serif font at the bottom of the blue gradient box.

NLST

National Lung
Screening Trial

National Cancer Institute

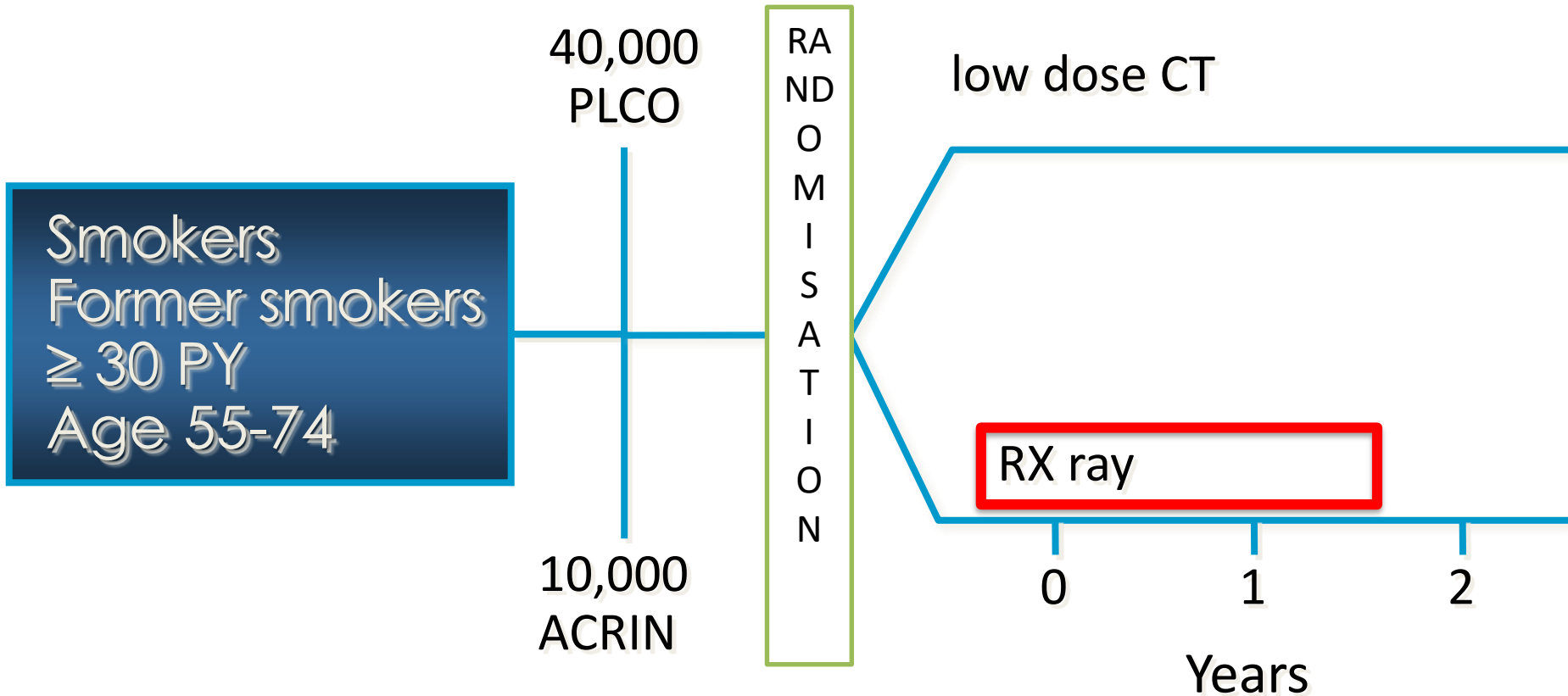
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National Lung Screening Trial Design

- 53454 persons, > 30 P/Y (= 270 kg tobacco)
 - 3 annual screenings
 - 26722 low-dose CT scan
 - 26732 P-A chest film
- Period of study
 - 2002-2004
 - Follow-up ended 2009

National Lung Cancer Screening Trial (NLST)



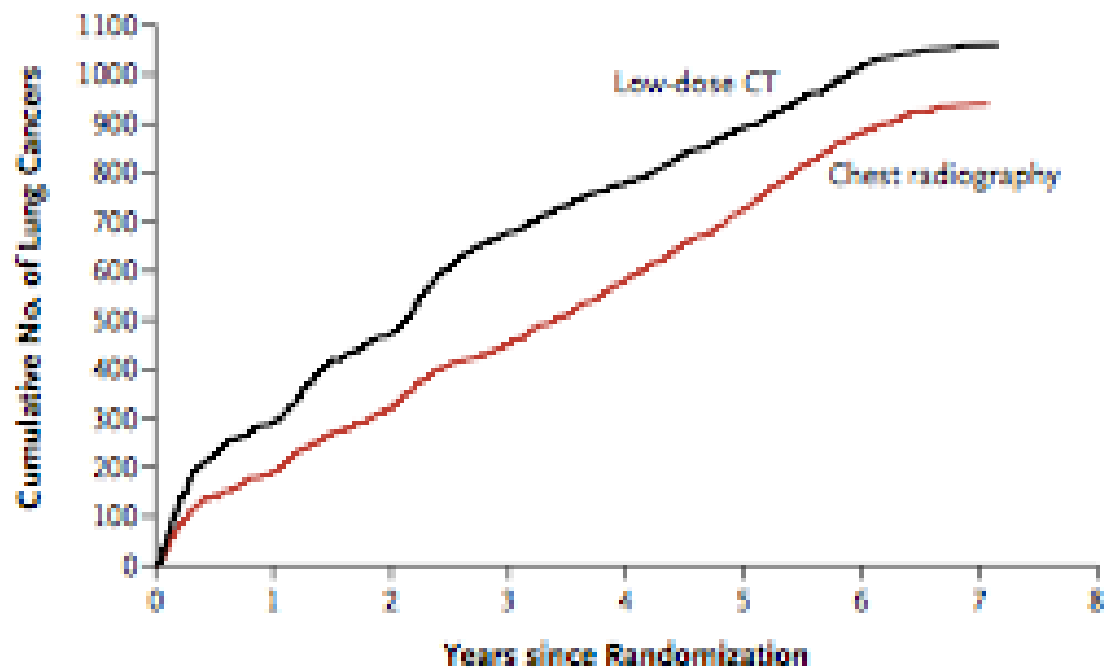
National Lung Screening Trial Results

	Chest Xray*	Low dose CT-scan*
Incidence of lung CA	572	645
CA related deaths	309	247

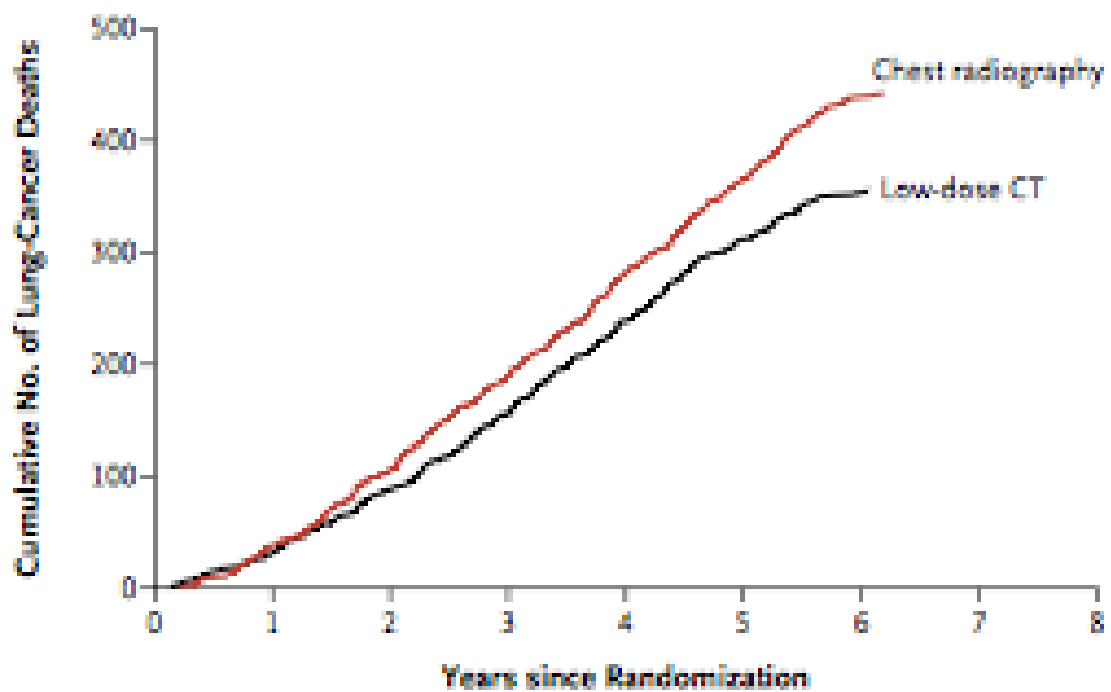
Relative reduction of mortality 20 %

* Cases per 100 000 persons-year

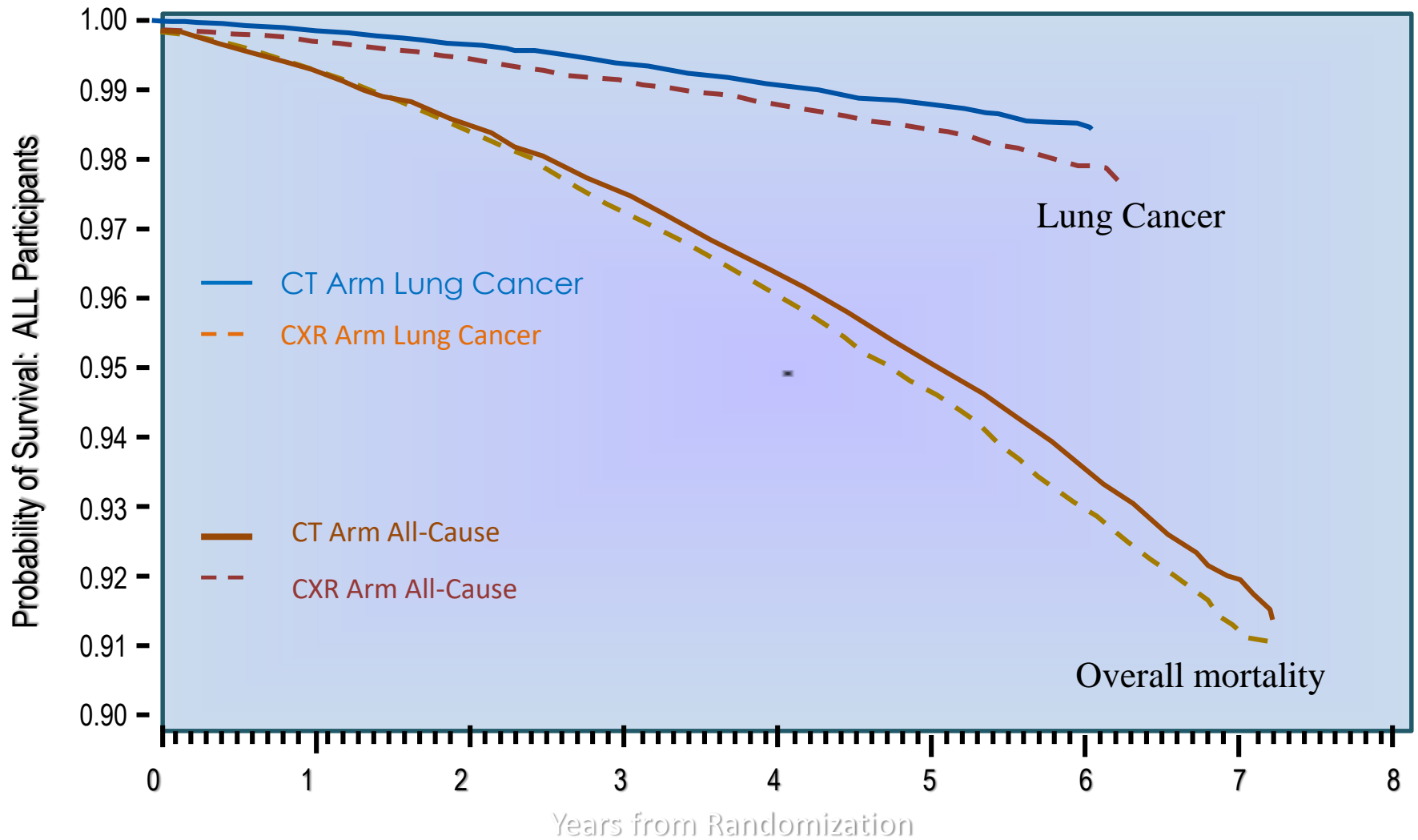
A Lung Cancer



B Death from Lung Cancer



Specific and overall survival



Many unsolved questions

Possible effect of screening	Possible consequences
False security owing to false negative	Patient ignores symptoms
	Poursuite du tabagisme
Positive action on weaning tobacco	Increases weaning tobacco
Irradiation	Seconds cancers, cardiac risk
False positives	Unnecessary explorations
	Unnecesssary biopsies
	Morbidity and mortality of surgery
Surdiagnosis	Unnecessary operation of « non-dangerous » cancer
Cost	Money spent for screening lacks for other activities (e.g.prevention)
Screening for other diseases	Beneficial or not ?
Quid faciam ??	

ESTS guidelines
on lung cancer
screening



Rec 1: implementation in Europe

- Hypothesis: uncontrollable implementation in Europe
- Lung cancer screening not included in EC health programs !!!
 - Expected for 2020??
- Experienced centres should establish demonstration projects
- Experienced centres should set up national protocols
 - Evaluation of safety & cost-effectiveness
 - Risk prediction models for selection of high-risk cohorts
 - Define nodule size cut-offs for false +
 - Value of biomarkers in CT screening
- ESTS should establish a check list for high-quality programs

Rec 2: involvement of thoracic surgeons

- Leading role : cf USA check list !
- Expertize for both diagnosis and treatment
- Challenges
 - Minimize parietal trauma
 - Maximize parenchymal preservation
 - Reduce false-positive rates
 - Optimize management of nodules
- Refer to ESTS rec on thoracic unit

Rec 3: MDT capabilities & requirements

- Screening should evolve in an MDT environment
- Participants should have proven expertise
- Link with tobacco cessation program

Rec 4: Diagnostic protocols

- Vast majority of detected lesions are benign!!
 - Guarantee sensitivity and specificity !!
- Correlation between imaging and pathology
- Important issues
 - Definition of population at risk
 - Risk models
 - Exposition to radiation
 - Cut-off values

Rec 5: qualification of thoracic surgeons

- Lack of specificity of screening
 - False positives
 - Need for surgery to demonstrate non-malignancy
 - Tears, toils, blood and sweat
- Challenge for surgeons
 - Avoid over-treatment
 - Minimize risk of useless invasive procedures
 - Weigh out risk and benefit in presence of comorbidities
- Competence of the surgeon
 - Experience in oncology
 - Minimally invasive approach
 - Sublobar resection
 - Ability to choose between follow-up and intervention

Rec 5: qualification of thoracic surgeons

- Certification
 - National specialist diploma
 - European Board Certification
- Demonstrable competence for
 - Minimally invasive surgery
 - Interpretation of imaging
 - Working in multidisciplinary environment
- Participation in a database
 - National
 - ESTS
- Experience in oncology
 - ERS-HERMES ??

Rec 6: use of minimally invasive approach

- Screening changes epidemiology
 - 80% stage I-II
 - Resection rate 80-90%
 - 5-year survival >70%
- Screening creates new problems
 - Unnecessary surgery for false +
 - Complications from diagnostic procedures
 - Detection of indolent disease
- Minimizing surgical trauma & risk
 - Decrease parietal trauma: VATS, RATS
 - Prefer parenchyma saving resections
 - Obtain diagnosis prior to resection

Rec 7: Pathology

- Follow IASLC/ATS/ERS 2011 classification for adenoCa
- Follow WHO 2015 recommendations for pathology report
- Follow biomarkers
 - Bio-banking !
 - EGFR, KRAS, BRAF, EML4-LK, ROS1, ERCC1, RRM1

Rec 8: Specific Surgical Issues

- Most lesions are eligible for VATS/RATS
- Consider sublobar resections for diagnostic purpose
- Keep resection for benign diagnosis < 15%
- Requirement for algorithms
 - Rely on volume rather than size
 - Consider doubling time
- Resection of benign nodules should be monitored
- GGO:
 - Follow GGO > 5 mm for at least 4 years
 - Solid component = invasive cancer
 - Follow-up > 4 years to avoid overtreatment ?

Rec 9: Quality monitoring and education

- Goals:
 - Beware of over-diagnosis
 - Avoid unnecessary operations
 - Keep mortality/morbidity low
- Protocol:
 - Definition of group at risk
 - Describe technical means and frequency of tests
 - Define positive-intermediate-negative result
 - Algorithms for management
 - Detail qualification of doctors involved
 - Monitoring of results

Rec 9: Quality monitoring and education

- Safety/collective level:
 - Information of public
 - Equal access for individuals at risk
 - Monitor compliance
 - Monitor false positive/negative – reevaluate criteria
- Safety/individual level:
 - Low dose CT
 - Describe follow-up of negative tests
 - Define management of positive tests
 - No treatment without histology
 - Minimally invasive approach
 - Surgery should be performed in expert centres

Rec 9: Quality monitoring and education

- Accurate database
 - MDT centred
 - Compliance of participants
 - Quality control of data
 - Periodical reports : reevaluation of criteria
 - Extension of ESTS database?
- Training:
 - European national specialty diploma
 - European Board certification?
 - Attend dedicated courses
 - Participate at MDT

Rec 10: central registration and certification of screening centres

- Screening requires dedicated multidisciplinary team
- Protocol for each centre
- Extensive quality control to reduce false +
- Standardized reporting – external auditing
- Availability of high quality Low Dose CT
- ESTS accreditation for European Centres
- Dedicated pathologist !!!!

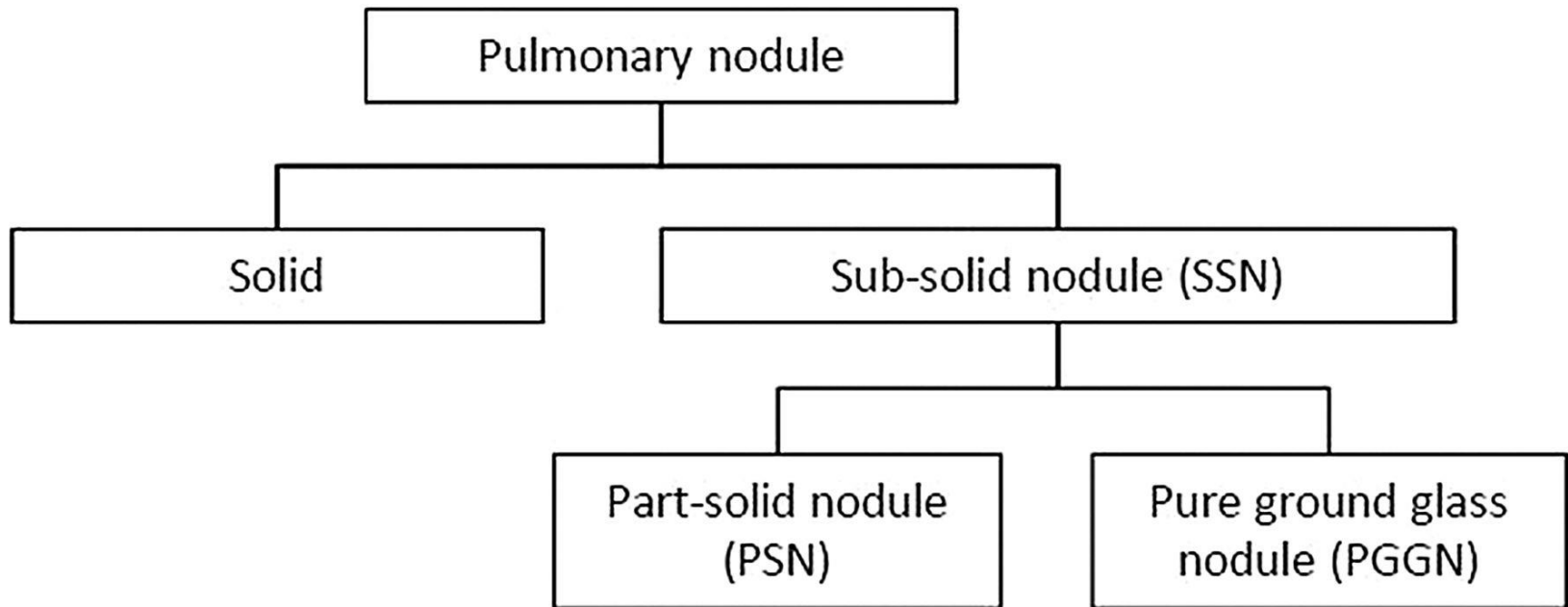
Management of

nodules:

Guidelines

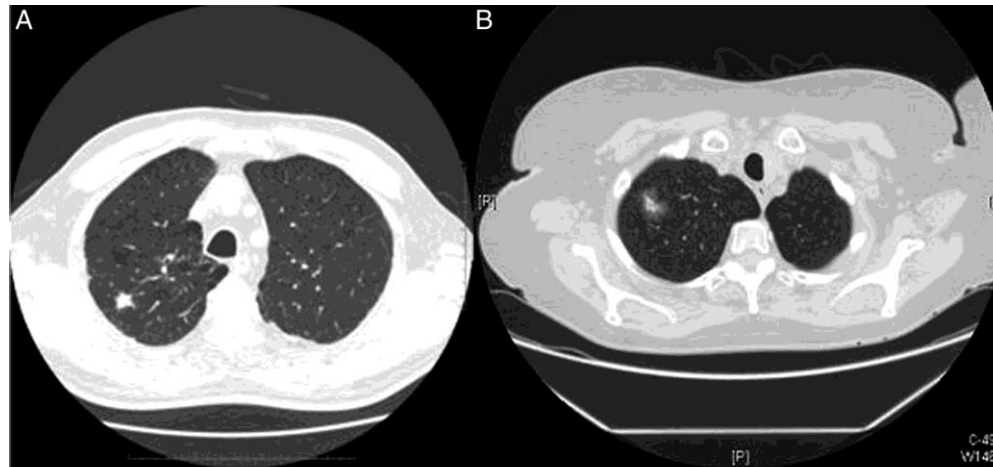


Classification of pulmonary nodules.



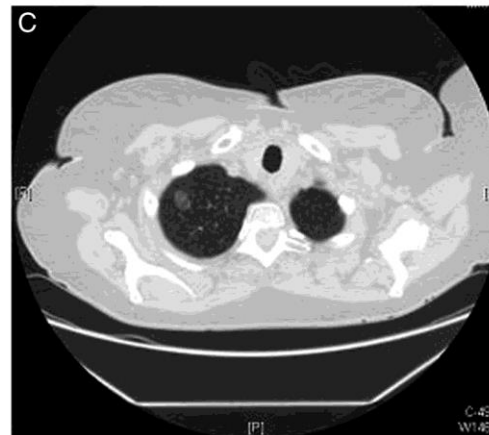
M E J Callister et al. *Thorax* 2015;70:ii1-ii54

Images of nodules.



Solid nodule

Part-solid nodule



Pure ground glass nodule

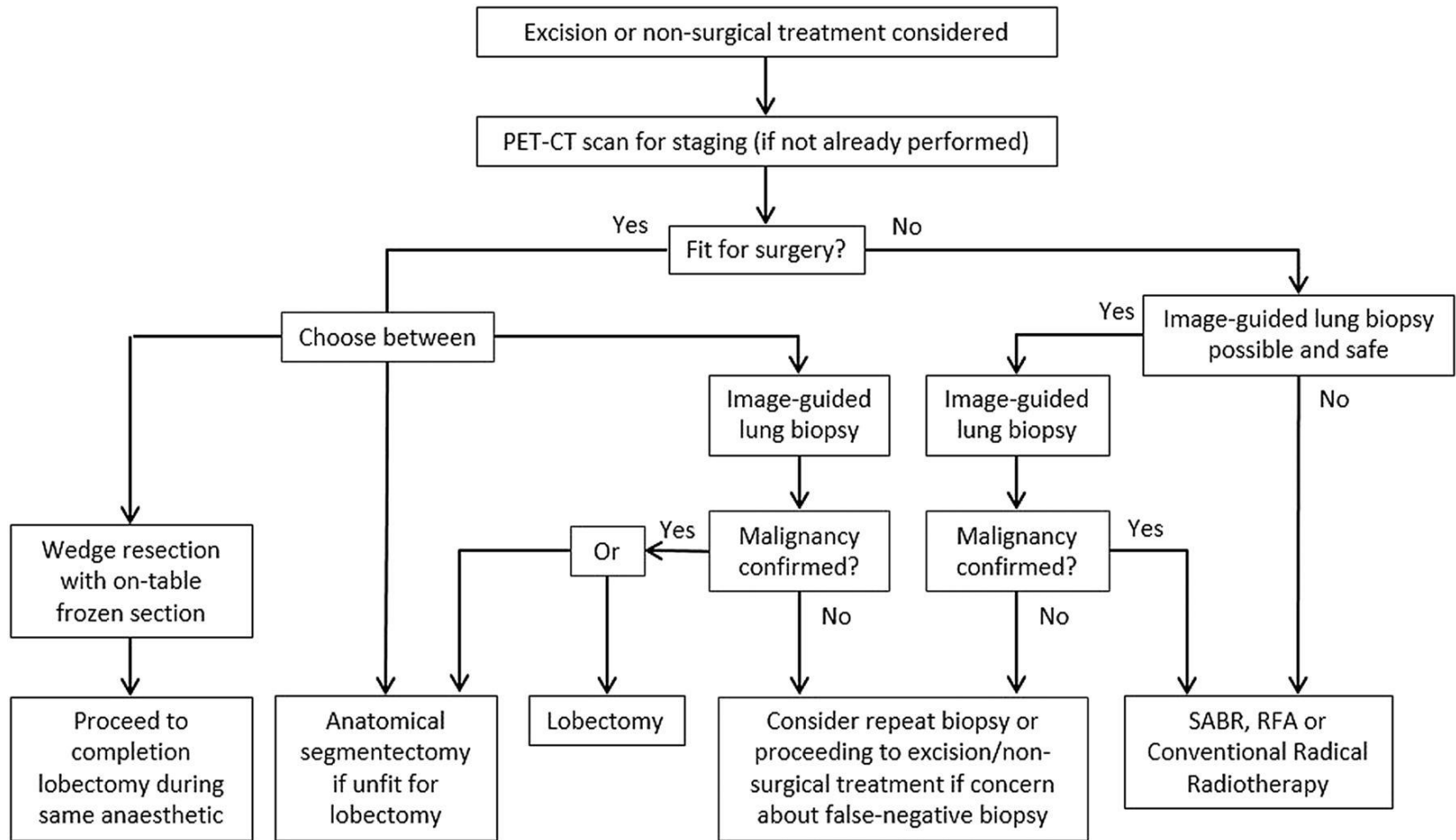
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Nodules pleins



Pulmonary nodule treatment algorithm.




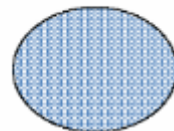
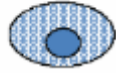
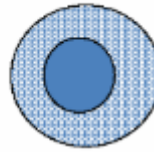
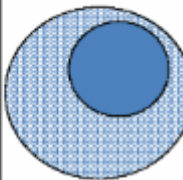
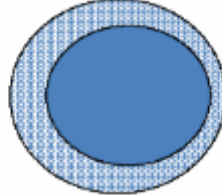
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Nodules

composites

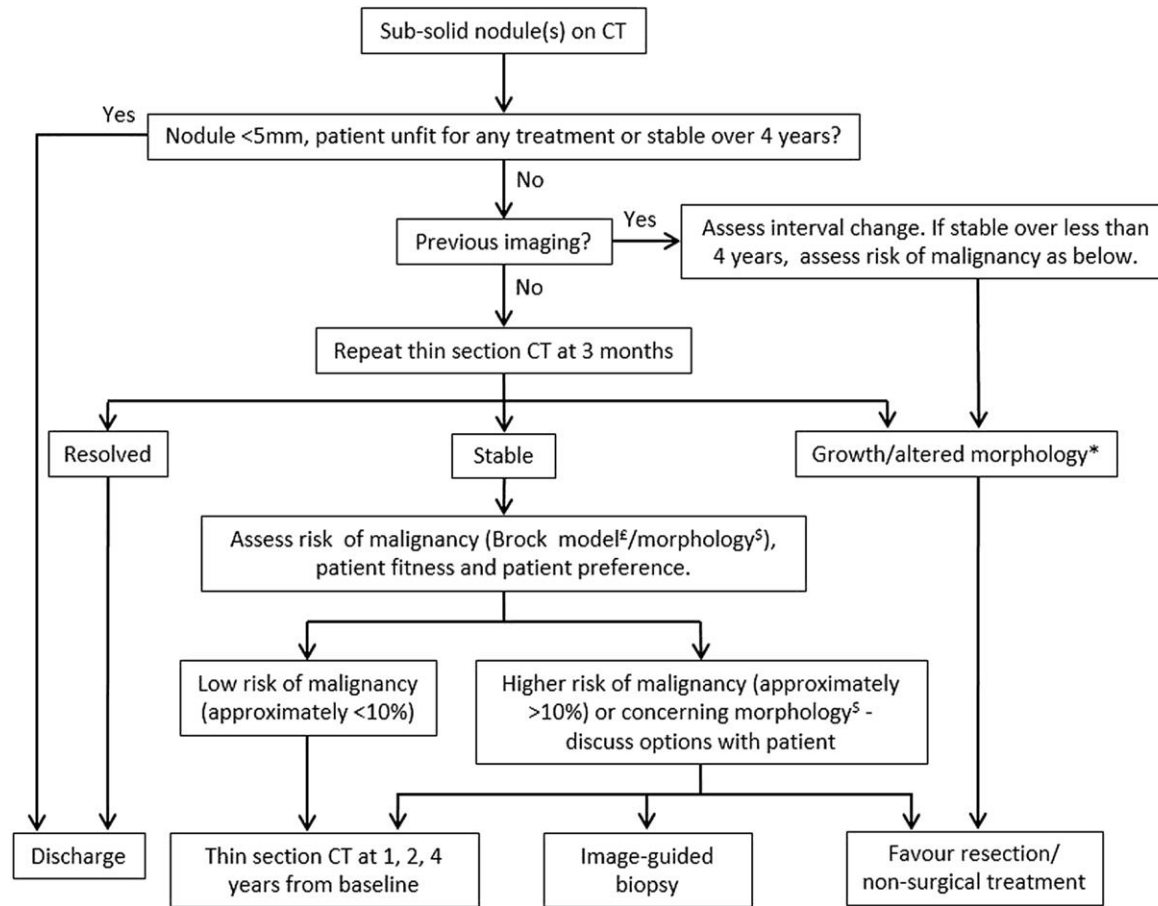


cT*	CT image on HRCT						
	Solid part	0 cm	0 cm	≤0.5 cm†	0.6-1.0 cm†	1.1-2.0 cm†	2.1-3.0 cm†
	Total tumor size including GG	≤0.5 cm	0.6-3.0 cm‡‡	≤3.0 cm‡‡	0.6-3.0 cm††	1.1-3.0 cm††	2.1-3.0 cm††
	Pathologic Differential Diagnosis	AAH‡, AIS, MIA	AIS, MIA, LPA	MIA, LPA, AIS	LPA, Invasive AD, MIA	LPA, Invasive AD	Invasive AD
	Clinical Stage*		cTis‡‡	cT1mi‡‡	cT1a	cT1b	cT1c
pT	Invasive part	0 cm	0 cm	≤0.5 cm‡‡	0.6-1.0 cm†	1.1-2.0 cm†	2.1-3.0 cm†
	Total tumor size including lepidic growth part	Usually ≤0.5 cm‡	≤3.0 cm‡‡	≤3.0 cm‡‡	0.6-3.0 cm††	1.1-3.0 cm††	2.1-3.0 cm††
	Pathology	AAH	AIS	MIA	Lepidic predominant AD or Invasive AD with lepidic component	Invasive AD with a lepidic component or lepidic predominant AD	Invasive AD with lepidic component
	Pathologic Stage		pTis‡‡	pT1mi‡‡	pT1a	pT1b	pT1c

New classification of adenocarcinoma in relation to nodule

Term	Malignant potential	CT correlate
Atypical adenomatous hyperplasia (AAH)	Premalignant	Pure GGN < 5 mm
Adenocarcinoma in situ (AIS)	Premalignant	Pure GGN > 5-30 mm
Minimally invasive adenoCa (MIA)	Invasive part solid nodule	Solid area < 5 mm
Invasive adenoCa	Larger part solid nodule	Solid area > 5 mm

Sub-solid pulmonary nodules algorithm.



* Change in mass/new solid component

[‡] Brock model may underestimate risk of malignancy in SSN that persist at 3 months

[§] Size of the solid component in PSN, pleural indentation and bubble-like appearance

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What is Brock model ?

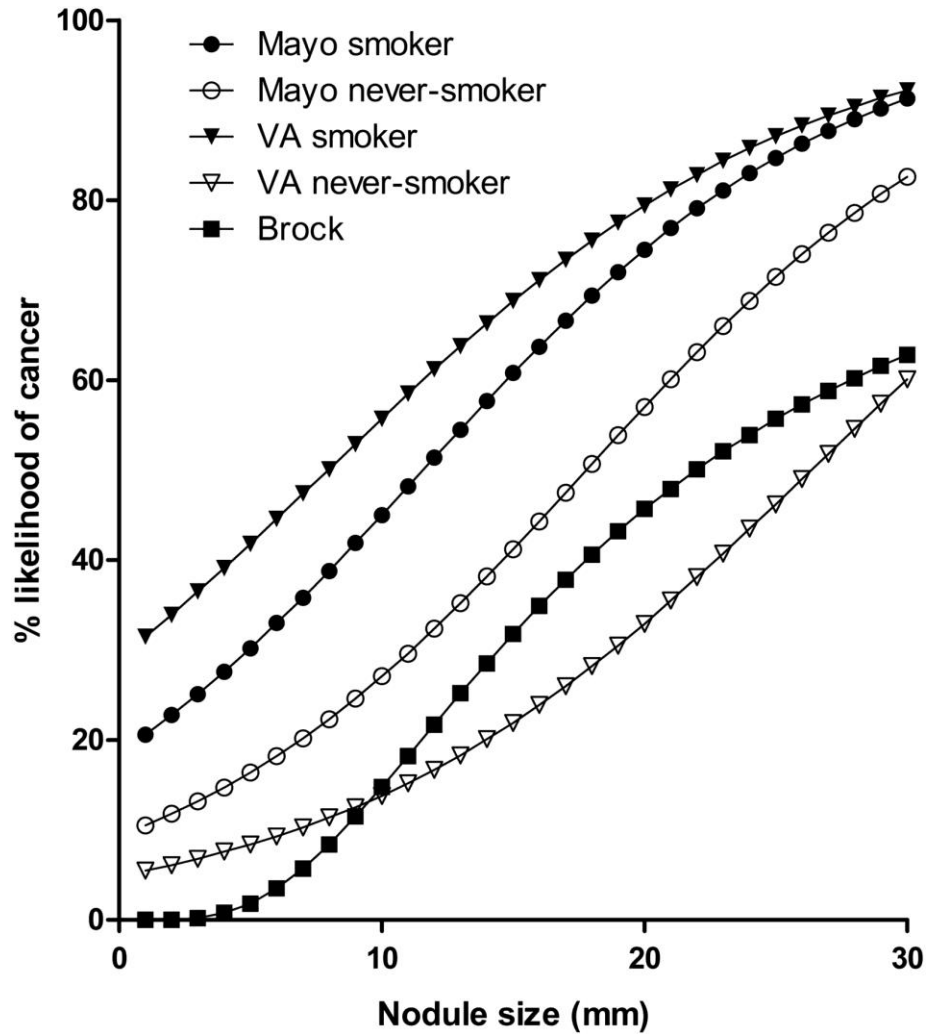
Predictors of lung cancer :

- Age
- Gender
- Family history
- Emphysema
- Size of nodule
- Type of nodule
- Upper lobe
- Spiculations
- Number of nodules

McWilliams et al:
Probability of cancer in
pulmonary nodules detected
on first screening CT.
N Engl J Med 369:910-9, 2013

<https://www.uptodate.com/contents/calculator-solitary-pulmonary-nodule-malignancy-risk-brock-university-cancer-prediction-equation>

Predicted probability of malignancy according to nodule size in a 70-year-old man (spiculate nodule in upper lobe).



M E J Callister et al. Thorax 2015;70:ii1-ii54



PET : benign or malignant ?

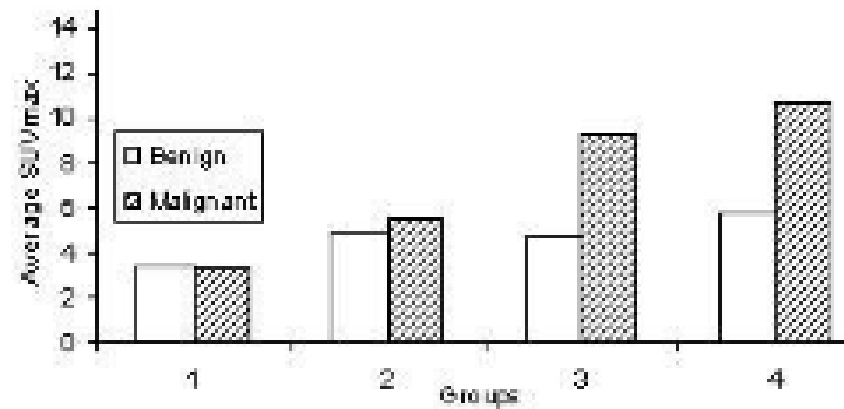
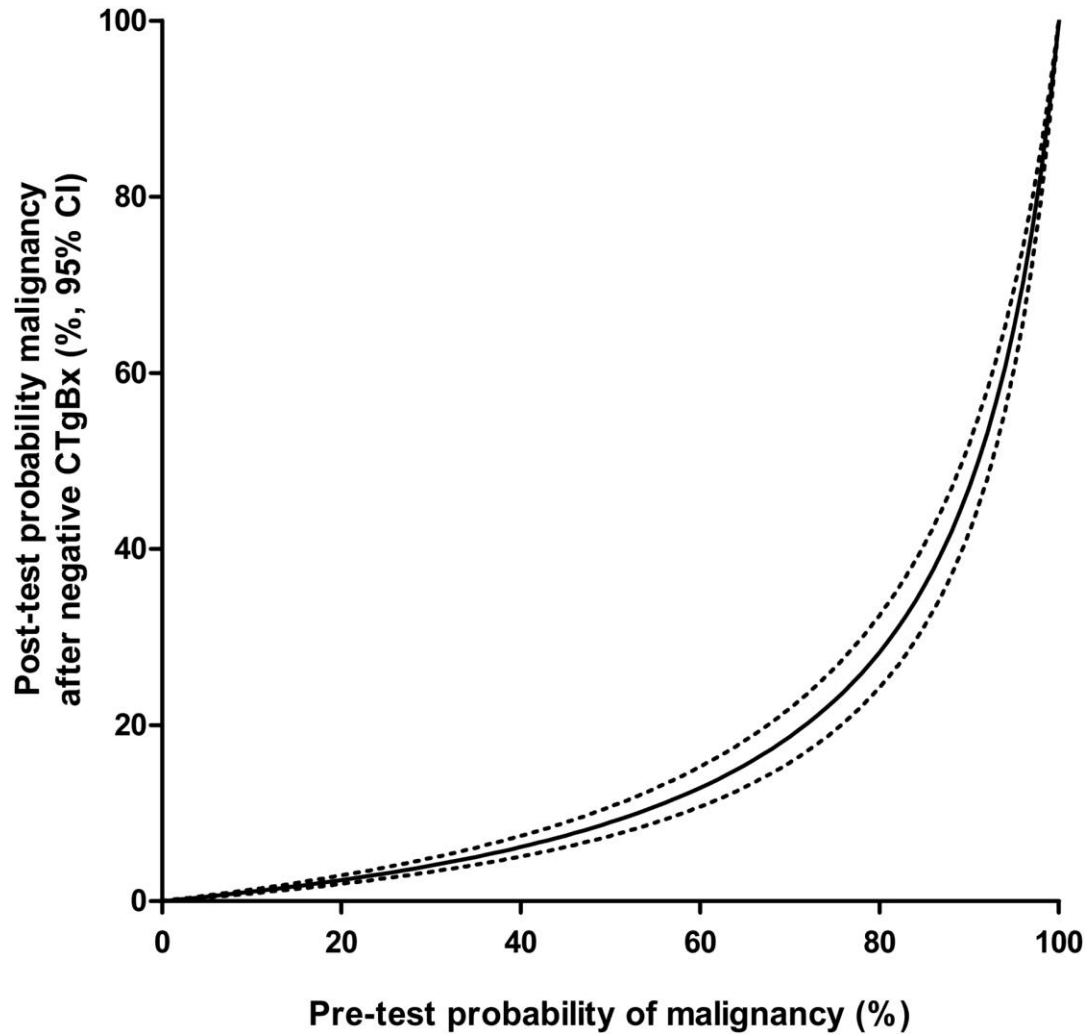


Figure 1
Histogram of malignant versus benign nodules for groups one to four.

The effect of a negative CT-guided percutaneous biopsy (CTgBx) on the probability of a pulmonary nodule being malignant.



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.....do not resign from sound clinical judgement!

- Refer, if ever possible, to previous imaging
- Calcification is not a of disease, but of healing
- Analyse the context
 - Infection?
 - Embolism?
- do not overdue !!

Nodules pleins



Take-home message

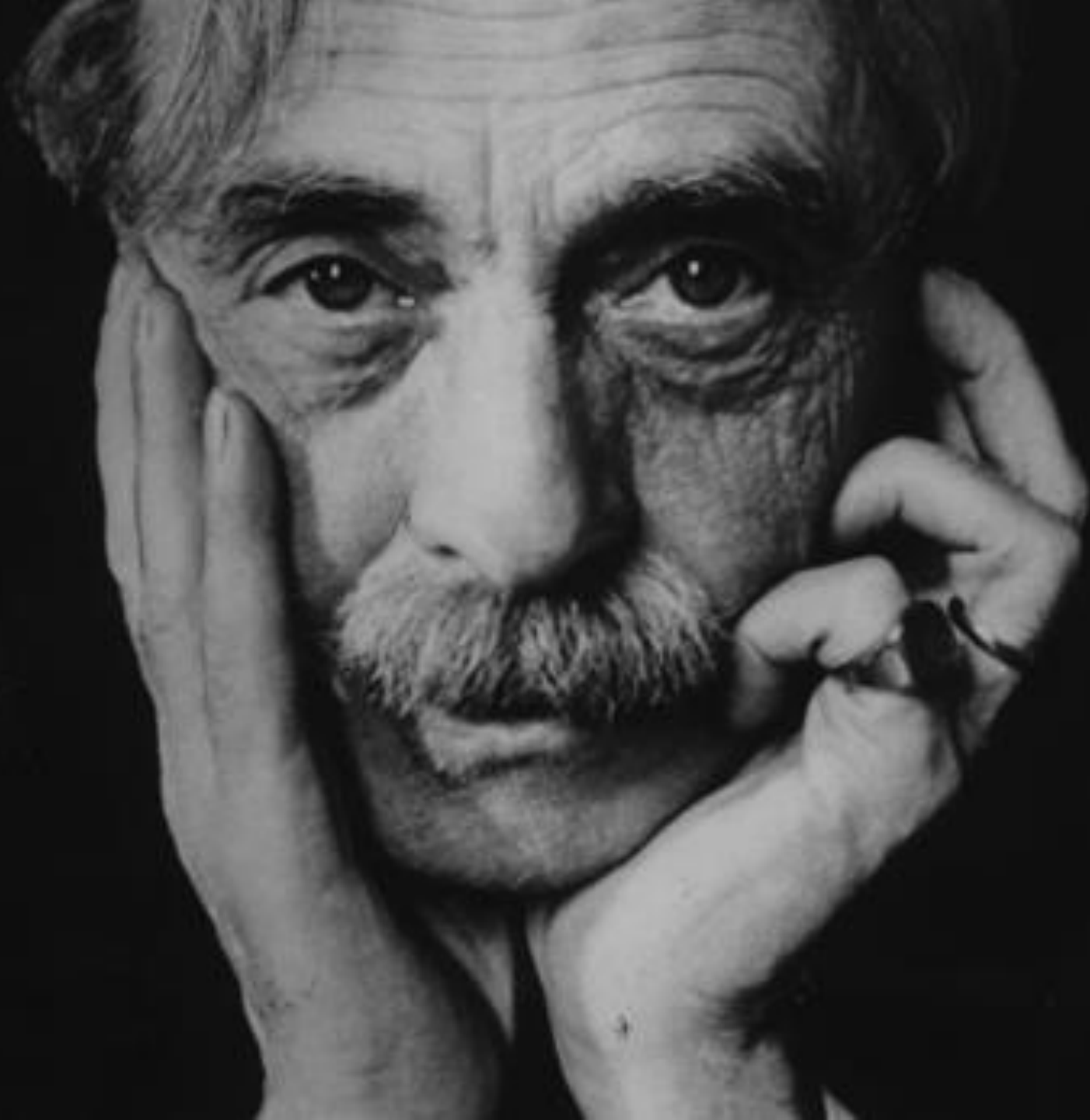
Envisager résection si

- Verre dépoli pur > 5 mm
- Progression
- Modification composante solide

Stratégie diagnostique

- VATS-wedge + extempo pour lésions périphériques
- Biopsie sous scan pour lésions centrales

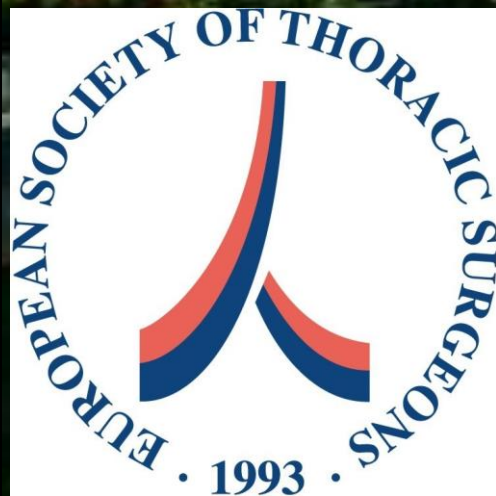




Merci de votre attention!



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Ljubljana, May 27-30, 2018

