I found a lung nodule on CT – what is the chance it could be cancer?

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10 y/o F, asymptomatic, PPD+
SAM 10 y/o F, asymptomatic, PPD+

Diagnosis?
13 y/o F, R chest pain
SAM
13 y/o F, recurrent pneumonia
Diagnosis?

A. Bronchogenic carcinoma
B. Osteosarcoma metastasis
C. Bronchioalveolar carcinoma
D. Bronchial carcinoid tumor
E. Hamartoma
Pediatric lung mass

- Primary neoplasm: 1
- Secondary (metastasis): 5
- Non-neoplastic: 60

Cohen Pediatr Pulmonol 1992
Pediatric lung mass: Benign

- Developmental: hamartoma
- Inflammation/infection:
  - granuloma
  - inflammatory myofibroblastic lesion
  - pneumonia, atelectasis
- Intrapulmonary lymph node
- Scar
Incidental nodules in Rio de Janeiro, Brasil
Tronco Alves AJR 2015

- 99 children scanned for pectus: 225 nodules (75% of patients)
- 2-8 mm, mean 2.8 mm
- 10.7% calcified
- Endemic for granulomatous disease

OBJECTIVE. Existing data are very limited on incidentally detected pulmonary nodules or mediastinal lymph nodes in healthy children who undergo chest MDCT. We aimed to evaluate the prevalence, distribution, and average dimensions of these occasional findings in a cohort of otherwise healthy patients.

MATERIALS AND METHODS. Two radiologists reviewed in consensus the scans of patients referred for chest MDCT during the preparatory workup for pectus carinatum or pectus excavatum treatments. Exclusion criteria included the presence of any documented malignancy (by date of MDCT or during the 2 years after the examination), history of recent infections, or trauma. Patients’ records were assessed after 2 years for the development of any malignancy.

RESULTS. A total of 99 individuals (63 boys, 36 girls; mean age, 13.5 years; range, 4–18 years) who fulfilled the study criteria were evaluated. The prevalence of at least one pulmonary nodule was observed in 75% of the patients, with a mean diameter of 2.8 mm. Of a total number of 225 pulmonary nodules, only 24 (10.7%) were calcified. Mediastinal lymph nodes were also identified in 81% of the cases, with a maximum diameter of 7 mm (smallest axis).

CONCLUSION. The presence of pulmonary nodules or mediastinal lymph nodes on the basis of preparatory chest MDCT scans in healthy children is frequent. Given that 75% of the nodules and 100% of the lymph nodes measured less than 6 mm and 7 mm, respectively, we conclude that incidental findings under these limits are very unlikely to be pathologic.

Keywords: CT, pectus carinatum, pectus excavatum, pediatric radiology
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Geography of fungal disease
Intrapulmonary lymph node

- Tends to be subcarinal
- Within 15 mm of a pleural surface (incl. fissure)
  - Connected via pleural tag
- Uniformly solid (> 0 HU)
- Oval/polygonal shape
Pediatric lung cancer

- Pleuropulmonary blastoma: < 6 yr
  - Large solid, small cystic
- Primary (bronchogenic ca): rare
  - Squamous cell ca: ~ papillomatosis
- Airways (carcinoid, ...): symptomatic
Embryonal RMS

6 mo M, treated for "round pneumonia", did not resolve in 2 wk
Pediatric lung cancer (cont.d)

- Leiomyoma/-sarcoma
  - HIV, Tx, immune deficiency (EBV)
- Bronchioalveolar carcinoma (BAC, adenocarcinoma)
  - Tx for extrathoracic malignancy
  - Chronic infections
  - CPAM
  - Ground glass nodule
The incidentally-detected lung nodule

- Fleischner guidelines do not apply
  - Solid nodule: intrapulmonary lymph node, granuloma, etc., not cancer (?)
  - Ground-glass nodule not a precursor for adenocarcinoma in children
  - Irregular nodule: inflammation, scar, atelectasis
Overlapping 1.25 mm slices

18 y/o, no pulmonary symptoms, negative history
< -160 HU: ground glass nodule
How to manage incidental 3 mm ground glass nodule?

• Ignore
• “Hide” in body of report body
• Mention in impression, no recommendation
• Recommend CT follow up
• Recommend biopsy
Lung Nodule on CT in Child

Asymptomatic
Unexpected Nodule

Negative History
Incidental Nodule

Symptomatic
- Pneumonia
- Obstructed airway
  Work-up if no resolution with treatment
  - Carcinoid
  - Infection/inflammation
  - TBC
  - Histoplasmosis
  - Vasculitis
  - Malformation
  - Hamartoma
  - Immune deficiency
  - Papillomatosis
  - ...

Positive History
- Malignancy
- Immune deficiency
- CPAM?
- Travel, exposure to TBC etc.

Solid
(> 0 HU)
Classic Features of Benignity
- Fat, "Popcorn" calcification: Hamartoma
- Peripheral location, elongated, pleural tag
  : Intrapulmonary Lymph Node
- Uniformly calcified: Granuloma
- Stability compared with prior studies

Ground glass
(< 0 HU)
- Inflammatory
- Infections
- Scarring
- Microatelectasis

Non-Specific Appearance

Individualized Care
(Appropriate Treatment versus Follow-up CT versus Tissue Sampling at the discretion of Referring Physician in consultation with Radiologist)

Concern for Malignancy
Lowest
Lowest
Lowest
Intermediate
Intermediate

STOP