

Infectious Diseases and the Lung: Granulomas

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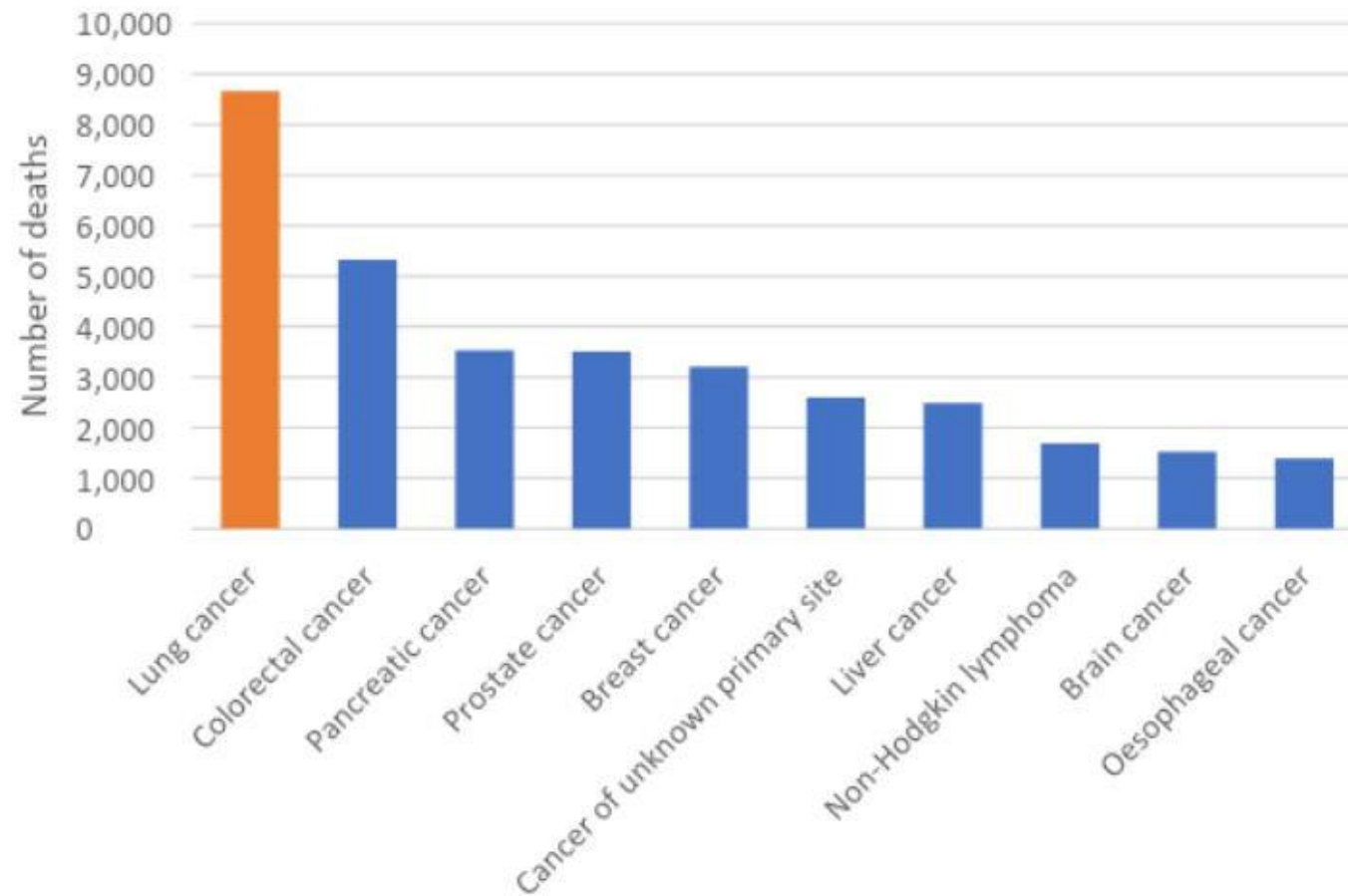
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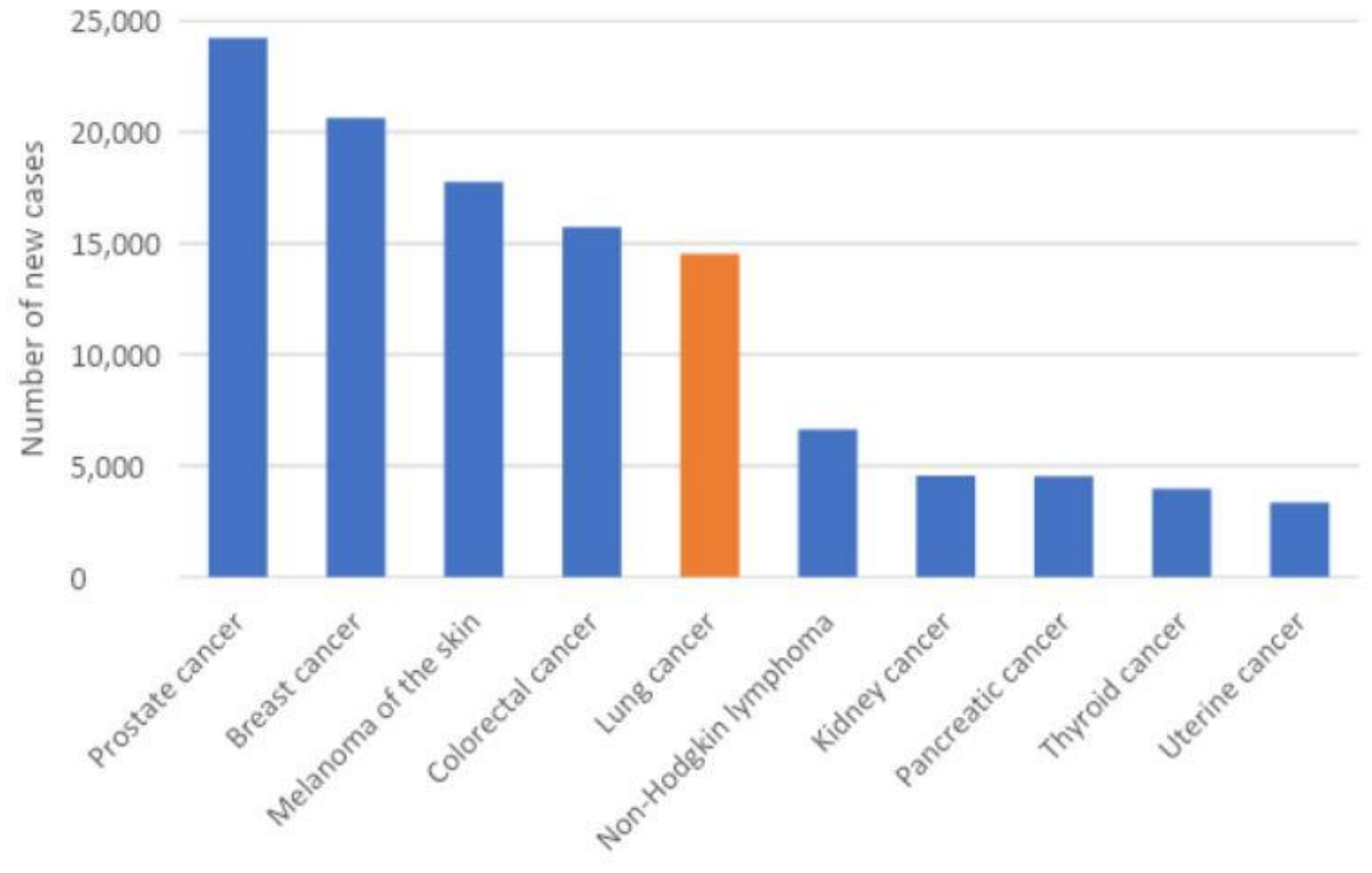
- None



Number of cancer deaths in Australia in 2021



Number of new cancer cases in Australia in 2021



- Suspicious mammographic findings may require a biopsy for diagnosis. More than 1 million women have breast biopsies each year in the United States. About 20 percent of these biopsies yield a diagnosis of breast cancer. (Agency for Healthcare Research and Quality)
- In general, if a mass in the lung lights up on the PET scan, there is an 80 to 90% chance that it is cancer. A false positive test can occur if the mass is inflammatory or infection. If the lung mass does not light up on the PET, the chances of the mass being cancer are only 5%. (Source Cedars Sinai Hospital)

Positive predictive Value

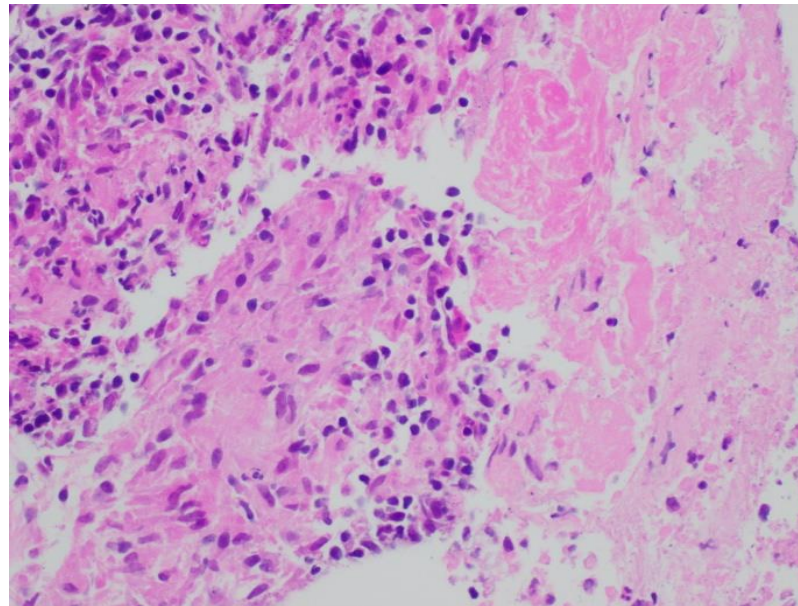
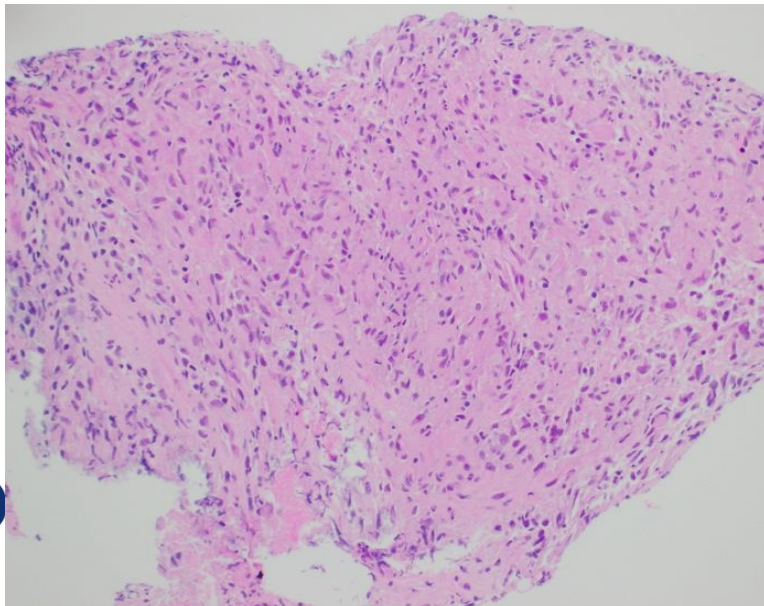
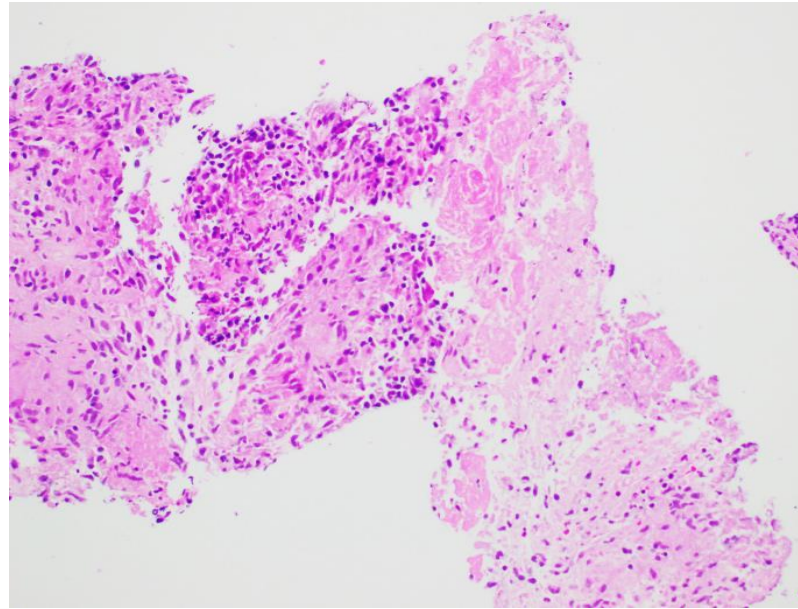
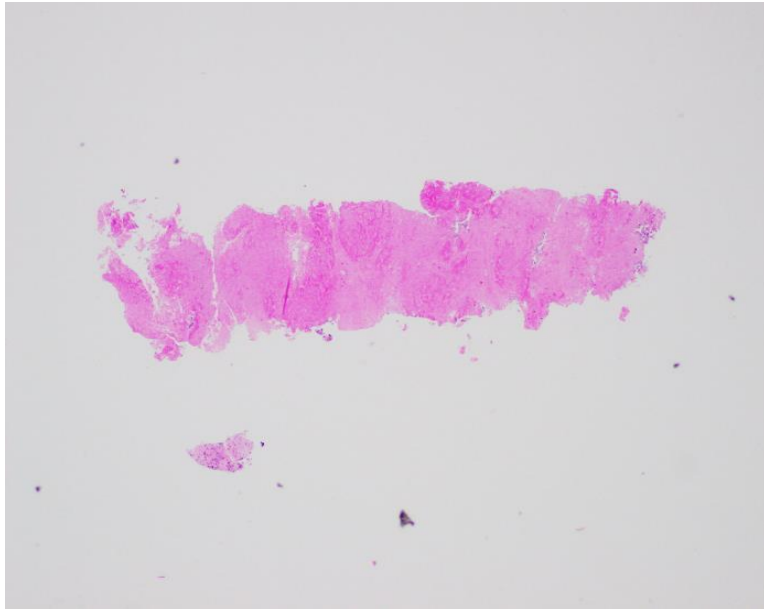
It is the ratio of patients truly diagnosed as positive to all those who had positive test results (including healthy subjects who were incorrectly diagnosed as patient).



Differential diagnosis of solitary pulmonary nodule

- Primary tumours: NSCLC (SCLC), Carcinoid tumours
- Metastasis
- Hamartoma
- Infection:
 - Abscess
 - Localised granulomatous disease: Fungi, mycobacteria
 - Parasitic: Echinococcus (Hydatid cyst), Paragonimiasis
- Non-infectious: Rheumatoid disease, GPA (Wegener's), (sarcoidosis)
- Congenital: Bronchogenic cysts, AVM
- Other: Rounded atelectasis, Infarction
- Scar NOS

Case 1. Solitary pulmonary nodule – core biopsy



- Clinically presumed carcinoma
- Partly necrotic core biopsy with granulomas
- *What to do next?*



Case 1. Solitary pulmonary nodule – core biopsy

What to do next?

- Is there other tissue available? Did the radiologist send a core in saline?
 - *I keep aside fresh tissue until I am happy it is not needed for culture and flow and then process.*
 - Should I do bug stains?
 - *Yes, whether there is tissue for culture available or not*
 - *I tend to do ZN (+/- Wade-Fite), Grocott (+/- other fungal stains), +/- Gram*
 - Should I do IHC?
 - *Up to you.*
 - Are there molecular tests I could do?
 - *Yes PCR for TB – but with provisos – see later slides*
 - Is there additional information I could obtain from a phone call?
 - *Ethnicity and travel history, occupation or hobbies (gardener etc)*
- *Also, if this is shown to be TB, it is a notifiable disease in most jurisdictions*



Confirming diagnosis of TB

From Mandell, Douglas and Bennett's Principles and Practice of Infectious Disease, 2020

- Culture and speciation remains the gold standard
- Acid fast stains – when compared to culture, the smears are approx 60% sensitive. Need 10,000 organism per ml of sputum to achieve smear positivity and one AFB on smear is suggestive of infection but 10 is optimal.
- Auramine-rhodamine technique
- PCR high sensitivity and specificity, particularly if AFB's are detected
 - *Retreatment cases can show false positive of residual DNA*



Case 1. Solitary pulmonary nodule – core biopsy

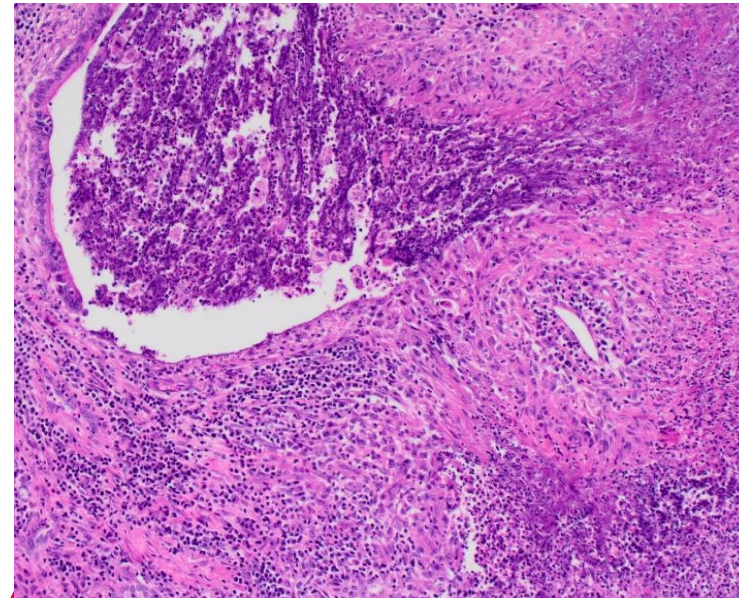
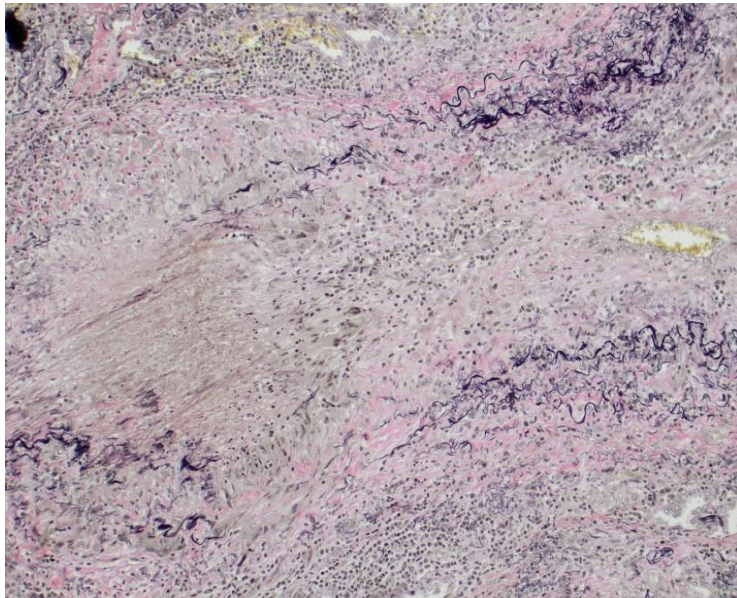
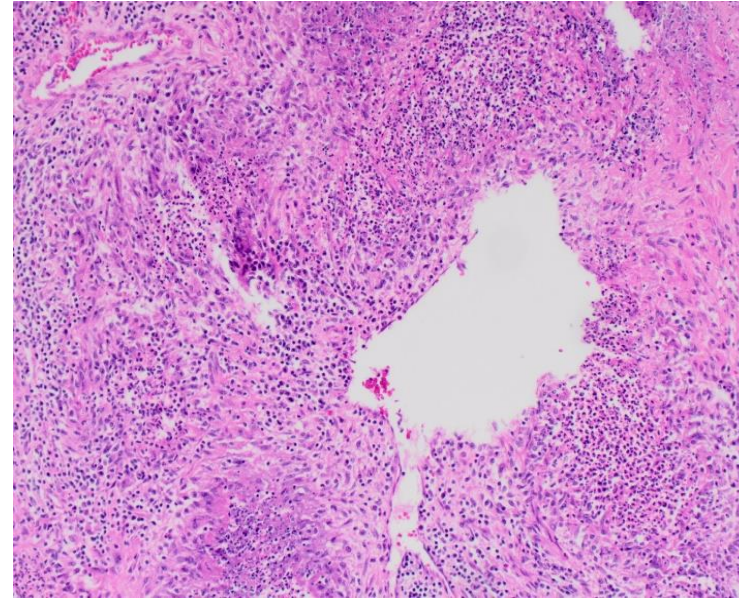
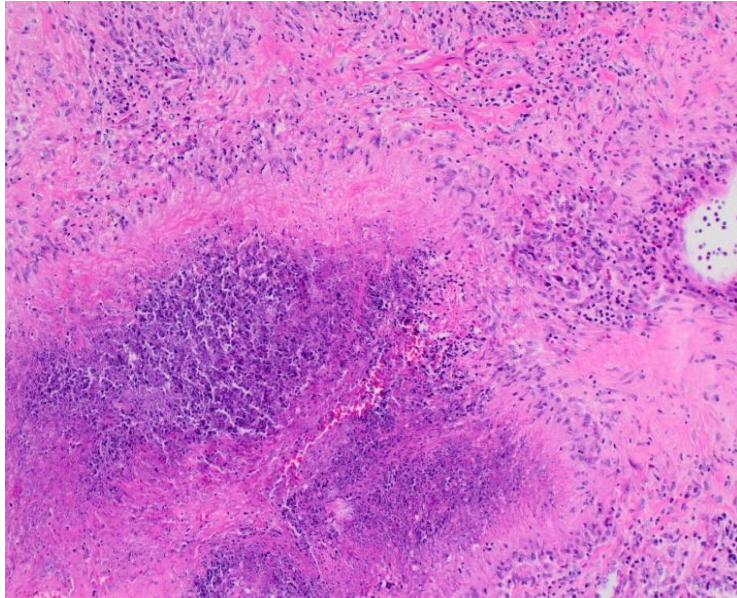
What to do next?

Differential diagnosis:

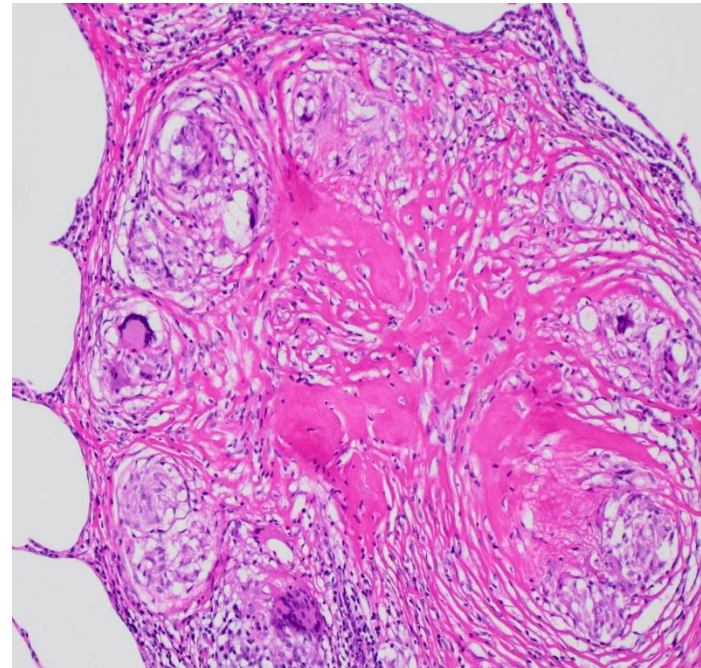
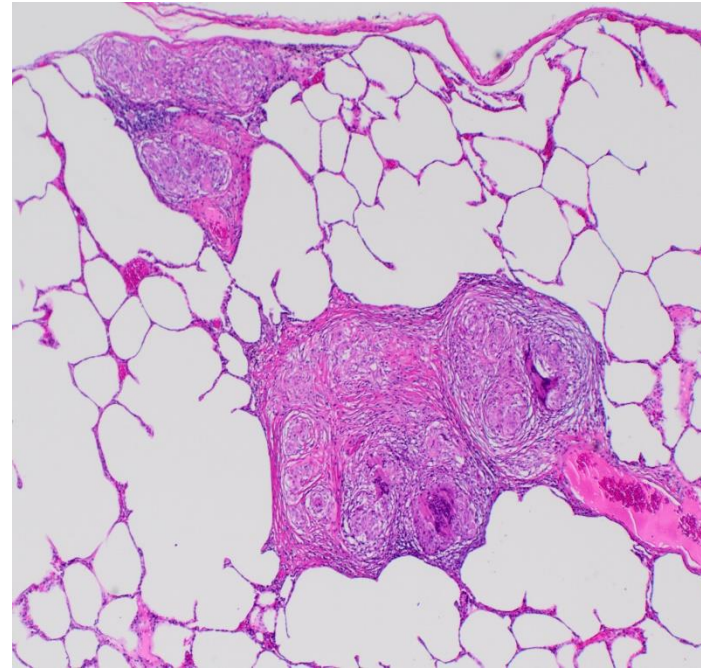
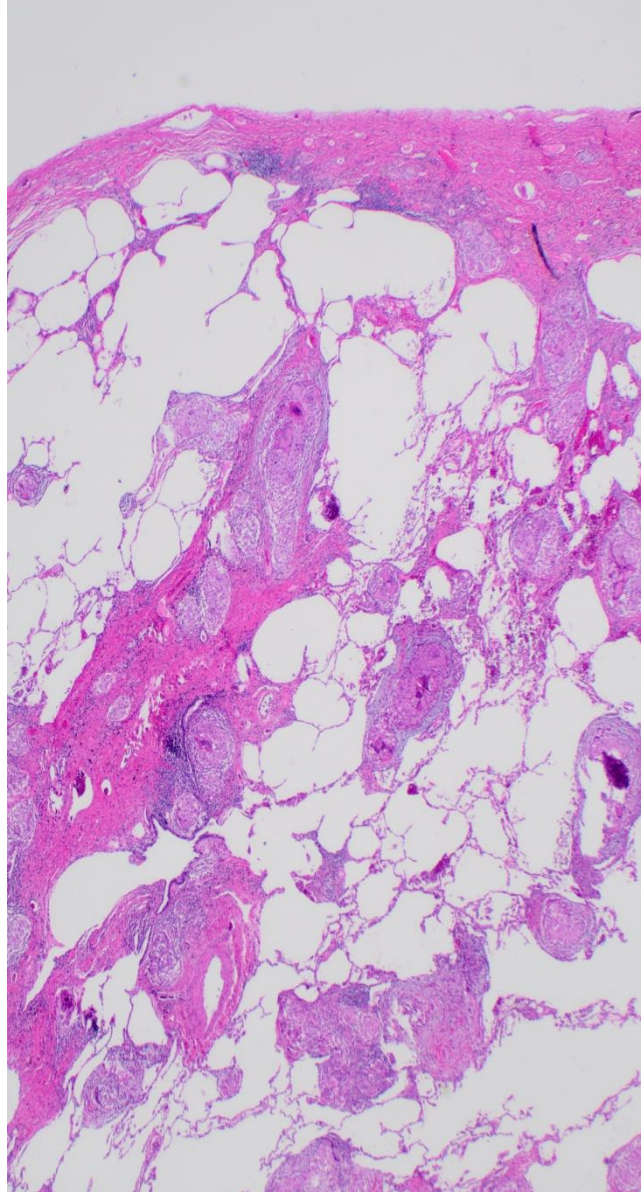
- Sarcoidosis: It can have punctate necrosis. Rarely broad zones except NSG. Can have granulomatous vasculitis. Usually not solitary.
- Infective: Pink necrosis. May have neutrophils but not degenerate. May have well-formed sarcoidal granulomas. No vasculitis generally.
- GPA/Wegener's: Blue necrosis due to the degenerate neutrophils. Vasculitis. Microabscesses but no well-formed granulomas.
- Rheumatoid Disease: History. Necrotising granulomas. Interstitial chronic inflammation



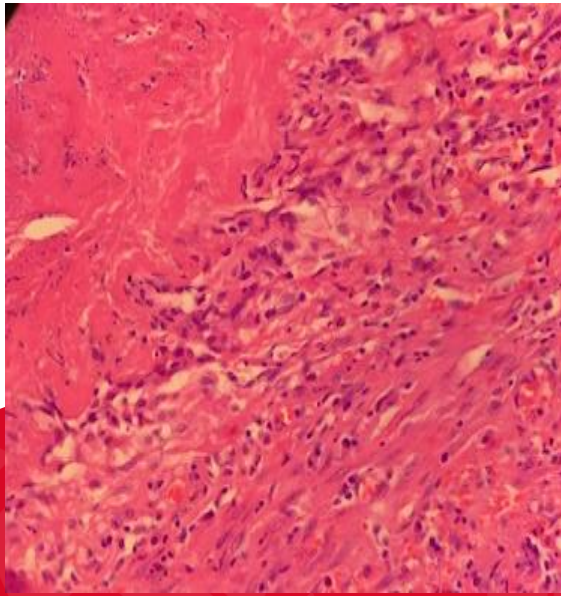
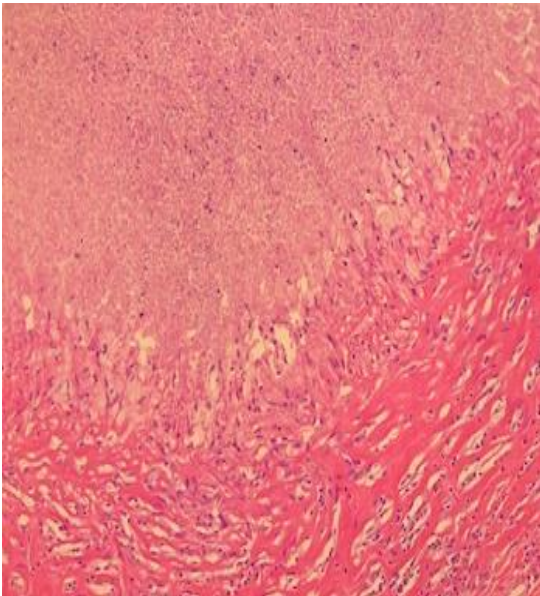
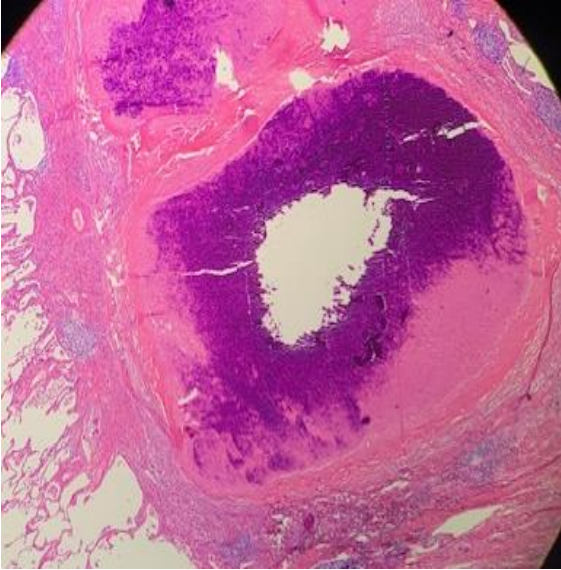
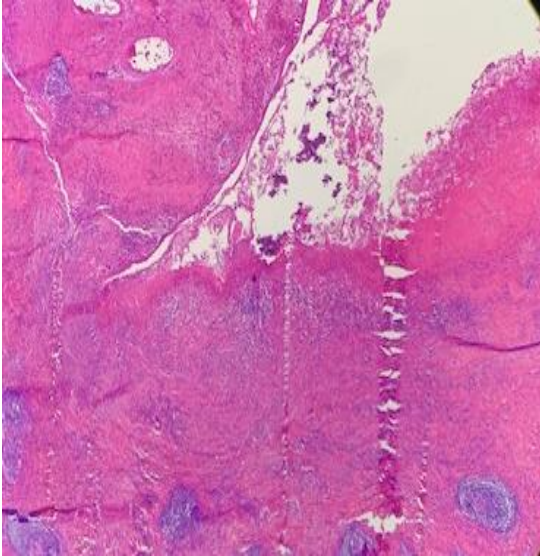
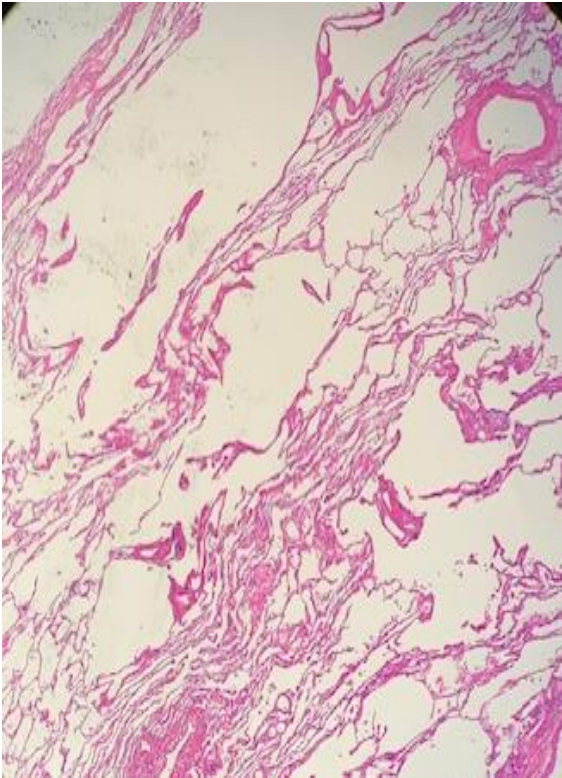
Granulomatosis and polyangiitis (GPA)

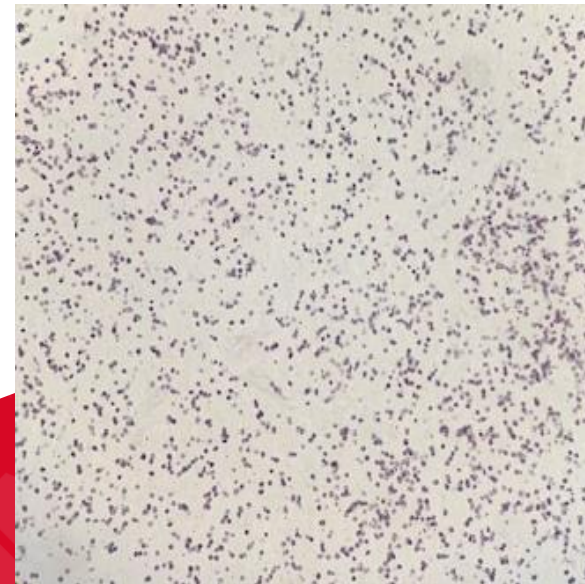
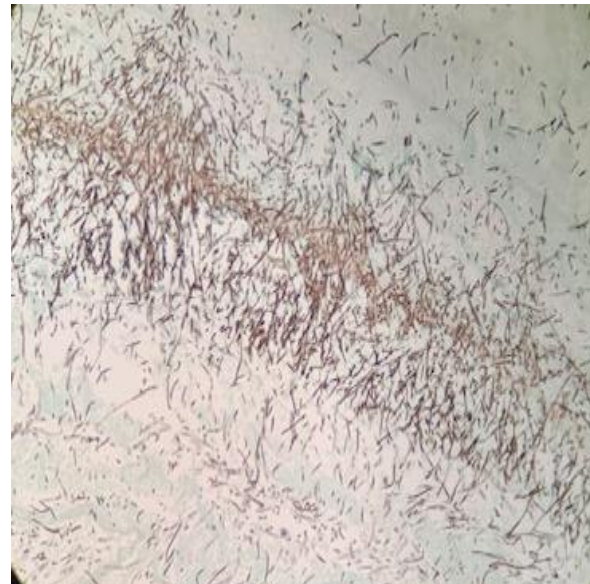
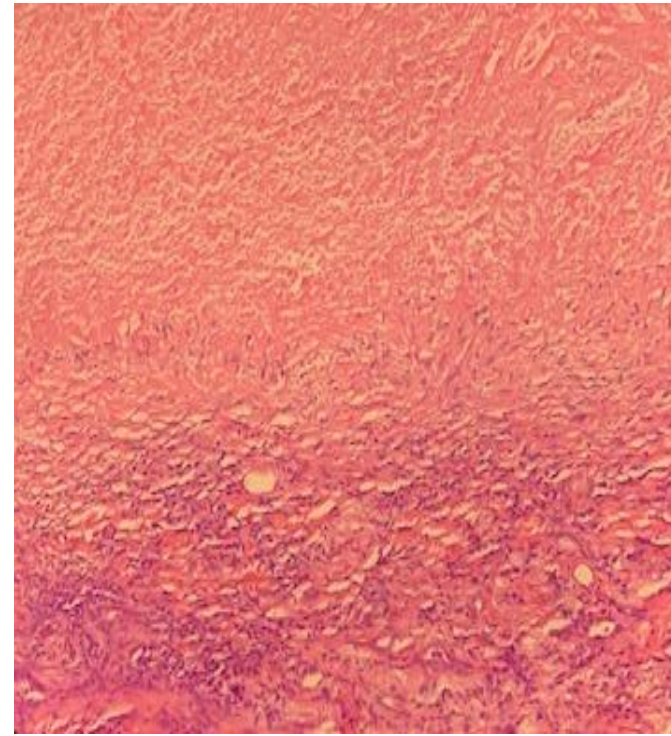
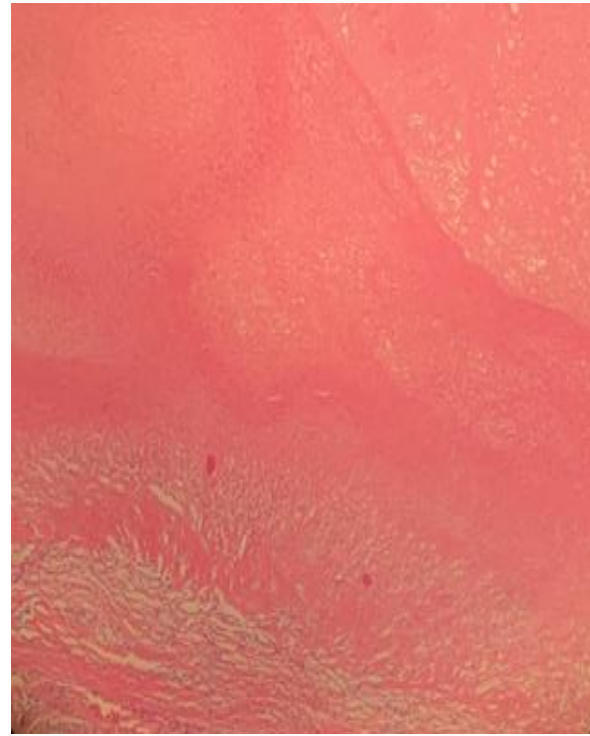
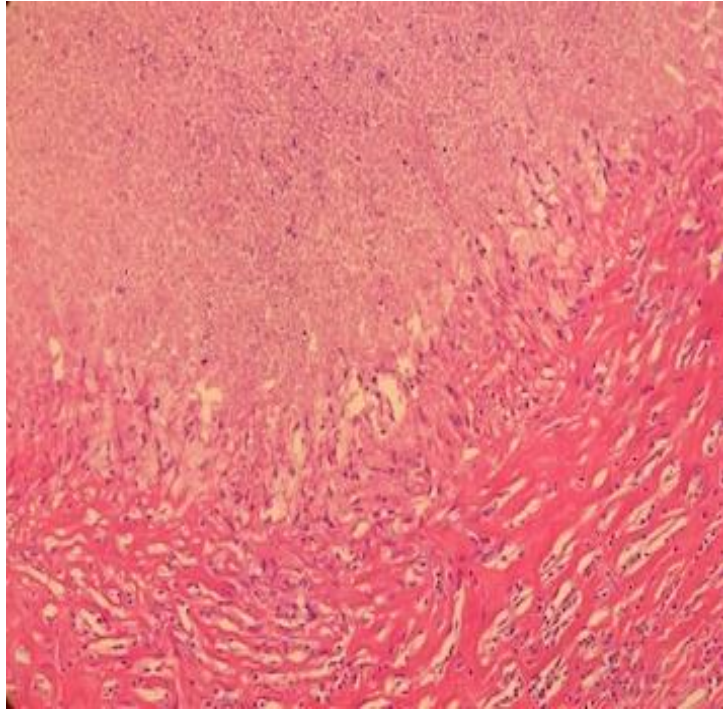


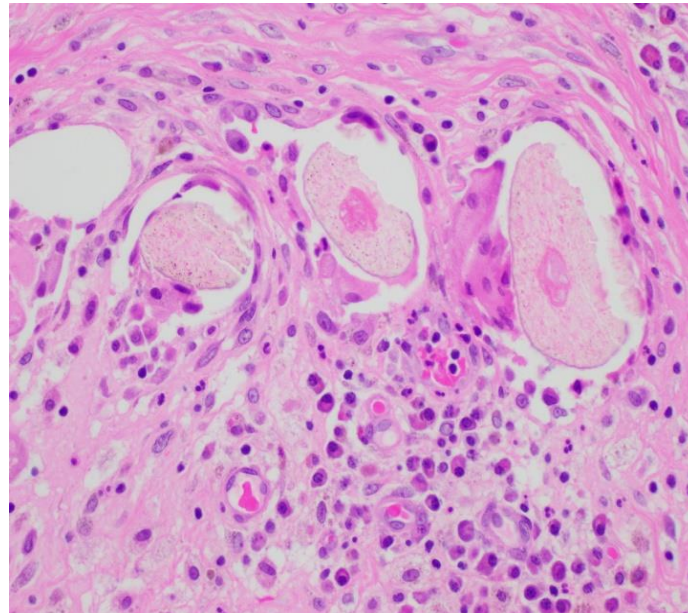
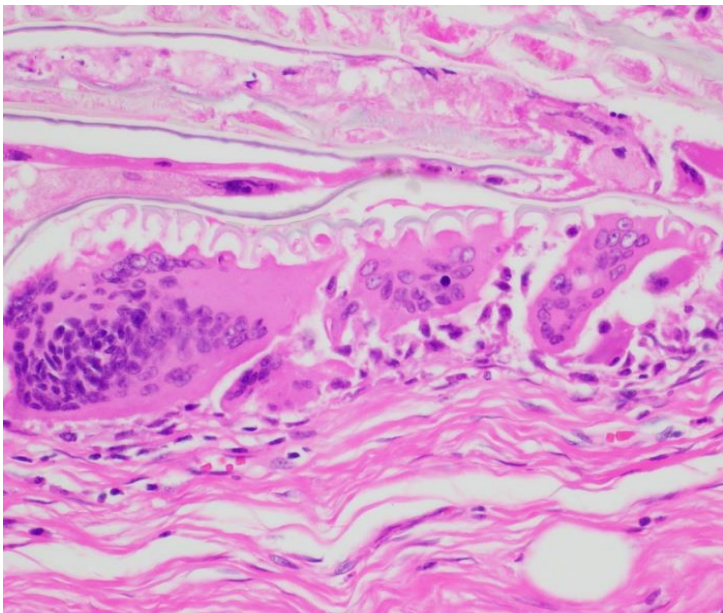
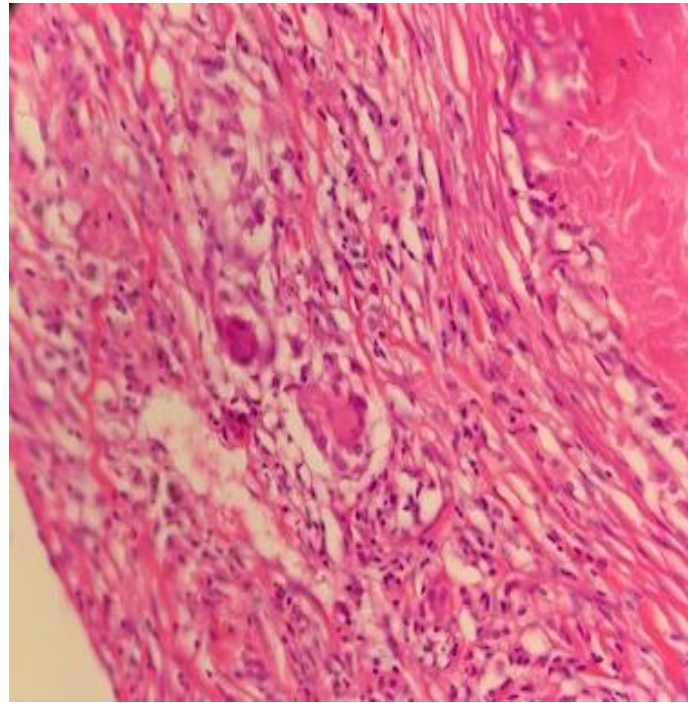
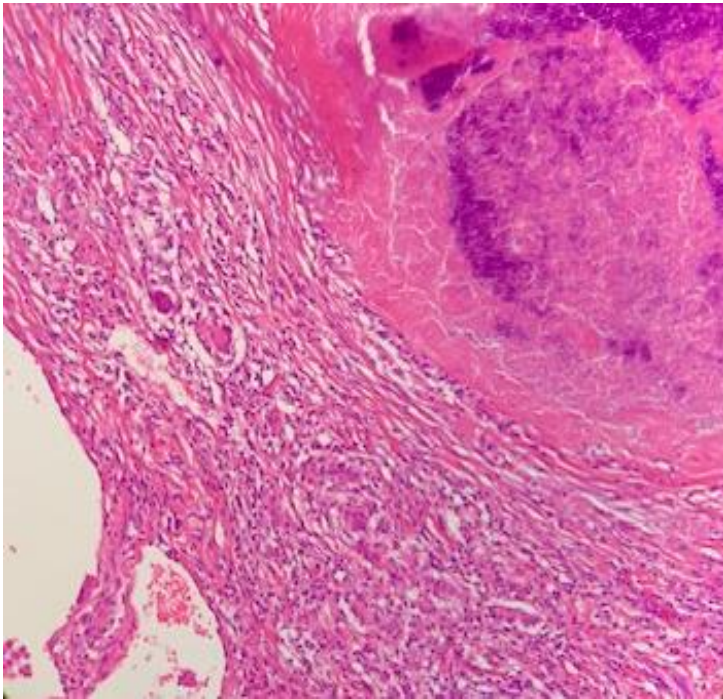
Sarcoidosis



Case 2 – lung resection







Mycobacteria

- Tuberculous
 - M TB
 - M Bovis
 - Bacillus Calmette-Guérin (BCG)
- Non-tuberculous
 - Leprosy
 - Mycobacterium avium complex
 - Rapid, intermediate and slowly growing eg M kansasii
can produce similar disease to MAC and M abscessus
can produce nodular disease in bronchiectasis



MAC pulmonary disease

- Higher in developed countries
- Environmental organism caused by inhalation, microaspiration or ingestion
- Found in soil, water and animals
- Colonises water pipes, filters, pools and spas

Associations:

- Underlying pulmonary disease
- Growing association with gastroesophageal reflux
- (HIV and other causes of immunosuppression)



MAC pulmonary disease

- In USA tend >60; F > M
- But cystic fibrosis patients increased risk

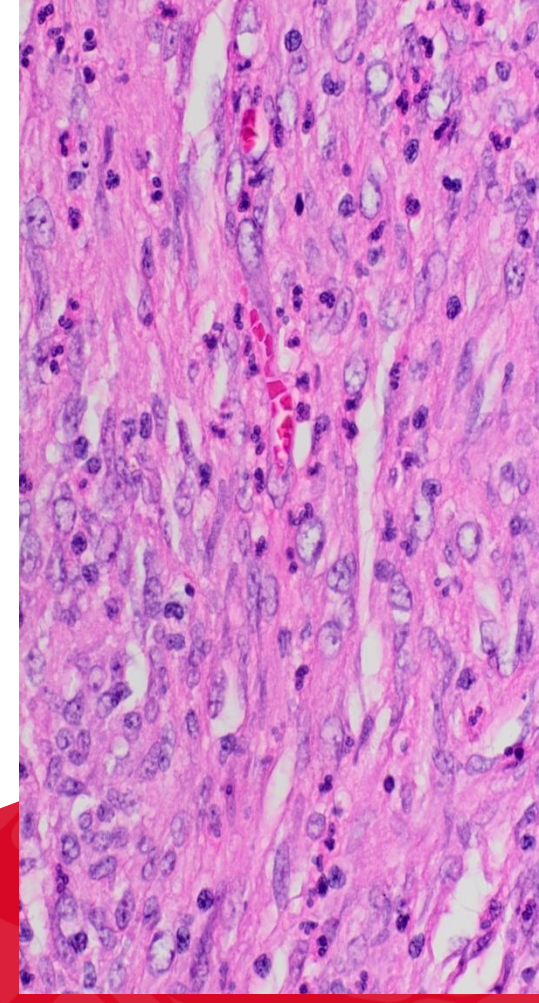
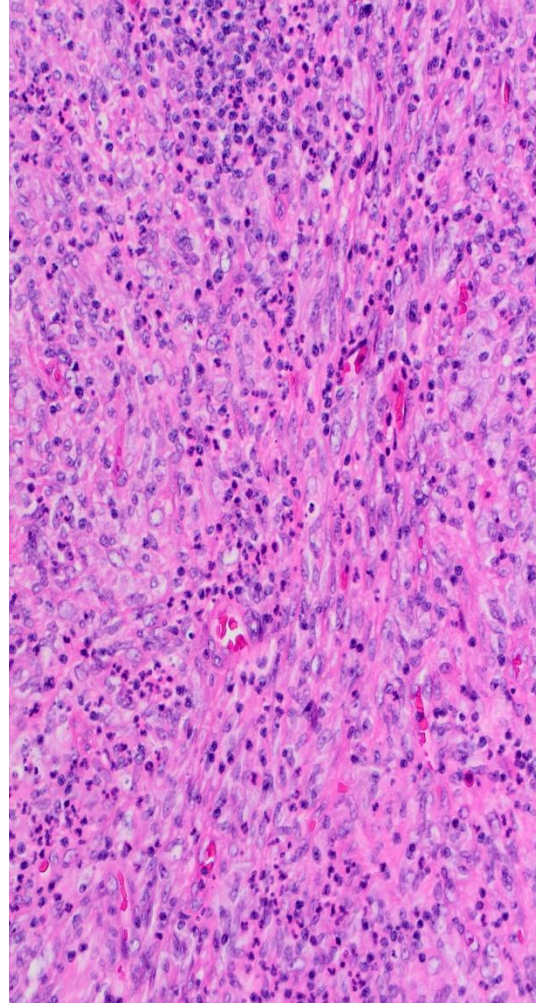
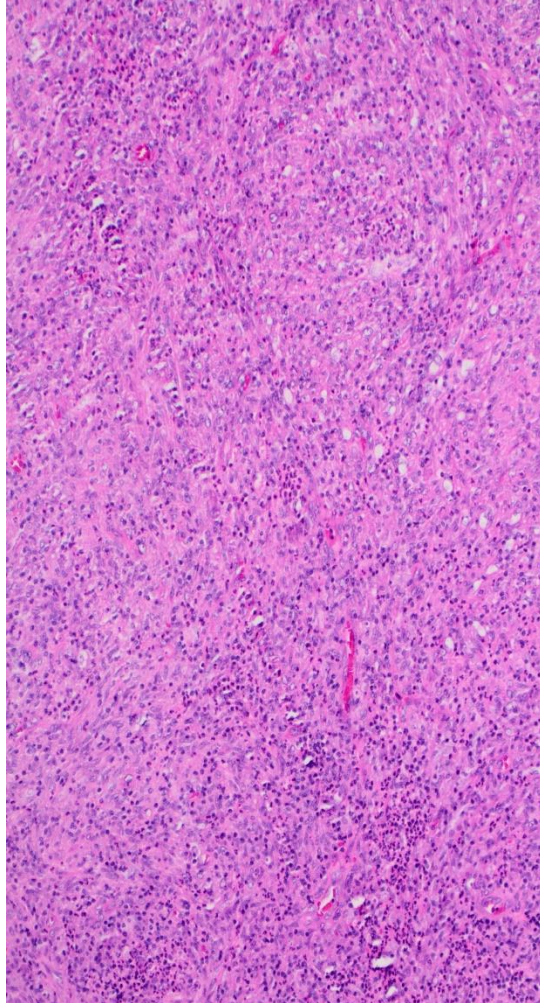
Pathological patterns:

- “Hot tub lung”
- In association with underlying lung disease eg COPD and bronchiectasis – (including what in past referred to as Middle lobe syndrome / Lady Windermere Syndrome)
- And case 3...
- ?? Carcinoma



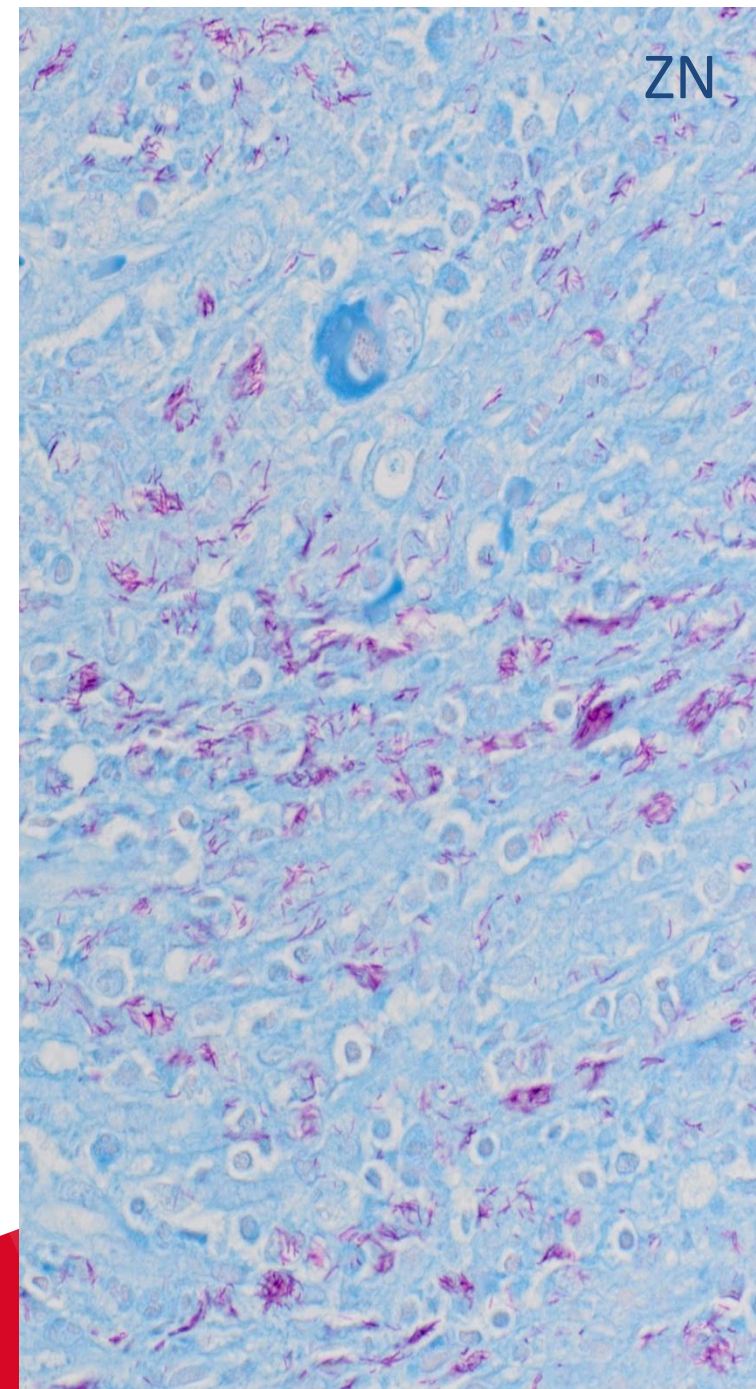
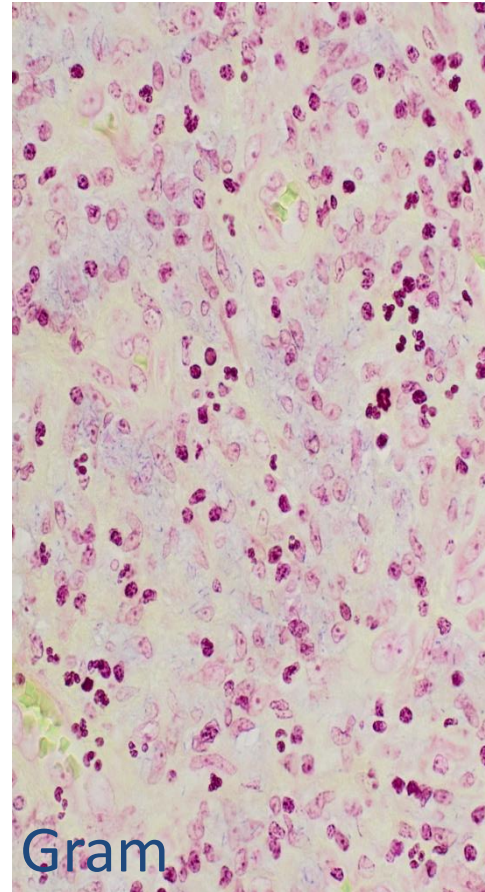
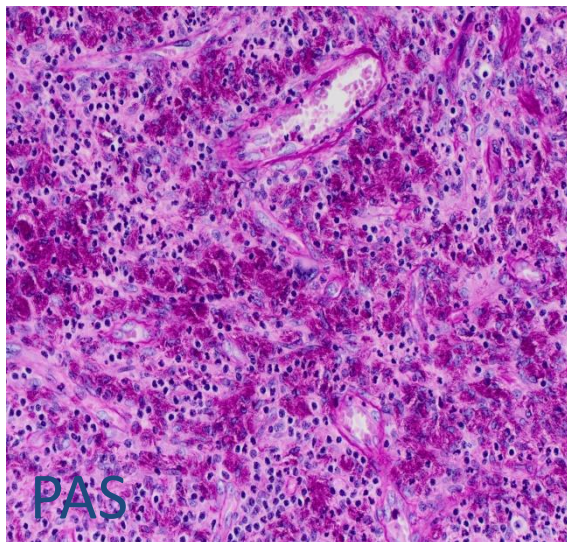
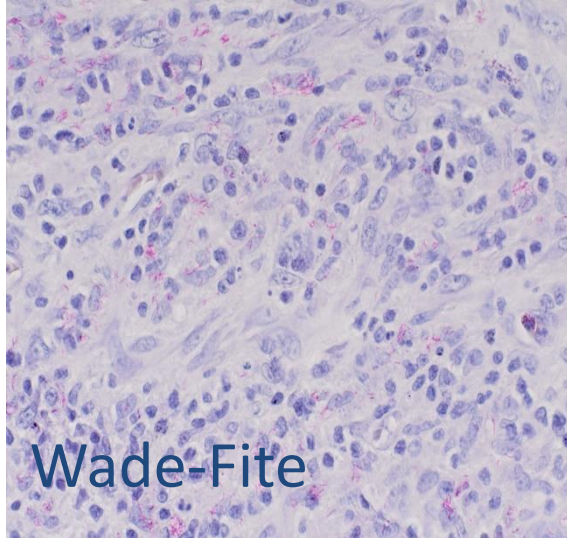
Case 3 Nasal lesion

Nasal spindle cell tumour – previous biopsy diagnosis uncertain type



Case 3 Nasal lesion

Nasal spindle cell tumour



Mycobacterial spindle pseudotumour

- A form of granulomatous inflammation with a more diffuse spindle morphology
- Has been identified in lymph nodes, skin, spleen, bone marrow and lung
- Generally associated with an immunocompromised state
- Can be mistaken for IMT, inflammatory pseudotumour and neoplasms including myogenic or neural sheath lesions, Kaposi's sarcoma, melanoma, neuroendocrine tumours, etc



Summary

- In the differential diagnosis for solitary pulmonary lesions, including PET positive ones, infective granulomas remain a consideration
- Mycobacterial disease can occur in developed countries and often represents atypical Mycobacteria. It is often present in older individuals on a background of underlying lung disease and/or immunosuppression
- A range of ancillary tests are available to support or better define the pathological process



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