A Rare Case of Pulmonary Nocardiosis in an Immunocompromised Patient

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Clinical Presentation
An 81 year old male ex-miner with a history of Myelodysplastic syndrome and asbestos exposure presented with prolonged dry cough. PET (Positron Emission Tomography) showed an FDG (Fluorodeoxyglucose) avid confluent mass in the anterior segment of the left upper lobe (LUL) extending interiorly into the chest wall. (Fig 1) There were multiple satellite lesions, one of which was cavitating. Multiple hilar, subcarinal and right paratracheal nodes were enlarged and FDG avid. These radiological findings, along with increased serum calcium suggested neoplasia. Transbronchial Needle Aspiration (TBNB) of the 4R and 7L lymph nodes was attended by a cytotechnologist. Both bronchial brushing and washing samples were obtained from the LUL.

Cytology
Specimens from the two nodes showed scant lymphocytes and reactive bronchial cells only. They were negative for neoplasm. The washing comprised benign lower respiratory tract material in a mucopurulent background. The bronchial brushing however, showed high cellularity with large aggregates of metaplastic squamous epithelial cells within a florid, mixed acute and chronic inflammatory background. (Fig 2) Granulation tissue fragments, benign reactive bronchial epithelial cells and occasional multinucleated histiocytes were also noted. Whilst the morphological features seen in the cell block and cytology sample favoured florid immediate squamous metaplasia with reactive cytological atypia rather than a neoplasm, a necrotic squamous carcinoma could not be definitively excluded.

Histology
The concurrent core biopsy from the LUL was fibrotic and heavily inflamed with a mixed inflammatory infiltrate. This inflammation was seen within both stromal and intraalveolar location. Extremely focal atypical lining epithelium was noted along with inflamed granulation tissue. (Fig 3) Again a cavitating squamous cell carcinoma could not be entirely excluded. Some of the biopsy sample was sent to microbiology for culture and Nocardia spp was isolated. More specific identification and susceptibility tests were performed by an external laboratory and Nocardia beijingensis was identified as a result. The patient was immediately placed under treatment for nocardiosis. One month into the treatment, the consequent X-ray showed that the previously demonstrated consolidation in the LUL appeared to have resolved.

Discussion
Clinically, nocardiosis is a rare and potentially life threatening gram positive bacterial infection with a mortality rate as high as 60%. Nocardia is recognised as an opportunistic pathogen found in soil and vegetable matter, most commonly affecting immunocompromised patients with haematopoetic stem cell transplantation, solid organ transplantation, HIV infection, malignancy, and chronic glucocorticoid therapy. The frequency of nocardiosis has been increasing steadily with rising incidences of transplantations, alcoholism, diabetes mellitus and use of immuno-suppressant therapy. Non specific symptoms and radiological features can make diagnosis difficult as it may mimic other infectious diseases like tuberculosis, actinomycosis, fungal infection, and malignancy. A high index of suspicion for nocardiosis must be maintained while assessing intense inflammatory cytologic material in immunosuppressed patients to allow mimicking other infectious diseases like tuberculosis, actinomycosis, fungal infection, and malignancy. A high index of suspicion for nocardiosis must be maintained while assessing intense inflammatory cytologic material in immunosuppressed patients to allow distinguishing from bacterial, fungal or neoplastic processes.

Histologically, Nocardia comprises a group of phylogenetically diverse but morphologically similar organisms. The most common species to cause lower respiratory tract infection is N. asteroides followed by N. brasiliensis. Nocardia beijingensis is only a recently established species and was first isolated by Wang et al. from soil in a sewage ditch in Beijing, China in 2001 and only a very few infectious cases in humans have been reported worldwide since.

The clinical presentation of pulmonary nocardiosis can be acute, subacute, or chronic. Common cytological presentations are acute and chronic changes of granulomatous inflammation composed of neutrophils, histiocytes, lymphocytes, giant cells along with abundant necrosis and reactive (involved/surrounding) epithelium. Nocardia is difficult to recognise in cytologic preparations, as these organisms are very thin and delicate, take up only very faint Papanicolaou stain and may even be obscured by the accompanying inflammatory exudate. Modified Ziehl-Neelsen, silver methenamine and Gram stains can be used to detect these organisms on cytological samples such as sputum, bronchoalveolar lavage (BAL), Lung TBNB and histological samples.

The diagnosis of nocardiosis is only presumptive on cytology and should be confirmed on culture since different species have different antibiotic resistance profile which is critical for treatment of the infection. Molecular techniques, such as PCR, restriction enzyme analysis, and 16s rRNA gene sequencing, have abled more rapid and precise identification of specific Nocardia species.

Conclusion
The frequency of nocardiosis has been increasing steadily with rising incidences of transplantations, alcoholism, diabetes mellitus and use of immuno-suppressant therapy. Non specific symptoms and radiological features can make diagnosis difficult as it may mimic other infectious diseases like tuberculosis, actinomycosis, fungal infection, and malignancy. A high index of suspicion for nocardiosis must be maintained while assessing intense inflammatory cytologic material in immunosuppressed patients to allow a timely diagnosis and lead to appropriate treatment of the patients with nocardiosis.

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References