

# European Respiratory Society Annual Congress 2013

**Abstract Number:** 4988

**Publication Number:** P2713

**Abstract Group:** 10.1. Respiratory Infections

**Keyword 1:** Infections **Keyword 2:** Imaging **Keyword 3:** Pneumonia

**Title:** The "Tree in bud" pattern on chest CT: Radiologic and microbiologic correlation

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**Body:** Background: The tree-in-bud pattern is a well described radiologic image seen on high resolution chest CT reflecting bronchiolar mucoid impaction. However its microbiologic significance is yet to be formally elucidated. Methods: We performed a two arm study of all patients with the tree-in-bud pattern detected on chest CT in our institution over a period of five years. A computer search was performed on all chest CT reports during the study period to identify studies with the tree in bud pattern as evaluated by a senior radiologist. Microbiology samples were ascertained where available in order to assess the frequency of the various organisms isolated in the tree in bud population. The number of lobes with the tree in bud pattern was documented in each case as was the presence of relevant clinical co-morbidities such as underlying lung disease and immune-compromise. Results: During the above period, the tree-in-bud pattern was described in 326 patients undergoing chest CT. Of these, 220 (67.5%) patients had an infectious etiology, 34 (10.4%) had aspiration pneumonia, 13 (4%) had lung malignancy, 31 (9.5%) had other malignancies, 20 cases (6%) were inconclusive or incidental findings and 8 (2.5%) had other non-infectious inflammatory disorders. The relative incidence of the various organisms isolated on sputum culture reflected the overall incidence of these bacteria in the populations independent of the tree-in-bud pattern. Conclusion: The tree-in-bud pattern reflects endo-bronchial inflammation due mainly but not exclusively to an infectious cause. The microbiologic etiology in patients with this finding is similar to that of community acquired pneumonia.