

CD34 and Alpha-Smooth Muscle Actin Distinguish Cryptogenic Organizing Pneumonia from Secondary Bronchiolitis Obliterans-Organizing Pneumonia

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Abstract

Context: Secondary bronchiolitis obliterans-organizing pneumonia (BOOP) is a reaction to injury, forming granulation tissue within airspaces. Idiopathic cryptogenic organizing pneumonia (COP) and secondary BOOP are histologically similar. COP has been reported to show increased collagen in the granulation plugs and fewer myofibroblasts and capillaries. Using CD34 for capillaries and alpha-smooth muscle actin (α -SMA) for myofibroblasts, we assessed these stains to differentiate COP from secondary BOOP.

Design: We retrieved and reviewed 21 biopsies diagnosed as secondary BOOP to verify they met criteria for secondary BOOP. Next, they were stained for CD34 and α -SMA. Based on the intensity of staining, they were classified as either COP or secondary BOOP. Clinical data were reviewed for evidence of a specific condition to confirm a diagnosis of secondary BOOP. In the absence of such data, the case was clinically classified as COP.

Results: From the α -SMA and CD34 staining, 6/21 cases were diagnosed as COP. The clinical records revealed a cause in 1/6 cases. Thus, 5/6 cases were correctly classified as COP. We diagnosed 15/21 cases as secondary BOOP. A cause was determined in 9 cases (7 chemo-radiation, 1 local effects of cancer, 1 illicit drugs). No cause was found in 6 cases.

Conclusions: Fourteen of 21 cases were correctly classified histologically as COP or secondary BOOP. One case was inappropriately classified; the remaining 6 were classified as secondary BOOP without an apparent clinical etiology. The data suggest that CD34 and α -SMA are useful in distinguishing COP from secondary BOOP.

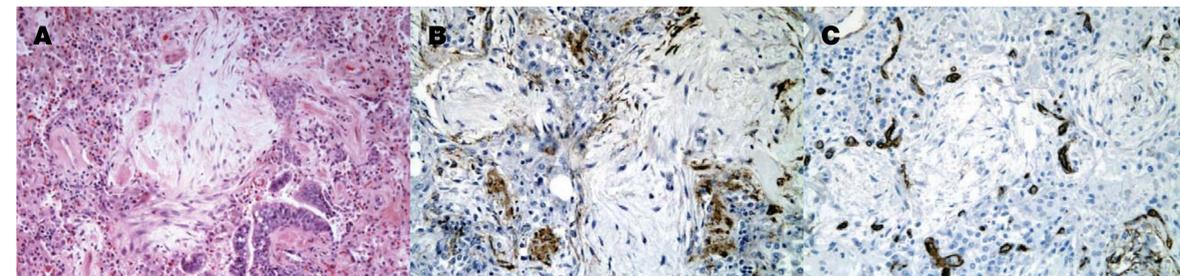


Figure 1. Cryptogenic organizing pneumonia. (A) Proliferation of plump fibroblasts embedded in an edematous stroma, forming intraluminal plugs in a bronchiole, H&E (20x). (B) Weak staining with α -SMA (20x). (C) Weak staining with CD34 (20x).

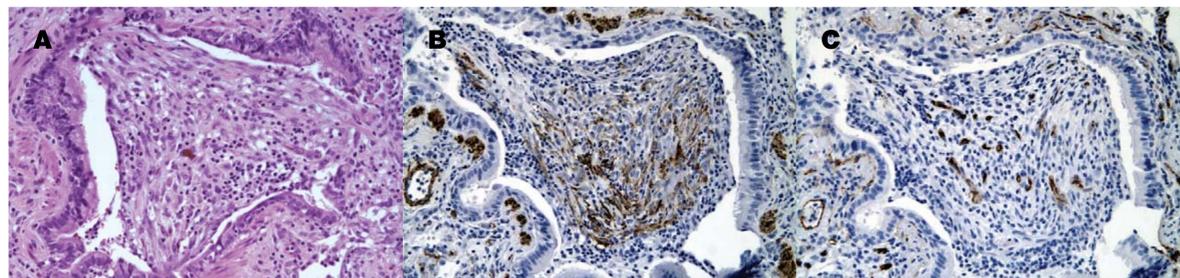


Figure 2. Secondary BOOP. (A) Proliferation of plump fibroblasts embedded in an edematous stroma, forming intraluminal plugs in a bronchiole, H&E (20x). (B) Strong staining with α -SMA (20x). (C) Strong staining with CD34 (20x).

Introduction:

Bronchiolitis Obliterans-Organizing Pneumonia (BOOP) is a distinct pattern of reaction of the lung to injury characterized by granulation tissue plugs within small airways, alveolar ducts, and alveoli. BOOP may be idiopathic, cryptogenic organizing pneumonia (COP), or secondary to a variety of injuries. Both COP and secondary BOOP are similar by light microscopy. Recently, COP as compared to secondary BOOP was shown to be characterized by increased collagen synthesis in the granulation plugs, lower myofibroblast proliferation, and reduced microvascularization.¹ By using CD34 for microvascular identification and α -SMA to identify myofibroblastic cells, we assessed the utility of staining results in differentiating COP and secondary BOOP.

Design:

All biopsies between 1995 and 2007 diagnosed as BOOP were retrieved from the archives of the Pathology Department of Thomas Jefferson University Hospital. The cases were reviewed to determine whether they met current criteria for this diagnosis. Twenty one cases were selected for study. The cases were stained for CD34 and α -SMA. Based on the intensity of the staining (weak vs. strong), the cases were classed as either idiopathic BOOP (COP) or secondary BOOP. The clinical records of these 21 patients were reviewed for evidence of the presence of a specific condition to which the BOOP could be attributed or related (secondary BOOP). In the absence of such data, the case was classed clinically as COP.

Results:

Based on the pattern of α -SMA and CD34 staining, 6 of the 21 cases were diagnosed as COP (idiopathic BOOP). Review of the clinical records revealed a cause for the pneumonitis (systemic lupus erythematosus) in only 1 of these 6 cases. Thus, 5 of the 6 cases were apparently correctly classed as COP. Fifteen of the 21 cases were diagnosed as secondary BOOP. A cause for the pneumonitis here was determined in nine: chemo-radiation:7; local effects of cancer:1; illicit drugs:1. No cause could be determined in 6 of the 15 cases.

Conclusion:

Our data suggest that CD34 and α -SMA immunohistochemical staining is a potential useful tool in distinguishing COP from secondary BOOP.

Reference:

1- Ranza ni OR, Parra ER, de Morais Fernezlian S, Capelozzi VL. Intraluminal plugs in idiopathic and secondary organizing pneumonia: repair or remodeling? *Histopathology* 2007;51:622-630.