

COMPARISON OF PROBE-BASED CONFOCAL LASER ENDOMICROSCOPIC IMAGES WITH LIGHT MICROSCOPY IN LUNG CANCER

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Introduction:

Light microscopic examination of *ex vivo* tissue is the gold standard for diagnosing lung cancer. This requires the removal of tissue and processing of specimens resulting in a time-delay between tissue acquisition and diagnosis. Probe-based confocal laser endomicroscopy (pCLE) is a novel technology that allows microscopic tissue examination *in vivo* during bronchoscopy. This FDA-approved technology has shown that different types of tissue can be demonstrated accounting for the spectrum of pulmonary diseases. Normal elastin/collagen airway and alveolar appearance with pCLE has been previously described in several reports. Although validated criteria for interpretation of pCLE images is forthcoming, little has been published comparing traditional light microscopy to pCLE images. The aim of this work is to describe the histologic findings with pCLE images in lung cancer.

Methods:

Following IRB approval, cases of lung cancer diagnosed from July 2012 to January 2013 obtained via bronchoscopy with pCLE images were identified. Diagnoses were made from sampling endobronchial or transbronchial lesions. In order to assure that images obtained by pCLE and samples were taken from the same area, electromagnetic navigation and fluoroscopy were employed for the transbronchial cases while direct visualization was used for the endobronchial cases. Tissue was then obtained and the pathology slides compared to the pCLE images retrospectively.

Results:

Twenty-five cases were identified that meet criteria (11 adenocarcinoma, 8 squamous cell carcinoma, 1 small cell carcinoma [SCLC] and 5 either poorly differentiated carcinomas or metastatic lesions). The case of SCLC was diagnosed via transbronchial needle aspiration into an extrinsically compressed airway with edematous bronchial mucosa. The other cases all showed varying degrees of disorganization and friability of the underlying elastin/collagen consistent with the destructive/desmoplastic reactions seen in malignancy. To summarize, a ragged appearance can be observed along with disorganization of the elastin/collagen network within the bronchus/alveoli where tumor is present. Disarray/friability increases with more poorly differentiated tumors. Areas with malignant cell groups appear as "black holes" giving the tissue a moth-eaten appearance. Tumors with lepidic pattern are suspected by pCLE when a "studded appearance" is noted.

Discussion:

These cases demonstrate that traditional histopathology does correlate with images obtained from pCLE during bronchoscopy. This suggests that pCLE appears to be a useful adjunct in guiding biopsies to increase yield. It also suggests that pCLE may be helpful in the future for *in vivo* diagnosis of lung cancer. Further study is needed to confirm these findings and correlate them with molecular changes.

