

## Pulmonary resections: cytostructural effects of different-wavelength lasers *versus* electrocautery

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### ABSTRACT

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**Aims and background.** There are few papers on the cytostructural effects of surgical instruments used during pulmonary resections. The aim of the present study was to evaluate the parenchymal damage caused by different surgical instruments: a new generation electrosurgical scalpel and two different-wavelength lasers.

**Methods.** Six surgical procedures of pulmonary resection for nodules were performed using a new generation electrosurgical scalpel, a 1318 nm neodymium (Nd:YAG) laser or a 2010 nm thulium laser (two procedures for each instrument). Specimens were analyzed using optical microscopy and scanning electronic microscopy.

**Results.** Severe cytostructural damage was found to be present in an average of 1.25 mm in depth from the cutting surface in the patients treated using electrosurgical cautery. The depth of this zone dropped to less than 1 mm in patients treated by laser, being as small as 0.2 mm using the laser with a 2010 nm-wavelength and 0.6 mm with the 1318 nm-wavelength laser.

**Discussion.** These preliminary findings support the use of laser to perform conservative pulmonary resections (i.e., metastasectomies), since it is more likely to avoid damage to surrounding structures. Controlled randomized trials are needed to support the clinical usefulness and feasibility of new types of lasers for pulmonary resections.

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**Key words:** devices, histology, lasers, lung, metastases/metastasectomy.

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