

1858P Intraoperative detection of resection margin by inhalation of ICG in lung cancer preclinical study

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Background: Identification of tumor margin during surgery is necessary for limited resection of non-small cell lung cancer (NSCLC). In this study, we developed a novel technique of lung cancer margin visualization by intraoperative inhalation of indocyanine green (ICG) and verified its clinical applicability using mouse and rabbit lung cancer model.

Methods: By observing the distribution of the inhaled ICG in each organ (lung, liver, brain, spleen, and kidneys) of mice at five different time intervals, we demonstrated that the inhaled ICG was delivered rapidly and was mainly distributed in the lung tissue. In the mouse model of lung cancer, we confirmed that the inhaled ICG entered the normal lung through phagocytosis by alveolar macrophages of normal lung tissue and rarely spread in lung cancer tissue because of mechanical airway obstruction by the tumor.

Results: Therefore, the fluorescent signal of inhaled ICG was mainly visualized in normal lung tissue but not in lung cancer tissue, which could assist in identifying the tumor margin. For clinical applicability, the inhaled dose of ICG was optimized in a rabbit lung cancer model. Compared to intravenous administration, this method accurately defined the tumor margin with 5.3-fold higher detection efficiency when 20 times lower dose of ICG was used. The ICG inhalation technique provided more clear visualization of tumor margin with lower dose and in shorter time during surgery compared to the conventional intravenous injection method.

Conclusions: The ICG inhalation technique provided more clear visualization of tumor margin with lower dose and in shorter time during surgery compared to the conventional intravenous injection method. Lung-specific delivery of the clinically approved ICG could be used effectively and safely in real clinical practice in the near future.

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