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Implementation status of indocyanine green fluorescence-guided laparoscopic liver resection: An international multicenter study in Asian countries

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Lecture :

Objectives:
In the last two decades, the understanding of clinical liver anatomy has been cultivated with the advancement of three-dimensional (3D) simulation software, the emergence of indocyanine green (ICG) fluorescence, and a high-quality magnified view of laparoscopic imaging. Consequently, more precise liver resections such as anatomic liver resections (AR) have been performed based on a liver inflow and outflow basis. In the Asia Pacific region, a parenchymal-preserving approach, such as AR less than sectionectomy has been a breakthrough treatment for a high population with liver impairment. ICG fluorescence is a promising intraoperative navigation in understanding the tumor location and anatomic borders of liver segments to achieve the concept. However, its optimal usage (dose and timing) and approach (positive and negative staining) has not been clarified yet. Our objectives are to review the implementation status of ICG fluorescence navigation and to compare both approaches (ie., positive and negative) in laparoscopic liver surgery (LLS) in Korea and Japan.

Methods:
The multicenter database was retrospectively collected and analyzed between January 2020 and December 2022. The subjects include patients who underwent laparoscopic anatomic resection using ICG fluorescence navigation for tumor detection or liver segmentation. The terminology for liver segmentation is according to the Tokyo 2020 terminology, which was the updated nomination of Brisbane terminology in 2000. The primary endpoint is to clarify the rate of ICG fluorescence-guided surgery in LLS, staining approaches, dose, and timing of administration. The secondary endpoints are to compare the staining achievement according to the subjective assessment of the questionnaire and the short-term perioperative outcomes between positive and negative staining.

Possible effects:
To understand the detailed implementation status in multiple countries, one can make an international consensus statement for using ICG staining in LLS as a navigation tool. As a consequence, one could lead to answer which is a better approach, positive or negative staining. In addition, the best approach can be also addressed in negative staining among intrafascial, extrafascial, and extrafascial and transfissural, according to Couinaud's description.

Prospect for spillover effects:
The proposed study aims to clarify an optimal approach for using ICG fluorescence-guided liver surgery in minimally invasive liver surgery. The proposed topic is the main interest in minimally invasive liver surgery in the Asia Pacific region. It may be a milestone for improving the practice of ICG fluorescence navigation in Asia and for opening the gate to western liver surgeries.