

1852P **Intraoperative fluorescent image-guided detection of esophageal cancer in rabbit and patient specimens**

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Background: This is the first study, to our knowledge, aimed at assessing the feasibility of intraoperative detection of esophageal cancer (EC) after intravenous indocyanine green (ICG) injections in rabbit and patient specimens using near-infrared (NIR) fluorescence imaging.

Methods: VX2 tumors were surgically implanted in the esophageal muscular layer of 45 rabbits 2 weeks before esophagectomy. They received 1, 2, or 5 mg/kg of intravenous ICG injections 3, 6, 12, 24, or 48 hours before surgery. Twenty-five consecutive patients (21 men; age, 63.9±8.59 years) who were scheduled to undergo esophagectomy for squamous cell EC were enrolled. Five patients received neoadjuvant concurrent chemoradiotherapy (CCRT) before surgery. All patients received 1 or 2 mg/kg of ICG intravenously 6, 12, or 24 hours before surgery. The fluorescence intensity was measured in all resected rabbit and patient specimens using an NIR fluorescence imaging system on a back table after surgery.

Results: EC was successfully detected in all rabbits; the mean tumor size was 0.86±0.21 (range, 0.5–1.3) cm. Fluorescence signals were detected in all animals. The tumor-to-normal fluorescence signal ratio (TNR) in rabbits was higher between 6 (6.89±0.35) and 12 (7.53±0.26) hours at 1 mg/kg ($p < 0.01$), between 12 (10.59±0.41) and 24 (12.06±0.57) hours at 2 mg/kg ($p < 0.01$), and between 24 (14.88±0.63) and 48 (13.73±0.19) hours at 5 mg/kg ($p < 0.01$) of ICG than at other times. Fluorescence signals were detected in all except 4 patients without residual tumors after preoperative CCRT. One false-positive case involved no residual tumor with inflammation (TNR, 13.64). The mean tumor size in 20 patients was 3.9±2.1 (1.1–10) cm. The TNR in the patients was higher between 6 (15.22±0.59) and 12 (17.01±0.18) hours at 1 mg/kg ($p < 0.01$) and between 12 (18.92±0.01) and 24 (19.81±0.73) hours at 2 mg/kg ($p < 0.01$) of ICG than at other times.

Conclusions: NIR fluorescence imaging revealed EC 6 to 24 hours after systemic ICG injections per their doses. However, passive ICG accumulation could not help discriminate tumors with inflammation; thus, tumor-targeted fluorescence should be developed to solve this problem in the future.

Clinical trial identification: This study was approved by the Institutional Review Board, Korea University Guro Hospital (2017GR0075).

Legal entity responsible for the study: Korea University.

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