ADVANCED IMAGING TECHNOLOGY FOR ASSESSING TISSUE OXYGEN SATURATION IN GASTRIC CONDUITS DURING THORACIC ESOPHAGECTOMY

Program # P606

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Introduction

Anastomotic leakage is a serious complication after thoracic esophagectomy. While indocyanine green (ICG) fluorescence imaging is commonly used to assess tissue perfusion, it has limitations, such as difficulty evaluating congestion, subjectivity in interpreting staining, and variability due to factors like ICG injection and camera distance. To overcome these, we explored tissue oxygen saturation (StO2) as a more objective method for assessing perfusion. StO2 is quantitative, reproducible, congestion-sensitive, and easy to perform. This study aimed to evaluate its effectiveness in assessing gastric conduit perfusion during thoracic esophagectomy.

Methods

This prospective study included 73 patients with thoracic esophageal cancer who underwent minimally invasive esophagectomy (MIE) with gastric conduit reconstruction between July 2022 and April 2024. The gastric conduit was anastomosed in the cervical region. Intraoperative StO2 and hemoglobin index (HbI) measurements were taken in real-time to assess conduit perfusion and were compared with the incidence of postoperative anastomotic leakage.

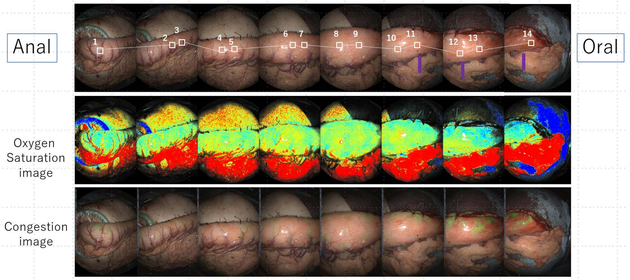
Results

Anastomotic leakage is a serious complication after thoracic esophagectomy. While indocyanine green (ICG) fluorescence imaging is commonly used to assess tissue perfusion, it has limitations, such as difficulty evaluating congestion, subjectivity in interpreting staining, and variability due to factors like ICG injection and camera distance. To overcome these, we explored tissue oxygen saturation (StO2) as a more objective method for assessing perfusion. StO2 is quantitative, reproducible, congestion-sensitive, and easy to perform. This study aimed to evaluate its effectiveness in assessing gastric conduit perfusion during thoracic esophagectomy.

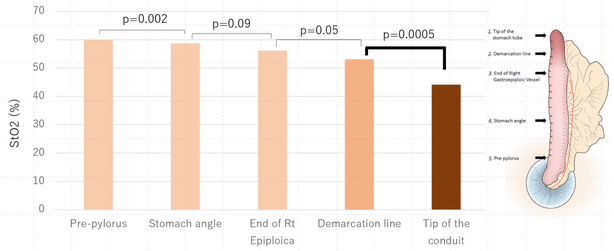
Conclusions

StO2 imaging effectively predicts anastomotic leakage risk and helps select the optimal anastomotic site in thoracic esophagectomy. This reliable, objective method overcomes ICG's limitations and can improve surgical outcomes in esophageal cancer treatment.

Oxygen saturation & congestion

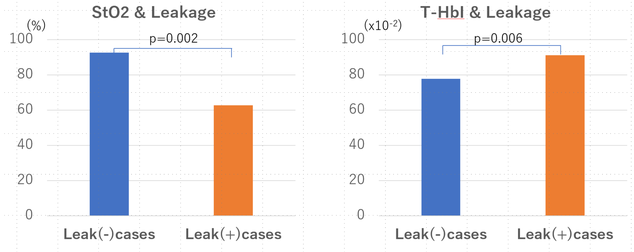


Mean StO2(%) values at each site of stomach tube

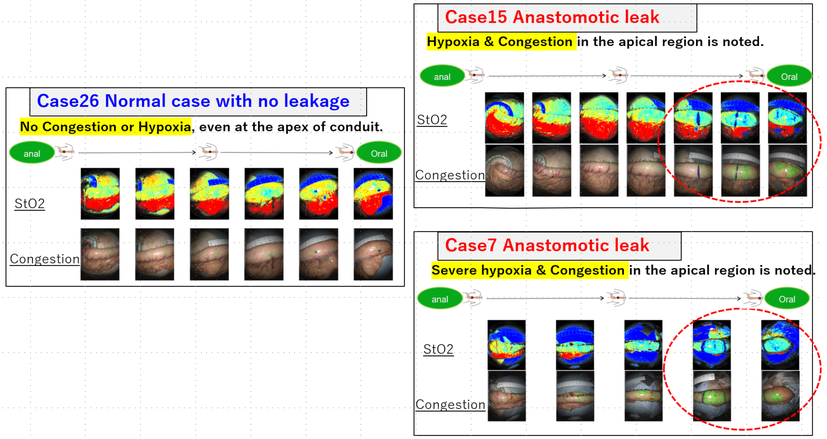


StO2 & T-Hb Index at the Anast Site

2022-24 NCCH-E (n=71)



Representative cases



Evaluation of this system ～Report from US Doctors～

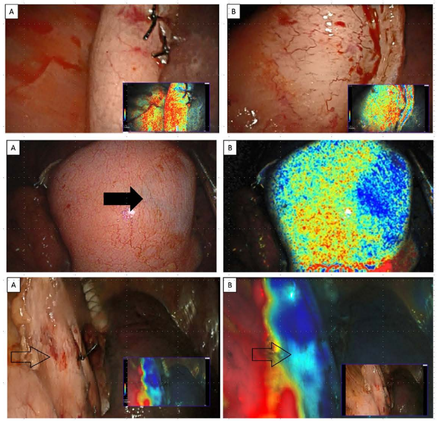
Innovative Technologies

Oxygen Saturation Endoscopic Imaging as a Novel Alternative to Assess Tissue Perfusion During Esophagectomy

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Conclusion

OXEI is a new non-pharmacologic technique for intra-operative perfusion imaging of gastrointestinal conduits, and is particularly advantageous when ICG is contra-indicated. Prospective studies are required to compare the efficacies of ICG and OXEI in analyzing tissue perfusion.

——SUMMARY——

✓ StO_2 imaging helps predict leakage and optimize anastomosis in esophagectomy.

✓ Enabling a more comprehensive assessment by evaluating congestion.

✓ It outperforms ICG, enhancing perfusion assessment and outcomes.

You can watch videos of this Procedure

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