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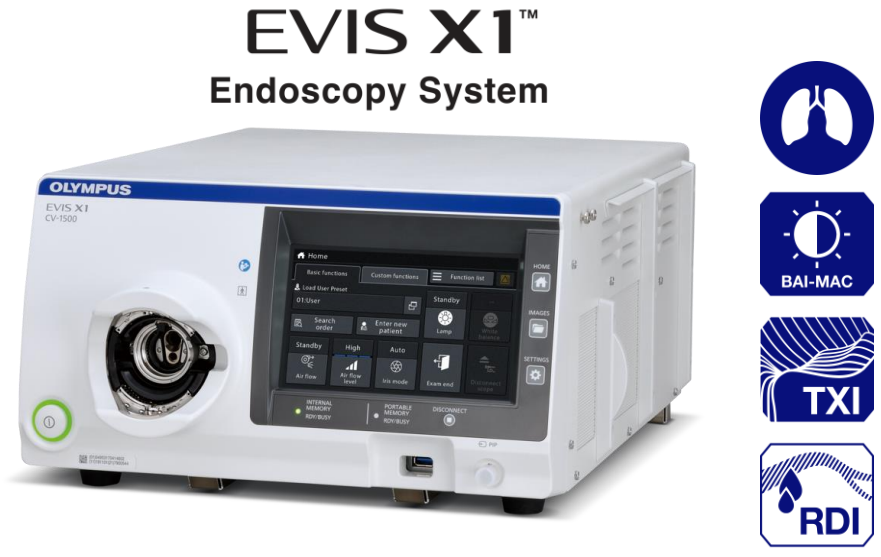
Morikawa K, Kida H, Handa H, Mineshita M. Thorac Cancer. 2025;16(7):e70065.



# Imaging Advances in Bronchoscopy Through the Combination of High-Definition Bronchoscopes and New Image Processing Systems

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*Thorac Cancer. 2025;16(7):e70065. doi:10.1111/1759-7714.70065*

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Kei Morikawa received research funding from Olympus Corporation. The remaining authors report no conflicts of interest.

# Study Design: Case-Based Technical Note

**Objective**

This case-based technical note aimed to compare the changes in lesion appearance across different imaging modes using case-based images, with white light observation serving as the standard.

## Patient Characteristics

- The study is a technical note based on a series of five representative cases and does not involve a cohort of patients with defined characteristics.

## Device

- CV-1500 (EVIS X1™ endoscopy system) with image enhancement endoscopy (IEE) including Brightness Adjustment Imaging with Maintenance Contrast (BAI-MAC™) technology, Texture and Color Enhancement Imaging (TXI™) technology, and Red Dichromatic Imaging (RDI™) technology
- BF-H1200 (diagnostic – Outer diameter 4.9 mm; 2.2 mm working channel)
- BF-1TH1200 (therapeutic – Outer diameter 5.8 mm; 3.0 mm working channel)

## Assessment

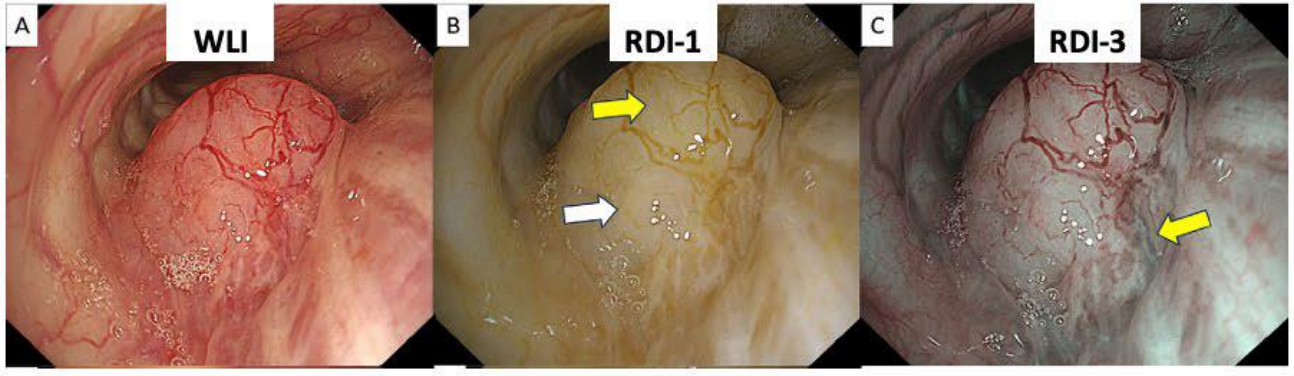
- The appearance of lesions and image quality with different imaging modes (RDI, TXI, BAI-MAC).

# Main Outcome: Red Dichromatic Imaging for Optimal Site Selection

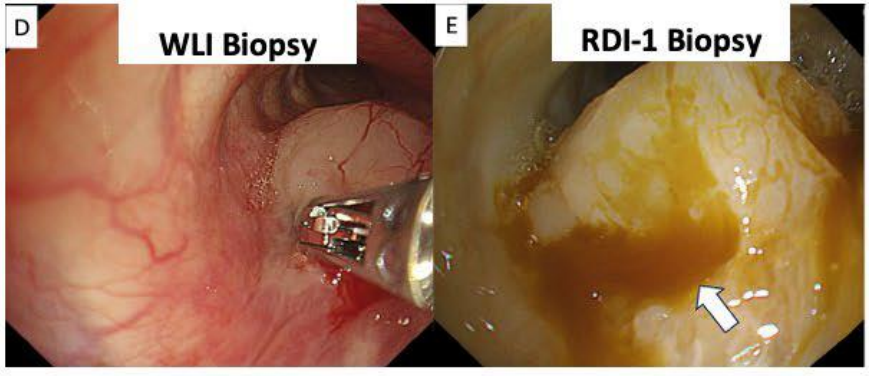
**Red Dichromatic Imaging (RDI™) technology aided the investigators in identifying local blood flow for optimal site selection, reducing bleeding risk.**

- RDI-1 identified superficial blood vessels associated with the lesion (B; yellow arrow)
- RDI-3 detected a deep vessel (C)
- This information guided site selection to a low-perfusion area (B; white arrow), and RDI-1 was then used to detect bleeding points (E)

## Site Selection with the Support of RDI




## Detection of Bleeding Points




**Disclaimer:** RDI technology is not intended to replace histopathological sampling as a means of diagnosis.

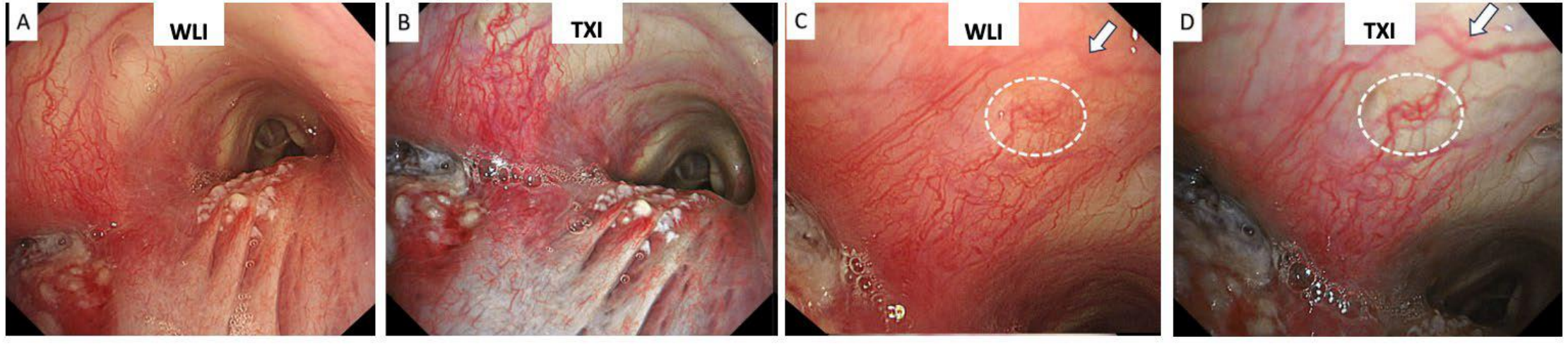
# Further Outcomes: Texture and Color Enhancement Imaging (TXI™) technology

**Texture and Color Enhancement Imaging (TXI) provided stronger image contrast, enabling the distinction of epithelial redness, edema, and skip lesions with local necrosis.**

- Improved the visibility of subepithelial blood vessels (A vs. B)
- Blood vessels were easily distinguishable and recognized more three-dimensionally (C vs. D)

**Tracheal Invasion of esophagus cancer**

**Close up images of the same case**

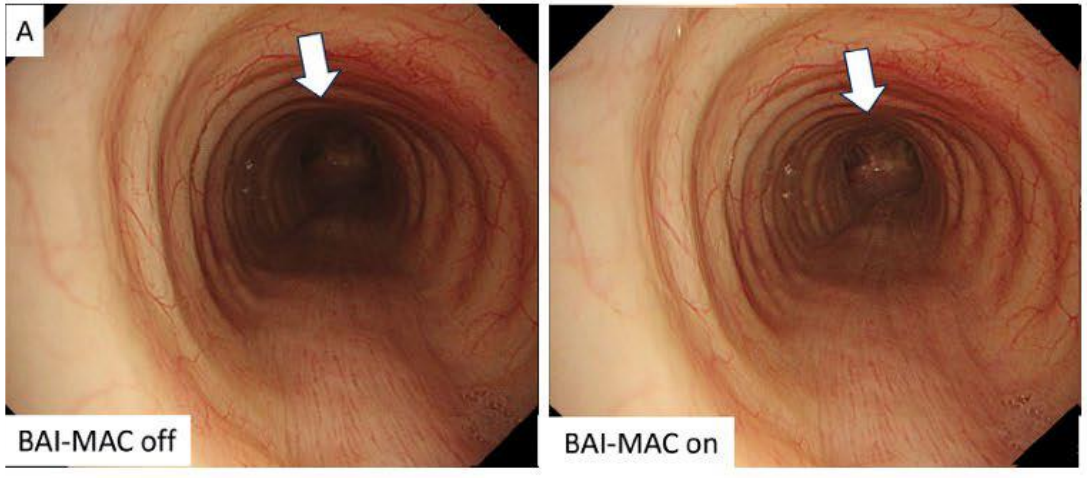


# Further Outcomes: Brightness Adjustment Imaging With Maintenance of Contrast (BAI-MAC™) technology

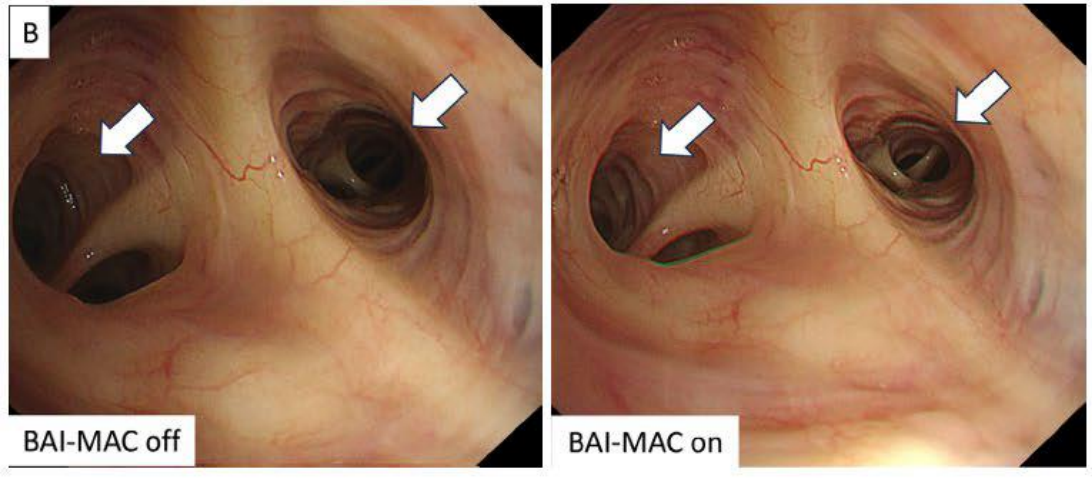
**Brightness Adjustment Imaging With Maintenance of Contrast (BAI-MAC) enhanced distal brightness while preserving proximal brightness and thereby supports navigation throughout the lung.**

- With the use of the BAI-MAC function, the tracheal carina is clearly visible from above the trachea (A).
- In peripheral bronchial branches, BAI-MAC aids in correctly accessing the next bronchus (B).

## BAI-MAC Function in the Trachea




## BAI-MAC Function in the Peripheral Bronchi




**Disclaimer:** BAI-MAC technology is not intended to replace histopathological sampling as a means of diagnosis.

# Safety Outcomes

**Safety of the CV-1500 and scopes was not assessed within the case series.**

# Study Conclusions

**High-definition bronchoscopes with advanced image processing allow for a more thorough and objective image evaluation that can enhance diagnostic accuracy, prevent complications, and reduce examination times.**

The integration of high-definition bronchoscopy with advanced image processing (RDI™, TXI™ and BAI-MAC™ technologies) shows potential for enhancing clinical knowledge and refining diagnostic strategies.

- The challenge of bronchoscopy for diagnosing malignant tumors is to sample viable cancer cells and avoid bleeding, a common side effect of bronchoscopy.
- RDI technology can assist in selecting optimal biopsy sites by identifying necrotic areas and regions with a high risk of bleeding, thus balancing the need to avoid bleeding while obtaining viable cancer cells.
- TXI technology provides a precise contrast on superficial blood vessels, even allowing the estimation of the depth of blood vessels.

# Strengths & Limitations as discussed by the authors

## Strengths

- Have not been discussed by the authors

## Limitations

- **Limited Case Studies:** The study is limited to five representative cases demonstrating the usefulness of high-definition image quality at a single institution.
- **Limited Number of Lesions:** The number of lesions observed under direct vision was limited, and imaging with various modes was not possible in all cases undergoing bronchoscopy due to bleeding and sedation effects.
- **Conflict of Interest:** There is potential bias from the endoscopic device development company, although they were not involved in the study design and interpretation.

# Definitions & Abbreviations

| | |
|---|---|
| **RDI™ technology** | Red Dichromatic Imaging |
| **TXI™ technology** | Texture and Color Enhancement Imaging |
| **BAI-MAC™ technology** | Brightness Adjustment Imaging With Maintenance of Contrast |
| **IEE** | Image Enhancement Endoscopy |

This Study Overview is intended for educational and informational purposes only. It provides an objective summary of data from a single publication. It does not constitute a comprehensive literature review and should not be interpreted as a substitute for evaluating the full body of evidence on the topic. For complete methodology, results, and context, please refer to the original publication.

**Link to Publication**

https://onlinelibrary.wiley.com/doi/10.1111/1759-7714.70065

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