Effects and challenges of an 8K Ultra-High-Definition Endoscopy for Laparoscopic Rectal Cancer Surgery

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Background

- Innovations in imaging technology have brought endoscopic surgery using 8K ultra-high-definition (UHD) images with four times the number of pixels of 4K, thereby contributing to further development of surgical procedures. .
- 8K clear images obtained without the scope being close to the subject makes it possible to secure the surgical space in narrow pelvic surgery.
- This study aimed to clarify effects and challenges of laparoscopic rectal cancer surgery with 8K UHD endoscopy.

Methods

- In this questionnaire survey, data were collected from surgical participants who newly used 8K UHD endoscopy in patients undergoing rectal cancer surgery from February 2020 to November 2020.
- Survey items are as follows.
  sense of presence, reality, depth perception, visibility of tissue, eyestrain, and degree of satisfaction for operators
  weight, operability, focus adjustment, physical fatigue, eyestrain, and degree of satisfaction for camera assistants.

8K UHD endoscopy system

- The endoscopy system used by each facility was an 8K/2D rigid endoscope manufactured by Air Water Inc. (Figure 1).
- A 70-inch large-screen monitor was used in the system (Figure 2).

Fig.1 8K/2D rigid endoscope



Fig.2 Laparoscopic surgery using the 8K UHD endoscopy system



Results

- Questionnaire responses from 44 participants assessing 8K UHD endoscopic surgery were collected from rectal cancer surgeries performed in 22 patients.

Table1 Surgical work experience of the participants

	Operators	Camera assistants
Well-experienced surgeon	20	4
Surgical resident	2	9
Intern	0	9

Fig.3 Existing laparoscopy systems

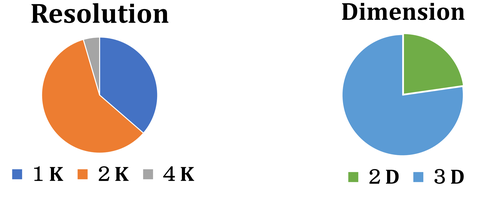
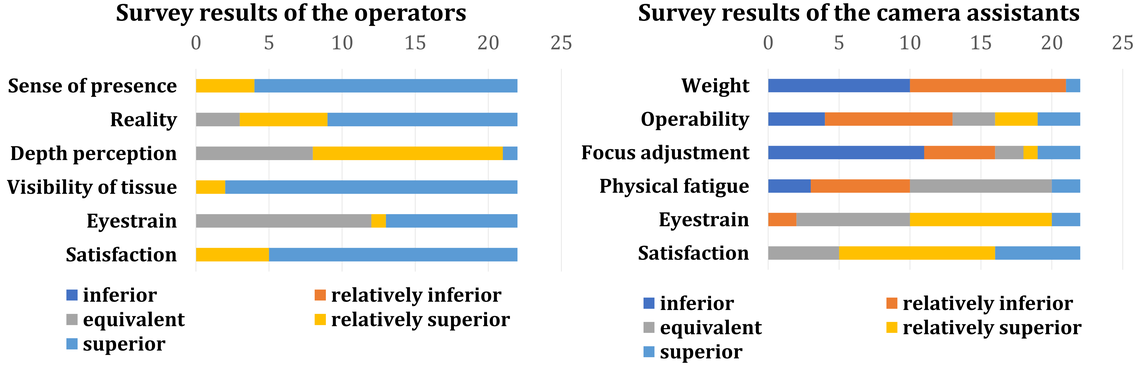


Fig.4 Survey results



Conclusions

- The high visual quality of the 8K UHD images and the understanding of fine anatomical structures could lead to precise surgical procedures and improve safety in rectal cancer surgery.
- The extra weight and difficulty of scope operation could increase the burden on camera assistants during long-term operations