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# The Evolution of the Conventional Endoscope in an Era of 3-Dimensional Technology

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See "Feasibility of Obtaining Quantitative 3-Dimensional Information Using Conventional Endoscope: A Pilot Study" by Jong Jin Hyun, Hoon Jai Chun, Bora Keum, et al., on page 182-188

As technology comes to grips with genuine 3-dimensional (3D) displays, these are beginning to make a mark in the market for medical devices. This pilot study by Hyun et al.<sup>1</sup> suggests that obtaining quantitative 3D information will be feasible with conventional gastrointestinal endoscopes. In practice, quantitative assessment is impossible since the conventional endoscope provides image but not quantitative data. The authors, however, attempted to calculate the height and width of the object and the distance between the endoscope and the object using the principle of triangulation based on two endoscopes fixed at a predetermined distance from each other experimentally. In the similar process, Hayashi et al.<sup>2</sup> measured airway calibre using a stereovision fiberoptic bronchoscope and compared it with that measured by high-resolution computed tomography-based virtual bronchoscopy.

I read this article with great interest but also with doubts concerning the practical value of 3D technology in endoscopic procedures such as endoscopic submucosal dissection (ESD) and natural orifice transluminal endoscopic surgery (NOTES). Although it seems to be a common sense that 3D imaging is likely to make endoscopic tasks easier, ESD is sufficient with conventional endoscope as mentioned in the article. Also, transgastric NOTES approaches have only been applied sparsely in patients due to concerns over secure endoluminal closure devices and infectious issues.<sup>3</sup> In addition, the benefits of 3D imaging still remain unsettled in laparoscopic surgery.<sup>4</sup> The experienced laparoscopic surgeons might have already

adapted to the lack of depth perception inherent in the 2-dimensional imaging systems.

In reality, the endoscopic performance takes place in a wide variety of situations with dynamic motion of differently shaped target lesions and endoscope. But this study was conducted in a controlled environment and was designed to perform in an inanimate model with the lens fixed at a distance. Furthermore, the inevitable increase of endoscopic diameter at distal end owing to two lenses and of the cost for a new technology should be considered.<sup>2</sup> Although there are some errors in measurement, this article is meaningful enough to attract the attention of endoscopists in a new era of 3D technology.

## Conflicts of Interest

The author has no financial conflicts of interest.

## REFERENCES

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