

**MODELING METHOD OF THE MALE URETHRA FROM
ENDOSCOPIC IMAGERY TOWARD THE LEAST INVASIVE
SURGERY FOR PATIENTS WITH VOIDING DYSFUNCTION**

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Introduction and Objectives: To date, resection of whole adenoma of the prostate is accepted as “platinum standard” surgery for the benign prostate hyperplasia (BPH). We have developed an algorithm to construct the three-dimensional (3D) intra-luminal model of the prostatic urethra from endoscopic imagery, Optical Virtual Endoscopy (OVE), in each patient with BPH to find critical lesion to be resected for designing least invasive surgery[1]. Though computed results showed compatibility with clinical symptoms[2], validity of the 3D model should be discussed further. Here, we tested the reproducibility and repeatability of the constructed 3D urethral model using different video files to confirm the robustness of the method.

Methods: The OVE was processed from video imagery of cystourethroscope pulled through the urethra at the constant axis and velocity. Luminance value of the pixels was used to calculate shape information. Thirty-nine video imagery of cystourethroscopy from 10 patients were processed to construct OVE. Every processed model had been compared in each patient in terms of the similarity of the shape and the anatomical feature.

Results: In six out of ten patients, reproducibility is confirmed through recognizing uniform anatomical features and land marks among OVE imageries processed from more than two different video files. On the contrary, reproducibility is deteriorated in four patients. The factors that obstructed the modeling quality were air bubbles, blood or hazing liquid, and shaking motion of the camera that blurred the image.

Conclusions: The reproducibility of the 3D urethral model processed from the video source is confirmed with cystourethroscopy operated in almost acceptable condition. The advanced robust algorithm covering the obstacles in the imagery should be established to make the method accepted widely.

[1] Ishii T, Zenbutsu S, Nakaguchi T, et al., J. Med. Imaging Health Inf., Vol.1, No.1,2011

[2] Sazuka T, Kambara Y, Ishii T, et al., J. Endourol, Apr., 2012, Epub ahead of print