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A novel ultrafine endoscope for noninvasive peritoneal examination to prevent EPS in patients undergoing peritoneal dialysis: EPS is preventable

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The most crucial complication of peritoneal dialysis (PD) remains to be encapsulating peritoneal sclerosis (EPS), which progressively develops around a degenerating peritoneal membrane (PM). Therefore, detection of the specific changes in the PM is crucial in order to prevent EPS. The presence of PM degeneration can be suggested by various examinations, such as surrogate markers in the PD fluid, high transport state of the PM on peritoneal equilibration test, ultrasound and computed tomography, histologic findings on PM biopsy, and laparoscopy. Among these, direct observation by laparoscopy can provide the most information on the PM state, such as changes in color, vascularity, presence of fibrin exudate, and, importantly, adhesion and formation of an encapsulating membrane, which are the signs of EPS. However, the available rigid laparoscopy necessitates general anesthesia and abdominal wall incision, and it is not adequate for regular PM monitoring of patients on PD. Therefore, a noninvasive method that allows regular monitoring of the PM changes is needed. We have developed a novel disposable ultrafine endoscope, specifically for use in patients undergoing PD. In the pre-clinical studies on pigs and in clinical trials on PD patients, no adverse events were observed while maneuvering this device. Compared with the currently available rigid laparoscopes, our device provided more detailed images, enabling easier observation of the morphology and status of the blood vessels on the peritoneal surface. The results of this study highlighted the potential of this tool for observing the extent of PM deterioration. This device may help detect EPS-related PM changes during the course of PD treatment and may have a major impact on PD practice.