

# Endoscopic procedures developed in Japan

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Endoscopic submucosal dissection (ESD) was developed as an endoscopic treatment technique for superficial gastrointestinal neoplasia in Japan. After submucosal injection and circumferential incision around the tumor, direct dissection of the submucosa underneath the lesion is performed in this procedure. ESD has the advantage over conventional endoscopic mucosal resection, enabling tumor removal in an *en bloc* manner and pathological review of the resected one. In this special issue, Gotoda, Sakamoto and Ishihara *et al.* have outlined the details of gastric, colorectal and esophageal ESD with special reference to Barrett's cancer, respectively (1-3). ESD requires endoscopic skill and sufficient experience in relation to substantial risks of such complications as bleeding and perforation. Thus, a standardized ESD training system has been established to disseminate safe and effective ESD technique globally, as proposed by Gotoda and Tsuji *et al.* from both the representative high-volume ESD centers in Japan (2,4). In the near future, we believe global dissemination of this procedure can be a great boon for much more patients suffering from gastrointestinal neoplasia.

Again, esophageal stricture following semicircular or complete circular esophageal ESD was not so uncommon. Largely extended esophageal ESD had required multiple balloon dilations compromising the patients' quality of life. More recently, innovative transplantation of autologous tissue-engineered epithelial cell sheets, which was developed by Okano and Yamato *et al.* in the representative advanced biomedical science institute, have shown promising results for resolving luminal stricture following esophageal ESD (5). As reviewed by Kanai *et al.*, the transplantable cell sheets are fabricated on temperature-responsive culture surfaces, which allow noninvasive harvesting of the cell sheets simply by reducing the temperature below 32 °C (5). Currently, we

have started to investigate safety and efficacy of endoscopic transplantation of oral mucosal epithelial cell sheets following transportation of 1,200 km between Tokyo and Nagasaki, almost nearly across Japan, in the clinical settings of large esophageal ESD. In cases of circumferential ESD, nevertheless, giving oral prednisolone can offer a unique treatment option for intractable post-procedural stricture of the esophagus. Shoji *et al.* have successfully applied the systemic and/or local steroid administration in the settings of extensive ESD for large gastric cardia or pylorus tumors, as presented in this issue (6).

Peroral endoscopic myotomy (POEM) became a treatment of choice for human achalasia which was developed by Inoue *et al.* With this innovative endoluminal technique, submucosal tunnel is created followed by endoscopic myotomy (7). Phalanusitthepha and Inoue *et al.* have provided a summary of current state-of-the-art of POEM with its future perspective (7). Otherwise, esophageal varices ligation and double balloon endoscopy (DBE), which were also developed in Japan, are reviewed by Ohmiya *et al.*, respectively. In particular, DBE is widely accepted as a safe and useful technology in resecting small bowel polyps without laparotomy (8).

Photodynamic therapy (PDT) is a treatment employing a photosensitizing drug followed by activation with a laser to induce a photochemical reaction leading to cancer cellular death and tumor tissue necrosis. While ESD is nowadays popular for endoscopic treatment against early esophageal cancer, PDT has been an alternative salvage treatment for local failure after chemoradiotherapy as outlined by Yano *et al.* (9). A new photosensitizing agent, talaporfin has been developed that requires a shorter sun shade period after administration, and studies are currently underway to establish indications of this next generation drug against recurrent or remnant bile duct or esophageal cancer. Topics

on the PDT application for these cancers are documented by Yano and Nanashima *et al.* for each (9,10).

Hopefully, readers shall enjoy this special issue on endoscopic therapy in the Japanese state and perspective.

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