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Ex-vivo porcine training model for colorectal and gastric endoscopic submucosal dissection – QEH experience
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Introduction
Endoscopic submucosal dissection (ESD) is a new endoscopic technique developed for en bloc resection of early gastrointestinal neoplasia. However, the procedure is technically demanding and adequate training is required before considering it a reliable treatment option.

Objectives
We aimed to introduce a simple, safe and inexpensive training model to enhance the technical proficiency of our therapeutic endoscopists.

Methodology
Since February 2012, an animal training model was introduced to our Kowloon Central Cluster (KCC). Porcine stomach and distal colon were used to set up a training model for ESD in our simulation center. A plastic box was constructed to contain the porcine intestine, and a side-hole was created for the insertion of an endoscope. A standard laparoscopic port (size 12mm) was utilized as an adaptor to minimize air leakage from intestinal insufflations during the procedure. The whole set up process required less than 30 minutes. Before dissection, gelofusine mixed with Indigocarmine solution were injected through a catheter into the submucosa. Flush knife and/ or grasping-type scissors forceps were used as the dissection devices. Mucosal incision and submucosal dissection could then be practiced using different instruments with the scope in straightened or retroflexed position. The presence of perforation could immediately be diagnosed by endoscopic imaging or through direction inspection inside the box.

Result
From 3 February 2012 to 28 August 2012, a total of 25 porcine model training sessions had been performed. These included 23 porcine colonic ESD and 2 porcine gastric ESD. The procedures were performed by endoscopists from both the medical and surgical department. The flush knife, grasping-type scissors forceps and laparoscopic port were recycled from prior human procedures. After the procedure, the whole set up was thoroughly cleansed and disinfected according to the infection

control protocol. The setup cost of the whole model was inexpensive when compared to live porcine model. Besides, it also saves unnecessary waste of animal lives for this purpose. From our experience, this simulation model provided an opportunity for the endoscopists to practice such meticulous dissection techniques before attempting the procedure in humans. However, such model also exhibits some differences to real-life human situation. Ex-vivo porcine gut was devoid of blood supply and hence, bleeding will not occur during the dissection process. Secondly, there is a lack of active peristalsis in the ex-vivo intestine. Nonetheless, this animal model is still considered an essential step prior to hands-on practice in humans. Conclusion The ex-vivo porcine model is an easy and inexpensive way to provide simulation training for both gastric and colorectal ESD. Endoscopists who are interested in this challenging procedure may now acquire the dissection technique through this method.