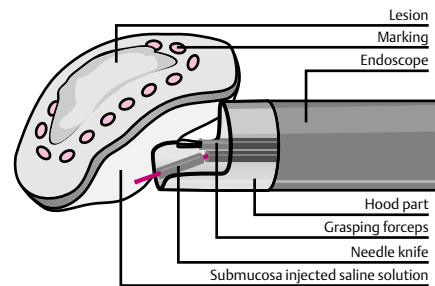


**Figure 1** The irrigation wiper-knife. **a** The irrigation tube (4) and needle-knife (1) were glued to the exterior surface over the hole, but only the needle-knife was intersected by and fixed with the handling wire (2). **b** The schematic representation shows more clearly how the needle-knife moves like a windshield wiper (double-headed red arrow).

Endoscopic submucosal dissection techniques require special skills and the procedure can be very prolonged [1,2]. In response to these drawbacks, we have designed a new dissection knife, the “wiper-knife”, which simplifies the procedure.

We recently developed a hood-knife that facilitates endoscopic submucosal dissection by sliding the hood-knife with coagulation current along the muscle layer [2]. However, we considered that it was essential to be able to perform endoscopic



**Figure 2** Schematic representation of the endoscopic submucosal dissection procedure using the wiper-knife.

submucosal dissection more mechanically. The wiper-knife was made by installing a needle-knife in exchange for the snare forceps we used in the hood-knife. The needle-knife was crossed by and fixed with a handling wire, which was inserted through tubes at either side of the hood.

The endoscopic submucosal dissection procedure using the wiper-knife is carried out as follows (Figure 2): a grasping forceps is passed through an accessory channel and used to push the lesion away from the muscle layer; submucosal exfoliation is then performed by moving the wiper-knife like a windshield wiper with coagulation current on the muscle layer to separate the submucosa from the muscle layer. We resected three specimens in animal models (pigs) using this wiper-knife. The average diameter of the resected specimens was 30 mm.

Endoscopic submucosal dissection can be safely and easily carried out under direct vision using this method. Another advantage of the wiper-knife is that endoscopic submucosal dissection and endoscopic hemostasis can be carried out while simultaneously applying adequate irrigation [2–6].

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