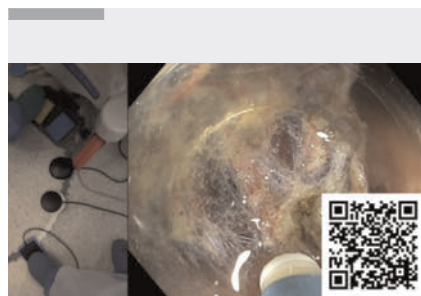
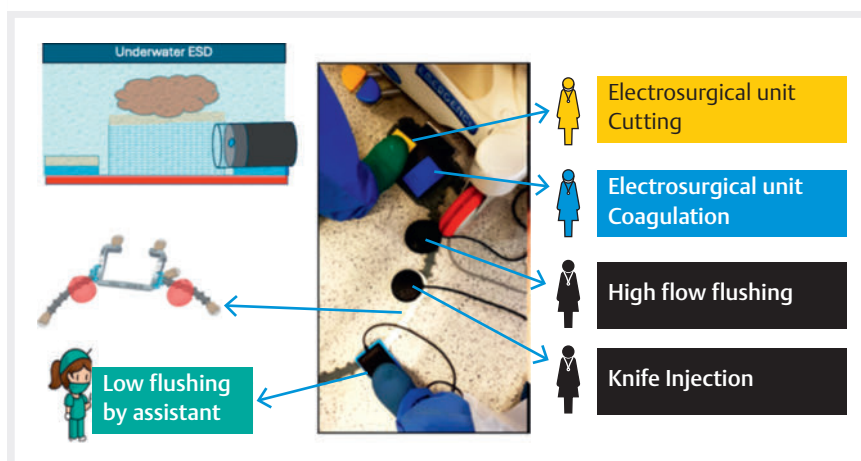


Combination of a permanent slow flow managed by the nurse and a rapid flow for bleeding management controlled by the doctor in underwater endoscopic submucosal dissection

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► **Video 1** Underwater endoscopic submucosal dissection is performed with double control using alternating low and high flow flushing controlled by the nurse and the physician, respectively.

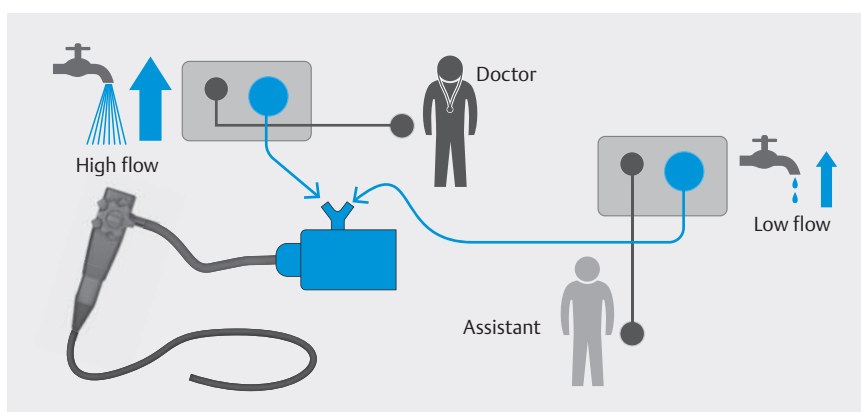


► **Fig. 1** Schematic representation of the different foot pedals controlled by the IPEFIX, with pedals for both the nurse and the physician.

Endoscopic submucosal dissection (ESD) is enjoying enormous growth, driven largely by all the technical innovations aimed at making it easier, safer, and faster [1]. Among the various means of facilitating submucosal exposure, floating the lesion to be resected in underwater dissection has become a precious technical aid in difficult cases, particularly when gravity is unfavorable for the situation [2, 3].

Underwater dissection does however pose a real technical problem when it comes to managing hemorrhage. A permanent low flow is necessary to maintain the floating effect of the lesion and to remove any dirt that gets into the cutting line, but this flow is not sufficient in the event of bleeding. Changing the flow rate during the procedure is not easy and generates stress when the bleeding is significant and the underwater field of vision turns red from the mixture of blood and water.

Our team of nurses came up with the idea of connecting two peristaltic pumps to the accessory channel of the endoscope via a T-fitting with two different foot pedals (► **Fig. 1** and ► **Fig. 2**; ► **Video 1**): a low flow one that is used by the assistant to



► **Fig. 2** Schematic showing how the two pumps are connected.

maintain a permanent low flow during dissection, and a maximum flow pedal that is put at the foot of the doctor as usual, for a higher flow in the event of bleeding, so that the area can be actively washed. In order to manage so many pedals without moving them and tangling up the wires, the IPEFIX device (Lyon, France) [4] helps us keep our workspace free of clutter.

Underwater ESD is an effective technique to deal with difficult procedures, and this technical trick helps greatly by offering

the benefits of both low flow and high flow flushing in parallel, when it is necessary to deal with bleeding.

Endoscopy_UCTN_Code_TTT_1AQ_2AD_3AD

Conflict of Interest

Mathieu Pioche is co-funder of ATRACT device, and also consultant for Olympus, Pentax, Erbe, Boston for training in ESD. Other authors have nothing to disclose

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DOI 10.1055/a-2318-5558

ISSN 0013-726X

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