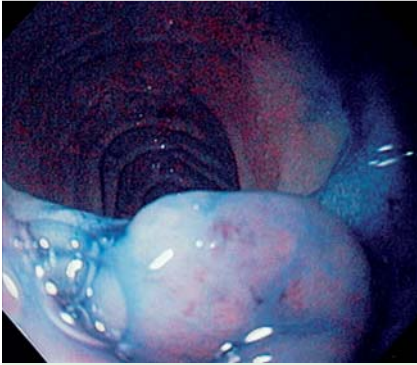
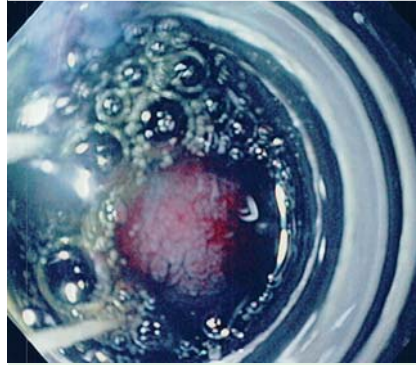


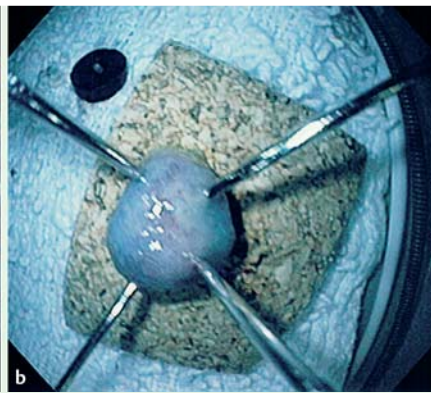
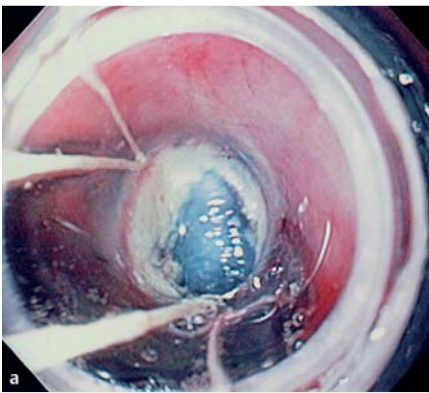
## Resection of carcinoids in the duodenal bulb using the band ligation technique with the Duette mucosectomy device



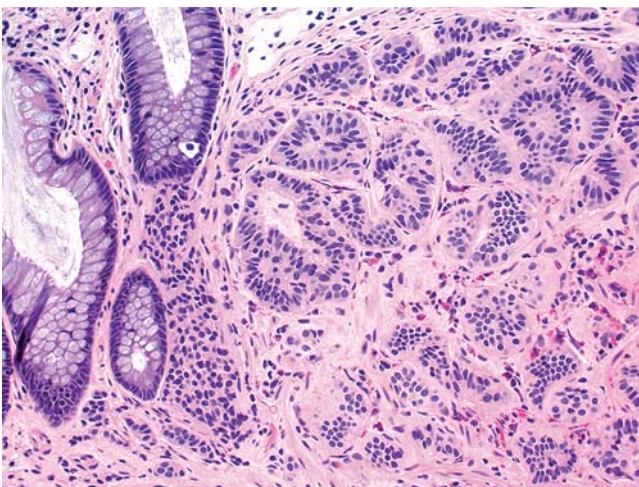
**Fig. 1** Indigo-carminium-guided chromoendoscopy in a 53-year-old-woman with duodenal carcinoids showing a smooth, round, superficial subepithelial mass with some central dimpling.



**Fig. 2** The subepithelial mass was sucked into the clear distal cap, and two rubber bands were deployed to create a pseudopolyp for subsequent resection.



**Fig. 3** **a** Band mucosectomy showing a clear mucosectomy side without any residual neoplastic tissue. **b** The resected specimen pinned on cork.



**Fig. 4** Histological section showing a typical carcinoid tumor.

Carcinoids are the most frequently occurring neuroendocrine tumors of the gastrointestinal tract, and they are usually located in areas that are difficult to access and treat using conventional endoscopic devices (e.g., small bowel and appendix) [1]. When presence of localized disease is confirmed with endoscopic ultrasonography, local treatment by endoscopic resection is an accepted treatment option [2, 3]. Although the freehand snare technique has been most frequently used to resect duodenal carcinoids, the results are often suboptimal [3]. Therefore, complete endoscopic resection using endoscopic submucosal dissection (ESD) and endoscopic mucosal resection (EMR) techniques has been advocated [4]. ESD has the appeal of potential en bloc R0 resection, however, it is associated with a high risk of perforation in the duodenum, of up to 20% [3]. Other resection techniques include the freehand EMR resection after prior submucosal injection and the cap-assisted suck and cut technique; these resection techniques may not be appropriate to resect encapsulated submucosal tumors such as carcinoids [3]. Here we present the use of the band and resect EMR technique for a duodenal carcinoid.

A 53-year-old-woman was found to have duodenal carcinoids during an esophago-gastroduodenoscopy (EGD) for dyspepsia. EGD showed two 10-mm submucosal lesions in the duodenal bulb located at the 12 o'clock and 3 o'clock positions (▶ **Fig. 1**). Endoscopic ultrasonography revealed well-circumscribed, hypoechoic lesions with regular margins, arising from the mucosa and with no involvement of the muscularis propria, measuring 12×9 mm and 8×7 mm, respectively. For resection, a gentle submucosal cushion was first created using 2 mL of saline-Indigo carmine-epinephrine 1 : 10 000 solution. Next, the lesion was targeted with the distal cap and mild suction applied until half of the mucosal cap was filled with tissue. Two bands were released (▶ **Fig. 2**) to avoid slippage of the tumor. Subsequently, the 5-Fr hexagonal snare was advanced to grasp it above the first rubber band. Standard snare polypectomy was carried out using Endocut (Erbe Vio, 60W). The resection margins were clear of residual neoplastic tissue and the carcinoid was mounted on a cork and sent for pathological examination (▶ **Fig. 3**). The final histopathological analysis revealed a classic carcinoid (▶ **Fig. 4**).

This case is of interest for several reasons. It is the first description of EMR of duodenal carcinoids using the multi-band mucosectomy device. We have shown that slight modification with limited suction to draw the tumor into the cap is sufficient, and deployment of two bands prevents slippage of the firm mass. The technique is safe and achieves R0 resection of encapsulated tumors located at endoscopically difficult to access areas such as the duodenal bulb. The use of interventional chromoendoscopy was helpful in determining a safe and complete resection. In addition, we provide a detailed description of the technical procedure, which may assist further use of the technique. Finally, our report adds to the growing literature on the use of advanced endoscopic resection methods for small-bowel polypectomy. In conclusion, our case highlights that in appropriately selected patients, endoscopic resection of carcinoid tumors with band mucosectomy is safe and effective, and permits complete resection with no complications.

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**Competing interests:** None

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