



BRIEF REPORT

## Knife-assisted resection (KAR) for small rectal neuroendocrine neoplasia

Andrea Lisotti<sup>1,2,\*</sup>, Sinan Sadalla<sup>1,2</sup>, Anna Cominardi<sup>1,2</sup>, Nicole Brighi<sup>3,4</sup> and Pietro Fusaroli<sup>1,2</sup>

<sup>1</sup>Gastroenterology Unit, Hospital of Imola, Imola, Italy; <sup>2</sup>Department of Medical and Surgical Sciences, University of Bologna, Bologna, Italy; <sup>3</sup>Department of Medical Oncology, Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori (IRST) IRCCS, Meldola, Italy; <sup>4</sup>NET Team Bologna ENETS Center of Excellence, S. Orsola-Malpighi University Hospital, University of Bologna, Bologna, Italy

\*Corresponding author. Unità Operativa Complessa di Gastroenterologia Ospedale di Imola, via Montericco 9, 40026 Imola, Bologna, Italy.  
Tel: +39-0542-662407; Email: lisotti.andrea@gmail.com

Rectal neuroendocrine neoplasia (rNEN) are usually small (<10 mm), well-differentiated (G1/2) lesions arising from the interface between mucosal and submucosal layers; therefore, polypectomy and standard endoscopic mucosal resection (EMR) techniques are usually not curative due to the presence of neoplastic cells on the resection margin, leading to possible tumor recurrence [1].

Ligation-assisted EMR and endoscopic submucosal dissection (ESD) have been proposed as treatment of choice in case of lesions <10 mm without *muscularis propria* involvement [1–3]. However, in real practice, most of these lesions undergo standard EMR and are then referred to tertiary centers in case of incomplete resections [2, 3]. Pagano *et al.* [4] recently demonstrated that, in those cases, ESD was indicated for lesions >3 mm because of the risk of residual neoplasia.

We report two cases of small (<5 mm) rNEN treated at the time of index colonoscopy with knife-assisted resection (KAR). KAR was initially described and proposed for *en bloc* resection of colorectal lesions, with incomplete elevation after submucosal injection, due to significant fibrosis [5]. The procedure started with a submucosal injection of methylene blue; then, a circumferential incision with the tip of a standard polypectomy snare (10-mm polypectomy snare, MedItalia, Palermo, Italy) was performed (Endocut Q, effect 3, VIO300D, ERBE, USA); finally, the polypectomy snare was then placed into the submucosal groove to complete the resection (Figure 1 and Supplementary Video 1).

*En bloc* resection was achieved in both cases in <5 minutes with no adverse events. The procedures were completed with the same equipment used in a standard EMR, with no need for dedicated devices. Pathological specimens showed the presence of well-differentiated G1 rNEN with negative lateral and deep resection margins (R0).

In our opinion, KAR might be considered the best treatment strategy for achieving an R0 resection of small rNEN at the time of index colonoscopy; compared to other advanced resection techniques (ESD or ligation-assisted EMR), KAR seems quicker (<5 minutes) and cheaper, without any increased risk of complications. Large comparative studies are needed to confirm this hypothesis.

### Supplementary data

Supplementary data is available at *Gastroenterology Report* online.

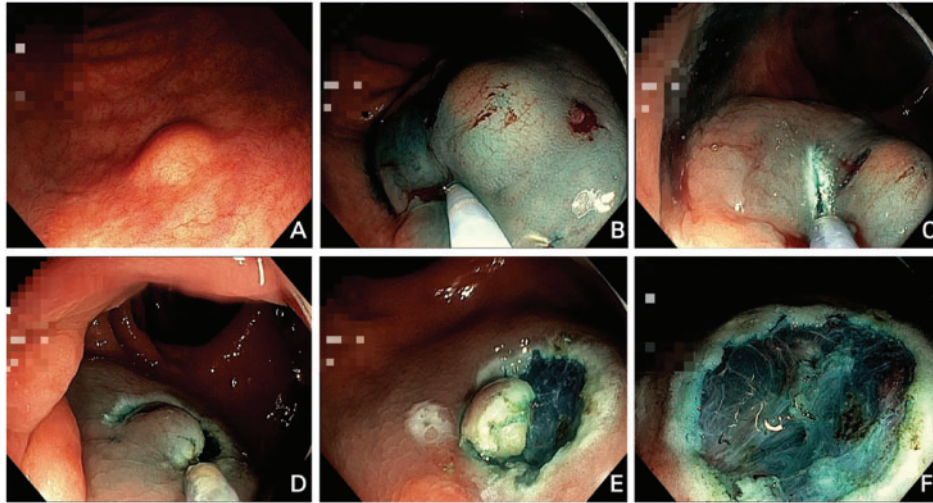
### Authors' contributions

A.L. performed the procedures; A.L., S.S. and N.B. drafted the manuscript. A.C. and P.F. prepared the figures and video, and edited the manuscript. All authors reviewed and approved the final version.

Submitted: 12 January 2020; Revised: 21 January 2020; Accepted: 24 March 2020

© The Author(s) 2020. Published by Oxford University Press and Sixth Affiliated Hospital of Sun Yat-sen University

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact [journals.permissions@oup.com](mailto:journals.permissions@oup.com)



**Figure 1.** Knife-assisted resection (KAR) for a small neuroendocrine tumor located in lower rectum. (A) A yellowish <10-mm sub-epithelial lesion was found in lower rectum. (B) After placement of a transparent distal attachment, submucosal injection with methylene blue solution was performed in order to create a fluid cushion between the mucosa and the *muscularis propria*. (C) The tip of the snare was used to make the first incision in EndoCut Q mode. (D) Circumferential incision with the tip of the snare was performed. (E) After a circumferential incision was completed, the tip of the snare was used to create a 1- to 2-mm submucosal groove. (F) After snare resection, a clear mucosal defect was observed.

### Conflicts of interest

None declared.

### References

1. Ramage JK, De Herder WW, Delle Fave G, et al. ENETS consensus guidelines update for colorectal neuroendocrine neoplasms. *Neuroendocrinology* 2016;**103**:139–43.
2. Lee DS, Jeon SW, Park SY et al. The feasibility of endoscopic submucosal dissection for rectal carcinoid tumors: comparison with endoscopic mucosal resection. *Endoscopy* 2010;**42**:647–51.
3. Yoshii S, Hayashi Y, Matsui T et al. 'Underwater' endoscopic submucosal dissection: a novel technique for complete resection of a rectal neuroendocrine tumor. *Endoscopy* 2016;**48**:E67–8.
4. Pagano N, Ricci C, Brighi N et al. Incidental diagnosis of very small rectal neuroendocrine neoplasms: when should endoscopic submucosal dissection be performed? A single ENETS centre experience. *Endocrine* 2019;**65**:207–12.
5. Chedgy FJ, Bhattacharyya R, Kandiah K et al. Knife-assisted snare resection: a novel technique for resection of scarred polyps in the colon. *Endoscopy* 2016;**48**:277–80.