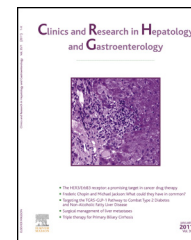




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ORIGINAL ARTICLE

Comparison of endoscopic therapies for rectal carcinoid tumors: Endoscopic mucosal resection with circumferential incision versus endoscopic submucosal dissection

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KEYWORDS

Carcinoid tumor;
Endoscopic resection;
Endoscopic mucosal resection;
Endoscopic submucosal dissection;
Rectum

Summary

Background and objective: Although various endoscopic resection techniques have been established for rectal carcinoid tumors, there remains controversy regarding the best endoscopic treatment modality for these tumors. This study aimed to evaluate and compare the therapeutic efficacy and safety of EMR with circumferential incision (EMR-CI) and endoscopic submucosal dissection (ESD) for endoscopic resection of rectal carcinoid tumors.

Methods: From March 2012 to June 2016, 66 rectal carcinoid tumors in 66 patients were resected by using EMR-CI ($n=30$) or ESD ($n=36$). The rates of both en bloc resection and complete resection, procedure time, procedure-related complications, and local or metastatic recurrence were analyzed retrospectively.

Results: The en bloc resection rate was 96.7% (29/30) and 100% (36/36) for EMR-CI and ESD groups, respectively, and the difference was not statistically significant ($P=0.455$). The complete resection rate of the ESD group was 97.2% (35/36) and significantly higher than 76.7% (23/30) of the EMR-CI group ($P=0.030$). The mean procedure time of the ESD group was 20.44 ± 6.64 minutes, which was significantly longer than that of the EMR-CI group at 8.47 ± 3.40 minutes ($P<0.001$). The complication rates for ESD and EMR-CI did not differ significantly (0% for EMR-CI vs. 2.8% for ESD, $P=1.000$). No local or metastatic recurrence was found in either group during the follow-up period.

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Conclusion: This study suggested that ESD may be a safe, effective, and feasible endoscopic technique for removing rectal carcinoid tumors. ESD showed a similar safety profile and superior efficacy to EMR-CI.

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Introduction

Rectal carcinoid tumors are slowly progressing, biologically well-differentiated neoplasms that originate from neuroendocrine cells [1]. These tumors are relatively uncommon, accounting for about 12.6% of all neuroendocrine tumors and only 1.3% of all rectal neoplasms [2,3]. The diagnostic rate of rectal carcinoid tumors has steadily and remarkably increased worldwide in recent years, most likely due to the more widespread performance of screening endoscopy [4–6]. Carcinoid tumors of the rectum are rarely symptomatic, and they are usually detected incidentally during colonoscopic examinations as small, localized, sessile and yellowish submucosal tumors [7]. Small lesions (< 10–20 mm) confined to the mucosa or submucosa have a low probability of metastasis, making them good candidates for local excision, such as local endoscopic resection [8,9]. Compared with surgical resection, this less invasive treatment strategy can more effectively improve quality of life for the patients.

A variety of endoscopic resection techniques have been established for rectal carcinoid tumors in clinical practice. As a widely practiced endoscopic procedure, conventional endoscopic mucosal resection (EMR) is relatively safe and simple. However, en bloc and complete resection are not always easy to achieve with this technique because the majority of these tumors infiltrate the submucosal layer, decreasing the accuracy of histopathological evaluation and resulting in the need for additional treatment to remove the residual tumor [10]. This shortcoming has led to the development of new therapeutic methods. These methods include endoscopic submucosal dissection (ESD), modified EMR techniques, such as cap-assisted EMR, EMR with circumferential incision (EMR-CI) and endoscopic submucosal resection with a ligation device (ESMR-L) [11–15]. ESD has several advantages over conventional EMR, including higher success rates of complete resection, more precise histopathological diagnosis and negligible local recurrence. However, ESD is not yet extensively used for resection of rectal carcinoid tumors because of its technical difficulties, higher frequency of adverse events, such as perforation or bleeding and longer resection time than conventional EMR [16]. Among modified EMR techniques, EMR-CI is a merged ESD and EMR endoscopic therapeutic technique, which involves circumferential mucosal and submucosal incision around the target lesion similar to ESD and then snaring resection as for EMR. A recent study suggested that compared with conventional EMR, EMR-CI might achieve better clinical outcomes for the removal of rectal carcinoid tumors [17]. However, comparative studies on treatment outcomes of EMR-CI and ESD for such tumors are few [13]. There remains controversy about which type of endoscopic treatment modality is preferable. Therefore, in this study, we reported our experiences of using EMR-CI and ESD techniques to resect rectal carcinoid

tumors. This retrospective study aimed to evaluate and compare the therapeutic efficacy and safety of EMR-CI and ESD for resection of rectal carcinoid tumors.

Methods

Patients and tumors

From March 2012 to June 2016, a total of 66 rectal carcinoid tumors in 66 patients were resected by using EMR-CI or ESD technique at the first affiliated hospital, Xiamen University, Fujian, China. The Institutional Review Board at our hospital approved the study. Medical records from these 66 cases were retrospectively reviewed for clinical information with regard to the characteristics of the patients and tumors, endoscopic procedure, procedure-related complications, and follow-up data. All patients were informed of the benefits and risks of the endoscopic intervention. Written informed consent to perform EMR-CI or ESD was obtained from all enrolled patients. The decision to perform EMR-CI or ESD was made at the discretion and preference of the attending endoscopist for rectal carcinoid tumors < 20 mm. Endoscopic ultrasonography (EUS) was carried out on all cases to measure the tumor size and to evaluate the depth of invasion before endoscopic treatment. No tumor involvement to the muscularis propria layer was found on EUS before EMR-CI or ESD. There was no evidence of lymph node or other organ metastasis visible by abdominopelvic computed tomography (CT) scan.

Endoscopic resection procedures

All endoscopic procedures were carried out by three expert endoscopists (M. Liu, J. Chen, and H. Su) with extensive experience in > 3000 colorectal EMR cases and > 100 GI tract ESD cases. The devices used were an electronic endoscope with water jet functions (GIF-Q260J, PCF-Q260JI, or CF-HQ290I; Olympus, Tokyo, Japan), and an electrosurgical current generator (VIO 300D; ERBE Elektro-medizin GmbH, Tübingen, Germany). A transparent plastic cap (D-201-11804, or D-201-14304; Olympus) was fitted onto the endoscope tip. The electric modes were set at endocut Q mode (effect 3, duration 3, interval 3) and a forced coagulation mode (effect 2, 40 W).

The ESD procedure was performed as follows (Fig. 1). First, normal saline solution containing epinephrine (0.005 mg/mL) and a small amount of indigo carmine was injected into the submucosa around the lesion in order to lift it away from the muscularis propria and thereby reduce the potential risk of perforation. Then, a circumferential incision was made at least 3 mm away from the tumor periphery using an endoknife (dual knife, KD-650Q; or hook knife, KD-620LR; Olympus) to secure a sufficient

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