Safety and efficacy of cap-assisted EMR for sporadic nonampullary duodenal adenomas

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Background and Aims: Eradication of sporadic nonampullary duodenal adenomas (SNADAs) is essential because of their high rate of malignant transformation. EMR techniques are the alternative to the traditional surgical treatments of SNADAs. There are very limited data on the safety and efficacy of cap-assisted EMR (C-EMR) in the treatment of SNADA.

Methods: The medical records of patients who underwent C-EMR for SNADAs between July 2002 and April 2013 were retrospectively reviewed. Eradication was defined as no residual adenoma on follow-up or en bloc resection on pathology. Recurrence was defined as finding adenoma after a negative follow-up.

Results: Fifty-nine C-EMR sessions were performed on 49 SNADAs (flat, 46; sessile, 3); 39 polyps were treated in piecemeal fashion and 10 polyps with en bloc resection. The polyp histology was tubular adenoma (63.3%) and tubulovillous adenoma (36.7%), with 16.3% of lesions showing high-grade dysplasia. Initial eradication rate was 90.5%; residual adenomas were successfully treated with repeat C-EMR/snare, resulting in 100% ultimate eradication rate without any recurrences (median follow-up of 17 months). The overall adverse events rate was 16.9%: intraprocedural bleeding (10.2%), delayed GI bleeding (5.1%), and perforation (1.7%). Among large polyps (≥15 mm), the initial and ultimate eradication rates were 87.9% and 100%, respectively, and the adverse event rate was 17%. Initial eradication rate for small polyps was higher than in large polyps (100% vs 87.9%, respectively; $P = .02$).

Conclusion: C-EMR is a highly efficient and safe method for the treatment of SNADAs. We recommend that endoscopists should learn C-EMR on esophageal, gastric, rectal, or left-sided colonic lesions before attempting C-EMR in the duodenum. (Gastrointest Endosc 2017;86:666-72.)

Abbreviations: APC, argon plasma coagulation; C-EMR, cap-assisted EMR; SNADA, sporadic nonampullary duodenal adenoma.

DISCLOSURE: *All authors disclosed no financial relationships relevant to this publication.*

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0016-5107/$36.00
http://dx.doi.org/10.1016/j.gie.2017.02.023

Received October 26, 2016. Accepted February 16, 2017.

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Sporadic nonampullary duodenal adenoma (SNADA) is a rare entity, reported in .1% to .4% of patients who underwent an EGD, with most lesions found in the second portion of the duodenum.[1,2] In contrast to adenomatous lesions of the colon, duodenal adenomas have a high reported rate of malignant transformation of up to 85%.[3-6] The malignant transformation process of SNADAs is rather fast, with a progression of about 22% of lesions with high-grade dysplasia to adenocarcinoma in less than 3 years.[7]

Traditionally, the standard treatment for benign duodenal neoplasms has been surgery, which carries a high rate of adverse events or recurrences, depending on the surgical method used.[8,9] Alternatively, EMR techniques have been adopted to approach duodenal adenomas. However, eradication rates vary widely among different studies (55%-100%).[10-19] More recently, use of cap-assisted EMR (C-EMR) for removal of duodenal adenomas has been reported,[10,19,20] with only 1 study investigating the efficacy and safety of C-EMR for SNADAs.[20] Nonetheless, because of limited data, the outcomes of

C-EMR for SNADAs have not been thoroughly evaluated, and more studies are needed. Here we report the largest case series using C-EMR as the primary method for resection of SNADAs.

METHODS

A retrospective review was conducted on the medical records of patients who had undergone C-EMR for the treatment of duodenal adenomas at a tertiary care center between July 2002 and April 2013. Patients with a history of familial adenomatous polyposis were excluded; thus, only those with SNADAs were included in the study. In addition, if a patient had concurrent ampullary duodenal adenoma, then this lesion was not evaluated in this study.

Efficacy and safety outcomes of C-EMR were assessed by polyp eradication and recurrence rates and the adverse event rate, respectively. Polyp eradication was defined as no residual adenoma on early follow-up endoscopy after the polyp was deemed to be completely resected; in addition, an en bloc resection with negative margin on pathology was considered as eradication.

Recurrence was defined as finding adenomatous epithelium after eradication was reported. Procedure-related adverse events, along with the adopted treatment, were also described. Statistical analysis was performed applying the Fisher exact test, and $P < .05$ was considered significant. The study protocol was approved by the Institutional Review Board of our medical center.

Procedures description

All C-EMRs were performed by 1 of 2 interventional gastroenterologists (S.K.L. and L.H.J.). Monitored anesthesia care was administered by an anesthesiologist for all procedures. All antiplatelet agents, except aspirin 81 mg daily, were discontinued before the procedure. All patients had a follow-up phone call the following business day to check for any major adverse events.

An adult diagnostic or therapeutic gastroscope was used for all procedures. Lesions were all resected using C- EMR as the primary technique (Fig. 1). C-EMR was performed by using the components of an EMR kit (K-001 or K-002; Olympus America Inc., Melville, NY). Submucosal injection was introduced using a 23G/4-mm length needle (NM-401L-0423; Olympus America) to create a fluid cushion. Normal saline solution or hypertonic saline solution alone or a mixture of epinephrine, Indigo carmine, methylene blue, and/or India ink (2 patients only) diluted in normal saline solution were used for submucosa injection. A transparent hard straight plastic cap (D-402-14312 or D-402-14212; Olympus America) with an outer diameter of 13.9 or 14.9 mm was affixed to the tip of the endoscope. A crescent-shaped snare (SD-221L-25; Olympus America) was used for polypectomy.

The cap was first placed on the normal tissue, and gentle suction was applied to open the snare adequately as it looped into the gutter of the cap. Once achieved, the cap was positioned on the edge of the polyp, while looking partly at normal mucosa. Gentle suction with occasionally reducing the suction power to half was applied. This was to aspirate the polyp into the cap while avoiding suctioning of the muscularis propria. Once adequate tissue was suctioned into the cap, the endoscopist's assistant closed the snare. Suction was then released, and after visualization of the grasped tissue, cautery was applied. Cautery settings were forced coagulation, effect 1, (Erbe Elektromedizin, Tübingen, Germany), with maximum power of 30 W. Once the cut was complete, the base was examined to ensure no adverse events. After that, adjacent normal and adenomatous tissue was resected, in piecemeal fashion, until the entire polyp was resected. If small residual adenomatous tissue was visible, it was sometimes resected with biopsy forceps or free-hand snare. Occasionally, if it was unclear whether there was residual adenomatous tissue, especially at the margins, argon plasma coagulation (APC) was applied.

RESULTS

Forty-eight patients underwent C-EMR for the treatment of duodenal adenoma within the study period; of these, 6 patients with history of familial adenomatous polyposis were excluded. Also, 2 ampullary adenomas were found in 2 patients who had SNADAs; these ampullary lesions were not evaluated in this study. Forty-two patients (27 men, 15 women), median age of 67 years (range, 36-89), underwent a total of 59 sessions of C-EMR for the treatment of 49 SNADAs (flat: 46, sessile: 3). Four patients had 2 polyps and 1 patient had 4 polyps, which were removed by C-EMR. Some polyps required more than 1 session of C-EMR for eradication; 2 sessions were required for 5 polyps, 1 polyp required 3 sessions, and 1 polyp required 4 sessions of C-EMR. C-EMR was performed in a piecemeal fashion on 39 polyps with a median of 4 pieces (range, 2-15). Ten polyps were resected en bloc. Characteristics of the polyps in respect to the applied polypectomy techniques are shown in Table 1.

Although C-EMR was used as the primary polypectomy technique, debulking (using a hexagonal snare) was performed on 1 large sessile polyp (20 × 60 mm) before C-EMR. Ancillary techniques including the use of snare, APC, or forceps were used in the treatment of 11 polyps. Primary closure of the post-EMR mucosal defect, using clips, was performed in 14 polyps; the median number of clips deployed per polyp was 5 (range, 1-9). Detailed description of each polyp's morphology, histology, adopted polypectomy technique, and length of follow-up is shown in Table 2.