

Wide-field piecemeal cold snare polypectomy of large sessile serrated polyps without a submucosal injection is safe

Authors

David J. Tate^{1,2}, Halim Awadie², Farzan F. Bahin^{1,2}, Lobke Desomer², Ralph Lee², Steven J. Heitman², Kathleen Goodrick², Michael J. Bourke^{1,2}

Institutions

- 1 Department of Medicine, University of Sydney, Sydney, New South Wales, Australia
- 2 Department of Gastroenterology and Hepatology, Westmead Hospital, Sydney, New South Wales, Australia

submitted 26.3.2017

accepted after revision 14.9.2017

Bibliography

DOI <https://doi.org/10.1055/s-0043-121219>

Published online: 23.11.2017 | *Endoscopy* 2018; 50: 248–252

© Georg Thieme Verlag KG Stuttgart · New York

ISSN 0013-726X

Corresponding author

Michael J. Bourke, MB BS, Department of Gastroenterology and Hepatology, Endoscopy Unit, Westmead Hospital, Cnr Hawkesbury & Darcy Roads, Westmead 2145, Australia
Fax: +61 2 9845 5118
michael@citywestgastro.com.au

 Fig e1, e3

Online content viewable at:

<https://doi.org/10.1055/s-0043-121219>

ABSTRACT

Background and study aims Large series suggest endoscopic mucosal resection is safe and effective for the removal of large (≥ 10 mm) sessile serrated polyps (SSPs), but it exposes the patient to the risks of electrocautery, including delayed bleeding. We examined the feasibility and safety of piecemeal cold snare polypectomy (pCSP) for the resection of large SSPs.

Methods Sequential large SSPs (10–35 mm) without endoscopic evidence of dysplasia referred over 12 months to a tertiary endoscopy center were considered for pCSP. A thin-wire snare was used in all cases. Submucosal injection was not performed. High definition imaging of the defect margin was used to ensure the absence of residual serrated tissue. Adverse events were assessed at 2 weeks and surveillance was planned for between 6 and 12 months.

Results 41 SSPs were completely removed by pCSP in 34 patients. The median SSP size was 15 mm (interquartile range [IQR] 14.5–20 mm; range 10–35 mm). The median procedure duration was 4.5 minutes (IQR 1.4–6.3 minutes). There was no evidence of perforation or significant intraprocedural bleeding. At 2-week follow-up, there were no significant adverse events, including delayed bleeding and post polypectomy syndrome. First follow-up has been undertaken for 15/41 lesions at a median of 6 months with no evidence of recurrence.

Conclusions There is potential for pCSP to become the standard of care for non-dysplastic large SSPs. This could reduce the burden of removing SSPs on patients and health-care systems, particularly by avoidance of delayed bleeding.

Introduction

Sessile serrated polyps (SSPs) are important precursor lesions for colorectal cancer [1]. They may remain indolent for many years but, once they develop dysplasia, they are high-risk lesions for transformation to colorectal cancer [2].

Endoscopic mucosal resection (EMR) offers a safe and effective method to resect large (≥ 10 mm) SSPs [3] but exposes patients to the risks of diathermy, including post-EMR bleeding, which may occur in up to 10% of procedures in the right colon and is likely due to unintended thermal injury to submucosal tissue and vessels. While these risks are small and certainly sig-

nificantly lower than the risks of surgery, they are resource intensive when they occur.

Cold snare polypectomy (CSP) is the first-line treatment for colorectal polyps ≤ 10 mm owing to its efficacy, precision, and excellent adverse event profile [4]. Extension of this technique to piecemeal resection of larger lesions using a submucosal cushion has been described in small retrospective series [5, 6].

Large SSPs have a lower risk for recurrence and dysplasia than conventional adenomas [7, 8]. They are therefore low risk for the development of submucosal invasive cancer and potentially suited to a piecemeal technique with a low risk of complications. We sought to systematically examine the safety of pie-

piecemeal cold snare polypectomy (pCSP) without the use of a submucosal cushion for large SSPs.

Methods

Over the 12 months to January 2017, large SSPs (≥ 10 mm and ≤ 35 mm) without endoscopic evidence of dysplasia that were referred to a tertiary endoscopy center were removed using pCSP by seven expert endoscopists. Resection was performed with a stiff thin-wire snare (TeleMed 10-mm Hexagonal; TeleMed Systems Inc., Hudson, Massachusetts, USA). Injection of a submucosal lifting solution prior to resection was not performed. Detailed patient, procedural, and lesion characteristics were recorded prospectively. Standard periprocedural advice regarding anticoagulation was given and split-dose bowel preparation was used. Procedures were performed using Olympus 180/190 colonoscopes (Olympus, Tokyo, Japan). Written consent was obtained from all patients and institutional review board approval was obtained for the study.

The technique for pCSP was standardized (► **Fig. e1**; ► **Video 1**). The lesion and its margins were assessed using high definition endoscopic imaging. If there was evidence of dysplasia, EMR was preferred. Snare resection commenced at one margin including a rim of 2–3 mm of normal tissue. Firm downward pressure and suction of luminal gas aided tissue capture. Subsequently, the assistant closed the snare until resistance was felt and, once the endoscopist was satisfied with the amount of captured tissue, closed the snare completely. If transection did not occur within 5 seconds, gentle traction against the tip of the colonoscope was exerted on the snare catheter. If transection still did not occur, the snare placement was revised. The mucosal defect was then expanded with a flushing pump (Olympus, Tokyo, Japan) containing 0.9% saline. Further resec-

tions were then performed, aligning the snare with the cut edge of the expanding mucosal defect.

Once the resection was completed, the mucosal defect was inspected for residual serrated tissue. If residual tissue was detected, further generous snare resection was performed. Oozing of blood from the resection site was common and was not actively treated (► **Fig. 2**). The term ‘intraprocedural bleeding’ described bleeding that required endoscopic control. Complete endoscopic resection described the removal of all serrated tissue.

After the procedure, patients were observed for 2 hours and were discharged on a clear-liquid diet overnight. A structured telephone interview was performed at 2 weeks. Clinically significant post-endoscopic bleeding described bleeding that required admission to hospital or re-intervention.

Patients were followed up at 6–12 months, the interval being determined by the endoscopist dependent on the number of synchronous lesions, the presence of serrated polyposis syndrome, and the presence of dysplasia in the resection specimen. At surveillance colonoscopy, any endoscopic resection scars were located (using the previously documented colonic location and prior images) and analyzed using high definition white-light endoscopy and narrow-band imaging (NBI).

Results

A total of 41 SSPs were removed by pCSP in 34 patients (7 patients had two lesions removed). ► **Fig. e3** shows images from the resection of four different lesions.

The mean age (standard deviation) of patients was 68.58 (10.12) years; 27/34 patients (79.4%) were female (► **Table 1**). The median size of the SSPs was 15 mm (IQR 14.5–20 mm; range 10–35 mm) and 26/41 of the lesions (63.4%) were located proximal to the transverse colon.

► **Fig. 4** shows recruitment to the study.

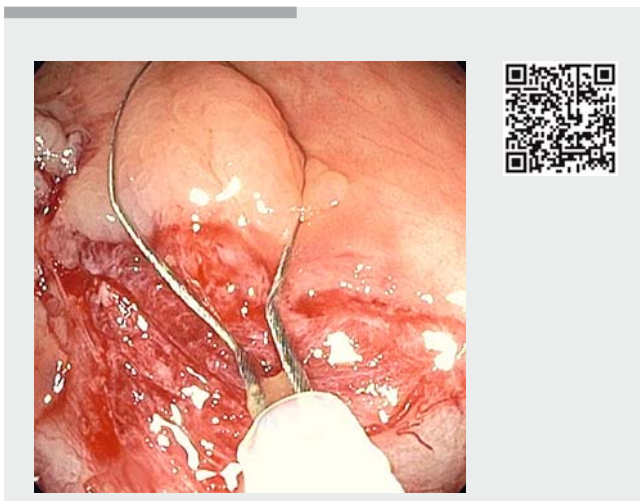
Procedure

The median procedure duration was 4.5 minutes (IQR 1.4–6.3). The median number of pieces required to completely remove the SSPs was 3.0 (IQR 3–5). There was no evidence of deep injury to the colonic wall in any of the patients. A cold snare protrusion was noted in 9/41 resections (22.0%). No intraprocedural bleeding was noted. Complete resection was achieved in all cases. No modality other than snare resection was used or required.

Pathology demonstrated sessile serrated adenoma in all lesions. Low grade dysplasia was present in three resection specimens (7.3%). Completeness of resection was not assessed histologically because of the piecemeal nature of the resection.

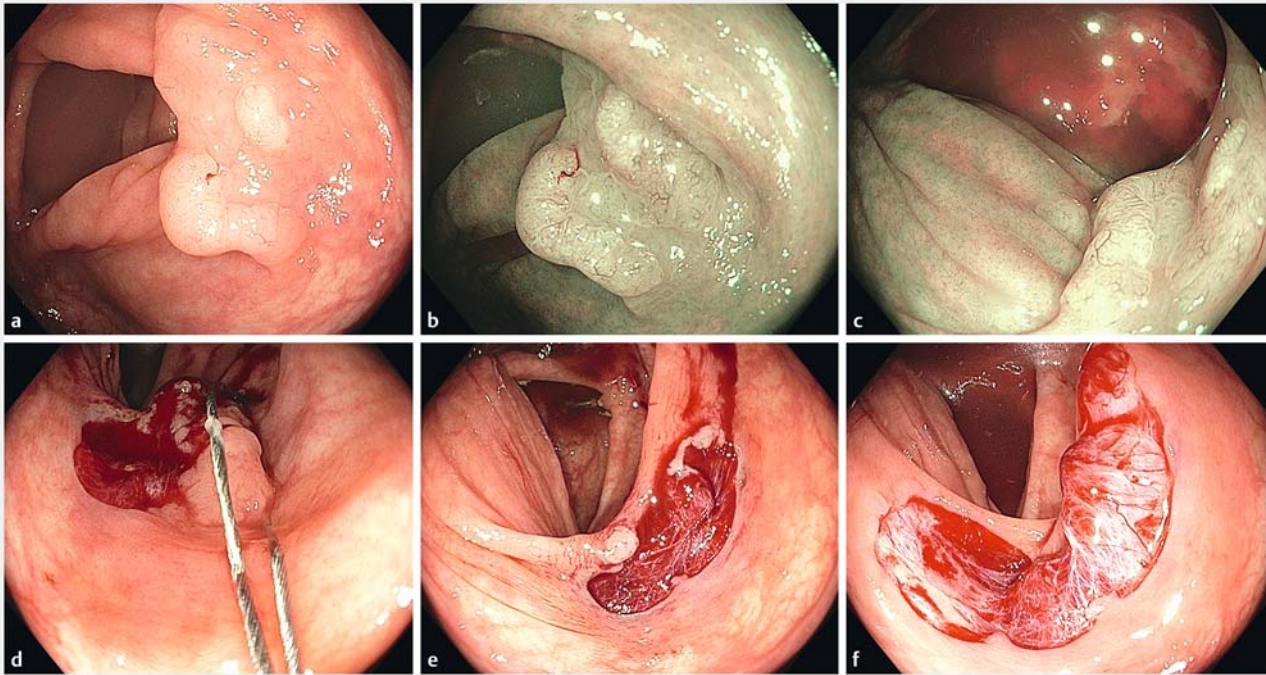
Outcomes and safety

Outcomes after pCSP are summarized in ► **Table 2**. There were no instances of clinically significant post-endoscopic bleeding, post-polypectomy syndrome, or delayed perforation, either during the post-procedural observation or when the patients were contacted at 2 weeks.

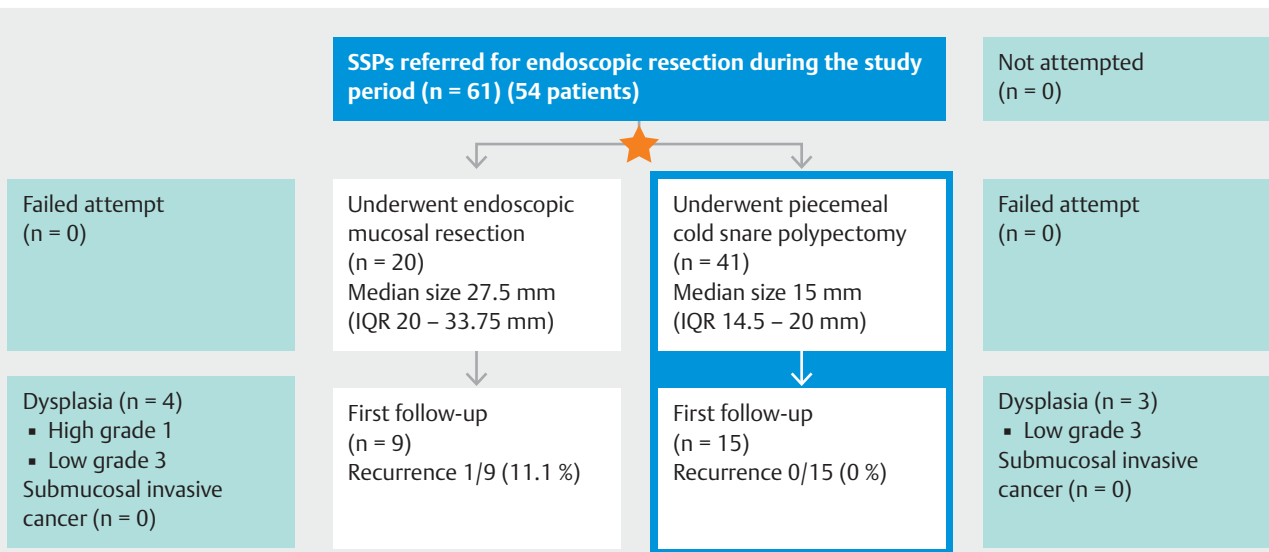


► **Video 1** Video illustrating the assessment and resection of a large sessile serrated adenoma using the piecemeal cold snare technique.

Online content viewable at:
<https://doi.org/10.1055/s-0043-121219>



► **Fig. 2** Piecemeal cold snare polypectomy (pCSP) of a 25-mm sessile serrated polyp (SSP) in the ascending colon. **a – c** Lesion assessment is performed using narrow-band imaging (NBI) and high definition white-light endoscopy to assess for endoscopic evidence of dysplasia, which in this example is demonstrated and particularly well seen under NBI. Given the patients age and comorbidities, pCSP was preferred over endoscopic mucosal resection. **d** Multiple snare resections are used with the cut edge of the mucosal defect acting as a guide for the next snare placement. **e** Minor ooze of blood from the resection defect is common, does not usually require active treatment, and the defect can be safely expanded as needed to achieve complete excision. **f** The defect after completion of CSP after expansion with normal saline showing no evidence of continued bleeding or deep injury.



► **Fig. 4** Study flow chart showing recruitment, procedures undertaken, and outcomes for all patients referred for endoscopic resection of large (≥ 10 mm) sessile serrate polyps (SSPs) during the study period. The blue shaded area represents the lesions described in this report. The orange star represents a decision by the endoscopist to resect the lesion by piecemeal cold snare polypectomy or endoscopic mucosal resection, a decision primarily based on lesion size and the presence/absence of dysplasia. Recurrence denotes endoscopic determination of adenoma recurrence. IQR, interquartile range.

This document was downloaded for personal use only. Unauthorized distribution is strictly prohibited.

► **Table 1** Baseline characteristics of the 34 patients and their 41 sessile serrated polyps that underwent piecemeal cold snare polypectomy.

Patient	
Age, mean (standard deviation), years	68.58 (10.12)
Sex, female, n (%)	27 (79.4)
Lesion	
Size, median (IQR), mm	15 (14.5–20)
Location, proximal to transverse colon, n (%)	26 (63.4)
Paris classification, n (%)	
▪ 0-IIa	40 (97.6)
▪ 0-IIb	1 (2.4)
Endoscopic evidence of dysplasia, n (%)	3 (7.3)
Highest Kudo, II-O, n (%)	41 (100)
Procedure	
Duration, median (IQR), minutes	4.5 (1.4–6.3)
Pieces, median (IQR)	3.0 (3–5)
Protrusion within defect, n (%)	9 (22.0)
Intraprocedural bleeding requiring intervention, n (%)	0 (0)
Histopathology, serrated adenoma, n (%)	41 (100)
Low grade cytological dysplasia, n (%)	3 (7.3)
IQR, interquartile range.	

► **Table 2** Outcomes followed the treatment of 41 sessile serrated polyps by piecemeal cold snare polypectomy.

Adverse events, n (%)	
Clinically significant post-endoscopic bleeding	0 (0)
Delayed perforation	0 (0)
Post-procedural pain	0 (0)
Admission to hospital for related complication within 2 weeks	0 (0)
Follow-up	
Months to SC1, median (IQR)	6 (5–7)
Recurrence at SC1, n (%) ¹	0 (0)
Histologic recurrence at SC1, n (%) ²	0 (0)
SC1, first surveillance colonoscopy.	
¹ N = 15	
² N = 9	

So far, 15/41 patients (36.5%) have undergone surveillance colonoscopy at a median of 6 months (IQR 5–7 months) after the index procedure. None of these patients had evidence of recurrent serrated tissue at the endoscopic resection scar.

Discussion

Large SSPs are recognized as important precursors of colorectal cancer. They can be safely removed by EMR [7] but, despite a favorable risk profile compared with surgery [9], electrocautery exposes patients to risks, including clinically significant post-endoscopic bleeding, post-polypectomy syndrome, and perforation. Because SSPs commonly lack high grade histology, have a long dwell time prior to developing dysplasia [2], and recur less frequently than conventional adenomas [7], they represent comparatively indolent disease and are excellent targets for piecemeal mucosal resection. In this study, we have demonstrated the feasibility and safety of pCSP for large colonic SSPs.

CSP is safe and effective for the complete endoscopic resection of small colorectal polyps [10]. Multiple randomized studies have demonstrated the similar efficacy of CSP versus hot snare polypectomy (HSP) with significantly fewer adverse events for polyps up to 10 mm in size [11–13].

Whether these benefits extend to larger lesions is unclear. Only retrospective studies, not restricted to SSPs and utilizing submucosal elevation, exist. Muniraj et al. [5] reported pCSP of 30 sessile polyps ≥ 10 mm using a thin-wire snare (Exacto; US Endoscopy, Mentor, Ohio, USA); no significant adverse events occurred, although 20% of lesions recurred. Choksi et al. [6] studied 15 colonic polyps larger than 10 mm that were removed by pCSP and found no significant complications, except for a single patient with pain post-polypectomy; long-term follow-up was not described.

We have described the simple technique of pCSP (without submucosal injection) for large SSPs. A thin-wire snare is paramount, both to aid tissue capture and to create a crisp resection margin that can be examined for residual serrated tissue. Each progressive resection utilizes this margin to ensure snare purchase and avoid tissue islands. Submucosal protrusion is often noted within the defect (an example is shown in ► **Fig.e3d**, lower image); this is composed of bunched-up submucosal tissue and has been previously shown not to contain epithelium [14]. Minor oozing of blood is common and appears not to predict clinically significant post-endoscopic bleeding in this cohort. The technique is quick to perform and we anecdotally find it much faster than EMR for equivalent lesions.

We avoided resecting SSPs with endoscopic evidence of dysplasia using pCSP as these represent high-risk lesions and this was a pilot study; however, three elderly patients with endoscopic evidence of dysplasia underwent pCSP in this study, primarily in an attempt to minimize the risk of post-EMR bleeding.

We did not use submucosal injection or a chromic dye. While we acknowledge their utility for delineation of serrated tissue, we found that high definition imaging was sufficient for this purpose and for detecting residual serrated tissue at the resection margin. In situations of uncertainty, further resections were made, expanding the defect without apparent adverse events.

Adverse events associated with pCSP in this study were infrequent. In particular, there was no clinically significant post-endoscopic bleeding, post polypectomy syndrome, or delayed bleeding within 2 weeks. The lack of significant post-endo-

scopic bleeding is clinically important. The absolute risk of clinically significant post-endoscopic bleeding after EMR of a proximal laterally spreading lesion – the most common location for an SSP – is 10%–12% [15]. Care of the patient with such bleeding is expensive and resource intensive, while prophylaxis with endoscopic clips is expensive and not possible with larger resections [16].

We have detected no recurrences (endoscopic or histologic) at the endoscopic resection scars in the patients who have thus far undergone follow-up. We suggest, cautiously, that this is related to the wide margin of tissue removed during the initial procedures and the meticulous examination of the defect and margin for residual tissue.

This study has several strengths. The technique is well characterized and was applied prospectively with defined data parameters collected at the time of the procedures. Drawbacks include this being a single-center series and the limited follow-up to date. Future studies should randomize large SSPs to EMR – the current standard of care – or pCSP to more accurately define outcomes and the place of these two techniques.

In conclusion, in this pilot study, we have demonstrated the safety and feasibility of pCSP in a tertiary referral cohort of patients referred for the removal of large SSPs. There is potential for pCSP to become the standard of care for non-dysplastic SSPs. This could reduce the burden of removing SSPs on patients and healthcare systems, particularly by avoidance of clinically significant post-endoscopic bleeding.

Acknowledgments

The Cancer Institute New South Wales provided funding for a research nurse and data manager to assist with the administration of this study. There was no influence from the Institution regarding study design or conduct, data collection, management, analysis or interpretation, or preparation, review, or approval of the manuscript.

Competing interests

None

References

[1] East JE, Vieth M, Rex DK. Serrated lesions in colorectal cancer screening: detection, resection, pathology and surveillance. *Gut* 2015; 64: 991–1000

- [2] Bettington M, Walker N, Rosty C et al. Clinicopathological and molecular features of sessile serrated adenomas with dysplasia or carcinoma. *Gut* 2017; 66: 97–106
- [3] Rex DK, Clodfelter R, Rahmani F et al. Narrow-band imaging versus white light for the detection of proximal colon serrated lesions: a randomized, controlled trial. *Gastrointest Endosc* 2015; 83: 1–6
- [4] Repici A, Hassan C, Vitetta E et al. Safety of cold polypectomy for <10mm polyps at colonoscopy: a prospective multicenter study. *Endoscopy* 2012; 44: 27–31
- [5] Muniraj T, Sahakian A, Ciarleglio MM et al. Cold snare polypectomy for large sessile colonic polyps: a single-center experience. *Gastroenterol Res Pract* 2015; 2015: 175959
- [6] Choksi N, Elmunzer BJ, Stidham RW et al. Cold snare piecemeal resection of colonic and duodenal polyps ≥ 1 cm. *Endosc Int Open* 2015; 3: E508–E513
- [7] Pellise M, Burgess NG, Tutticci N et al. Endoscopic mucosal resection for large serrated lesions in comparison with adenomas: a prospective multicentre study of 2000 lesions. *Gut* 2017; 66: 644–653
- [8] Burgess NG, Pellise M, Nanda KS et al. Clinical and endoscopic predictors of cytological dysplasia or cancer in a prospective multicentre study of large sessile serrated adenomas/polyps. *Gut* 2016; 65: 437–446
- [9] Ahlenstiel G, Hourigan LF, Brown G et al. Actual endoscopic versus predicted surgical mortality for treatment of advanced mucosal neoplasia of the colon. *Gastrointest Endosc* 2014; 80: 668–676
- [10] Hassan C, Repici A. Colonoscopy: Cold snaring diminutive polyps – the thinner the better! *Nat Rev Gastroenterol Hepatol* 2015; 12: 191–193
- [11] Paspatis GA, Tribonias G, Konstantinidis K et al. A prospective randomized comparison of cold vs hot snare polypectomy in the occurrence of postpolypectomy bleeding in small colonic polyps. *Colorect Dis* 2011; 13: 345–348
- [12] Horiuchi A, Hosoi K, Kajiyama M et al. Prospective, randomized comparison of 2 methods of cold snare polypectomy for small colorectal polyps. *Gastrointest Endosc* 2015; 82: 686–692
- [13] Ichise Y, Horiuchi A, Nakayama Y et al. Prospective randomized comparison of cold snare polypectomy and conventional polypectomy for small colorectal polyps. *Digestion* 2011; 84: 78–81
- [14] Tutticci N, Burgess NG, Pellise M et al. Characterization and significance of protrusions in the mucosal defect after cold snare polypectomy. *Gastrointest Endosc* 2015; 82: 523–528
- [15] Burgess NG, Metz AJ, Williams SJ et al. Risk factors for intraprocedural and clinically significant delayed bleeding after wide-field endoscopic mucosal resection of large colonic lesions. *Clin Gastroenterol Hepatol* 2014; 12: 651–661
- [16] Liaquat H, Rohn E, Rex DK. Prophylactic clip closure reduced the risk of delayed postpolypectomy hemorrhage: experience in 277 clipped large sessile or flat colorectal lesions and 247 control lesions. *Gastrointest Endosc* 2013; 77: 401–407