Impact of cap-assisted colonoscopy on detection of proximal colon adenomas: systematic review and meta-analysis

Madhav Desai, MD, MPH,[1] Andre Sanchez-Yague, MD,[2] Abhishek Choudhary, MD,[3] Asad Pervez, MD,[1] Neil Gupta, MD,[4] Prashanth Vennalaganti, MD,[1] Sreekar Vennelaganti, MD,[3] Alessandro Fugazza, MD,[5] Alessandro Repici, MD,[5] Cesare Hassan, MD,[5] Prateek Sharma, MD[1,3]

Kansas City, Missouri; Chicago, Illinois, USA; Marbella, Spain; Milan, Italy

Background and Aims: Proximal colon adenomas can be missed during routine colonoscopy. Use of a cap or hood on the tip of the colonoscope has been shown to improve overall adenoma detection with variable rates. However, it has not been systematically evaluated for detection of proximal colon or right-sided adenomas where the cap may have maximum impact on adenoma detection rate (ADR). Our aim was to perform a systematic review and meta-analysis to evaluate the impact of cap-assisted colonoscopy (CC) on right-sided ADRs (r-ADRs) compared with standard colonoscopy (SC).

Methods: PubMed, EMBASE, SCOPUS, and Cochrane databases as well as secondary sources (bibliographic review of selected articles and major GI proceedings) were searched through October 1, 2016. Primary outcome was the pooled rate of r-ADR. Detection of flat adenoma, sessile serrated adenoma/polyp (SSA/P), and number of right-sided adenomas per patient were also assessed. Pooled odds ratio (OR) and 95% confidence intervals (CIs) were calculated using random-effect models.

Results: We screened 686 records and analyzed data from 4 studies (CC group, 2546 patients; SC group, 2547 patients) that met criteria for determination of r-ADRs, whereas 6 studies (CC group, 3159 patients; SC group, 3137 patients) were analyzed to estimate right-sided adenomas per patient. r-ADR was significantly higher with CC compared with SC (23% vs 17%; OR, 1.49; 95% CI, 1.08-2.05; $I^2 = 79\%$; $P = .01$). CC also improved detection rates of flat adenoma (OR, 2.08; 95% CI, 1.35-3.20; $P < .01$) and SSA/P (OR, 1.33; 95% CI, 1.01-1.74; $P = .04$). The total number of right-sided adenomas (CC: 1428 [60%] vs SC: 1127 [58%]) and number of right-sided adenomas per patient (CC, .71 ± .5, vs SC, .65 ± .62 [mean ± standard deviation]) were numerically higher for CC but were not statistically significant ($P = .43$). Approximately 17 CCs would be required to detect an additional patient with right-sided adenoma.

Conclusions: Use of CC significantly improves the proximal colon ADR. In addition, flat adenoma and serrated colonic lesion detection rates are also significantly higher as compared with SC. (Gastrointest Endosc 2017;86:274-81.)

(footnotes appear on last page of article)

Colorectal cancer (CRC) is a leading cause of death in the United States. Colonoscopy continues to be the criterion standard for CRC screening, either as primary test or as a workup of a positive fecal occult blood test. Current evidence demonstrates a large difference in CRC occurrence and detection on the right side compared with the left side of the colon.[1-3] In addition, location of the primary neoplasm could influence the treatment choice. Importantly, overall survival was substantially longer for patients with the tumor originating from the left side or distal colon (descending colon, sigmoid colon, and rectum) compared with the right side of the colon or the proximal colon (cecum and ascending colon mainly) (33.3 vs 19.4 months).[2] There are higher odds of missing right-sided or proximal adenomas, and patients with proximal adenomas have a higher risk for adenoma recurrence overall.[4] A Canadian study also found that interval colon cancer incidence of the right side of the colon was higher than that of the left side over a period of 10 years after a normal colonoscopy.[5] This indicates that polyps/adenomas are more commonly missed in the proximal or right-sided

Use your mobile device to scan this QR code and watch the author interview. Download a free QR code scanner by searching "QR Scanner" in your mobile device's app store.

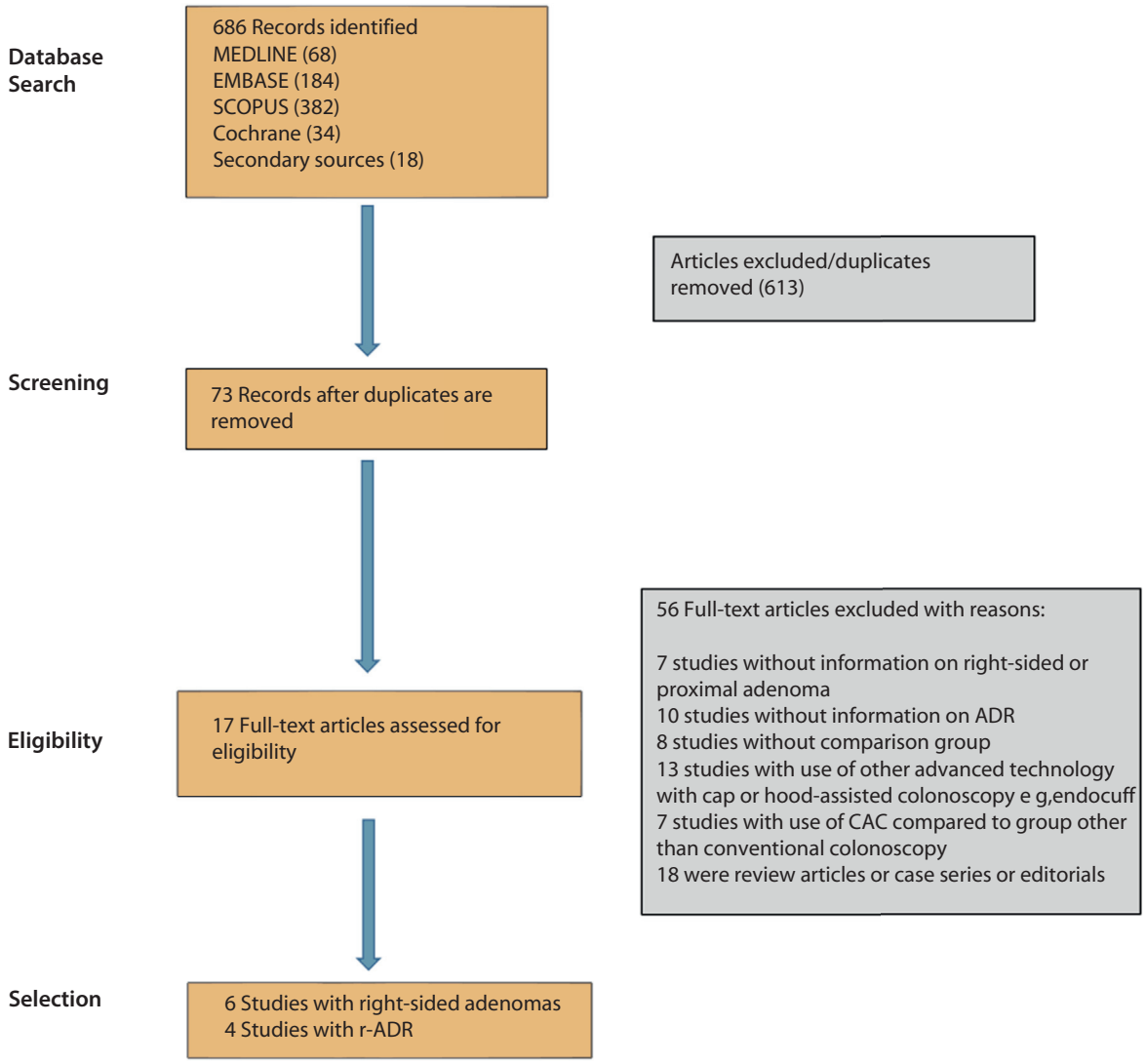

Figure 1. Electronic search, screening of articles, and selection process. *ADR*, adenoma detection rate; *CAC*, cap-assisted colonoscopy; *r-ADR*, right-sided ADR.

colon during colonoscopy, which progress to CRC over time. This study highlighted the need for better adenoma detection rate (ADR) in the right side of the colon.

Several developments have occurred in the mechanical aspects of colonoscopy with the invention of cap, cuff, and ring to enhance quality and efficiency of the standard colonoscope.[6] Cap-assisted colonoscopy (CC) is a technique that uses a transparent cap or hood attached to the tip of the colonoscope that flattens the mucosal folds and improves visibility of polyps situated proximal to them. These are the so-called blind spots where polyps can be commonly missed as determined by a study that compared colonoscopy results with CT colonography images.[7] Meta-analysis of studies comparing CC with standard colonoscopy (SC) has shown that CC is associated with improved detection of colorectal neoplasia and higher cecal intubation rates than SC.[8,9]

However, techniques to enhance the efficacy and quality of SC has not been formally assessed earlier to evaluate detection rates of right-sided or proximal lesions. CC provides better visualization, but we do not know the efficacy of CC for detecting proximal colonic lesions. Because CC has higher rates of reaching the cecum and improving visualization in the right side of the colon, it is likely that detection rates of right-sided adenomas would be improved with CC compared with SC. Multiple randomized control trials have determined variable ADRs of CC versus SC. However, only a few of these trials reported and compared ADRs specifically for the proximal colon.[10-13] Therefore, we performed a systematic review of the present literature and conducted a meta-analysis of eligible studies to compare pooled rates of ADRs for right-sided or proximal colon adenomas for patients undergoing CC versus SC.