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Frequency of serrated polyposis syndrome recognition by community endoscopists

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ABSTRACT

Background and study aims Some data indicate serrated polyposis syndrome (SPS) is underdiagnosed. We determined the frequency of SPS diagnosis by community endoscopists prior to referral to a tertiary center.

Patients and methods We performed a retrospective analysis of a prospectively collected database of SPS patients at a tertiary academic hospital. There were 212 patients who were referred to our center for resection of one or more lesions detected at a prior colonoscopy and who had records available that allowed determination of whether SPS was diagnosed before referral.

Results Only 25 of 212 patients (11.8%) had a diagnosis or suspicion of a polyposis syndrome prior to referral, and only 12 patients (5.7%) had a specific SPS diagnosis made prior to referral. Among 187 patients diagnosed at our center, 39 had sufficient serrated lesions removed and documented in outside records to meet SPS criteria prior to referral, but the diagnosis was not made by the referring physician despite adequate numbers of lesions resected. The remaining cases required lesions removed at our center to meet SPS diagnostic criteria. Limitations were a single center, single expert endoscopist.

Conclusions SPS is the most common colorectal polyposis syndrome, but it remains underdiagnosed by community endoscopists. Underdiagnosis may contribute to post-colonoscopy colorectal cancer in patients with SPS.

Introduction

Serrated polyposis syndrome (SPS) is the most common colorectal polyposis syndrome, identified in 0.4% to 0.8% of patients undergoing colonoscopy for positive fecal immunochemical tests [1]. SPS is associated with an increased risk of colorectal cancer (CRC) [2], with most cancers in SPS identified at the baseline examination [3]. Identification and diagnosis of SPS, followed by clearing colonoscopy and appropriate surveillance, has resulted in a very low incidence of CRC during surveillance. In our large single-center experience, no patient has developed CRC during surveillance [4].

Some evidence suggests SPS is underdiagnosed in the community [1, 5, 6, 7, 8, 9, 10]. At our center, SPS cases are diagnosed in many cases in patients with polyps referred for endoscopic resection [6]. This provides an opportunity to assess the frequency with which referring physicians have identified and diagnosed SPS by the time of referral. In a previous series of patients referred for resection of sessile serrated lesions ≥20 mm [6], we described that 30% met the criteria for SPS and that only 1 in 20 patients with SPS had been identified and diagnosed by

the community-based referring physician. Further, only 12 of the 20 cases had been identified and diagnosed with SPS by the senior endoscopist at our center prior to the chart review. Thus, SPS may be seriously underdiagnosed in community practice and academic centers.

Our cohort of SPS patients includes over 300 patients, of whom more than 70% were initially encountered at our center through a referral by a community endoscopist. In this report, we describe the frequency of SPS diagnosis by referring endoscopists prior to referral.

Patients and methods

The senior endoscopist maintains a database of all SPS patients to help establish optimal surveillance intervals based on polyp burden and to ensure patients undergo surveillance. This quality assurance database was de-identified for this study. We received permission from the Human Research Committee of the Institutional Review Board at Indiana University for this study on November 28, 2022. The database contains age, gender, date of colonoscopy, procedure indication at our center, results of previous colonoscopies by any referring physician, results of colonoscopies performed at our center including number, size, location, methods of resection, and histology of serrated polyps (sessile serrated lesions, traditional serrated adenomas, and hyperplastic polyps) detected at baseline colonoscopy and any surveillance colonoscopy.

We used information in referral requests and referring center colonoscopy and pathology reports to determine whether the referring physician had indicated a diagnosis of SPS, any polyposis syndrome, or any suggestion of a polyposis syndrome by the time of referral to our center. Patients were diagnosed with hyperplastic polyposis syndrome prior to 2010, as SPS from 2010 to 2019 according to World Health Organization (WHO) 2010 diagnostic criteria for SPS [11] and using 2019 WHO criteria since 2019 (▶ **Table 1**) [12]. For the purpose of this analysis, we excluded patients diagnosed at our center during routine screening and surveillance colonoscopy, and all such patients were referred without an indication to remove specific lesions identified at a previous colonoscopy (▶ **Fig. 1**). Most of these patients were referred by primary care physicians within our health system or self-referred for colonoscopy.

Statistical analysis

Statistics were largely descriptive. Chi-square was used to compare the fraction of patients with a Type 1 diagnosis in the 90 patients diagnosed by screening or surveillance colonoscopies at our center compared to the 187 patients who were diagnosed only after referral to our center for resection of a lesion.

Results

The database includes 319 patients, of whom 14 were diagnosed with hyperplastic polyposis syndrome prior to 2010, 149 were diagnosed between 2010 and 2019 using 2010 WHO criteria, and 156 were diagnosed from 2019 to November 2022 using 2019 WHO criteria. There were 158 patients with Type I SPS by 2010 or 2019 criteria, 49 with either Type III by 2010 criteria or Type II by 2019 criteria, 97 meeting either Type I and Type III (2010) or Type I and Type II (2019), and one meeting 2010 criteria for Type II SPS.

The mean age of patients was 64.0 years (±9.3), and 65.8% were female. Ninety patients were excluded from the current analysis because they were diagnosed with SPS after presenting to the senior endoscopist for screening colonoscopy (n = 23) or during surveillance colonoscopy performed to follow-up previous polyps removed at our center or another center (n = 67). All these cases met the criteria based on lesions resected by the senior endoscopist during a colonoscopy at our center.

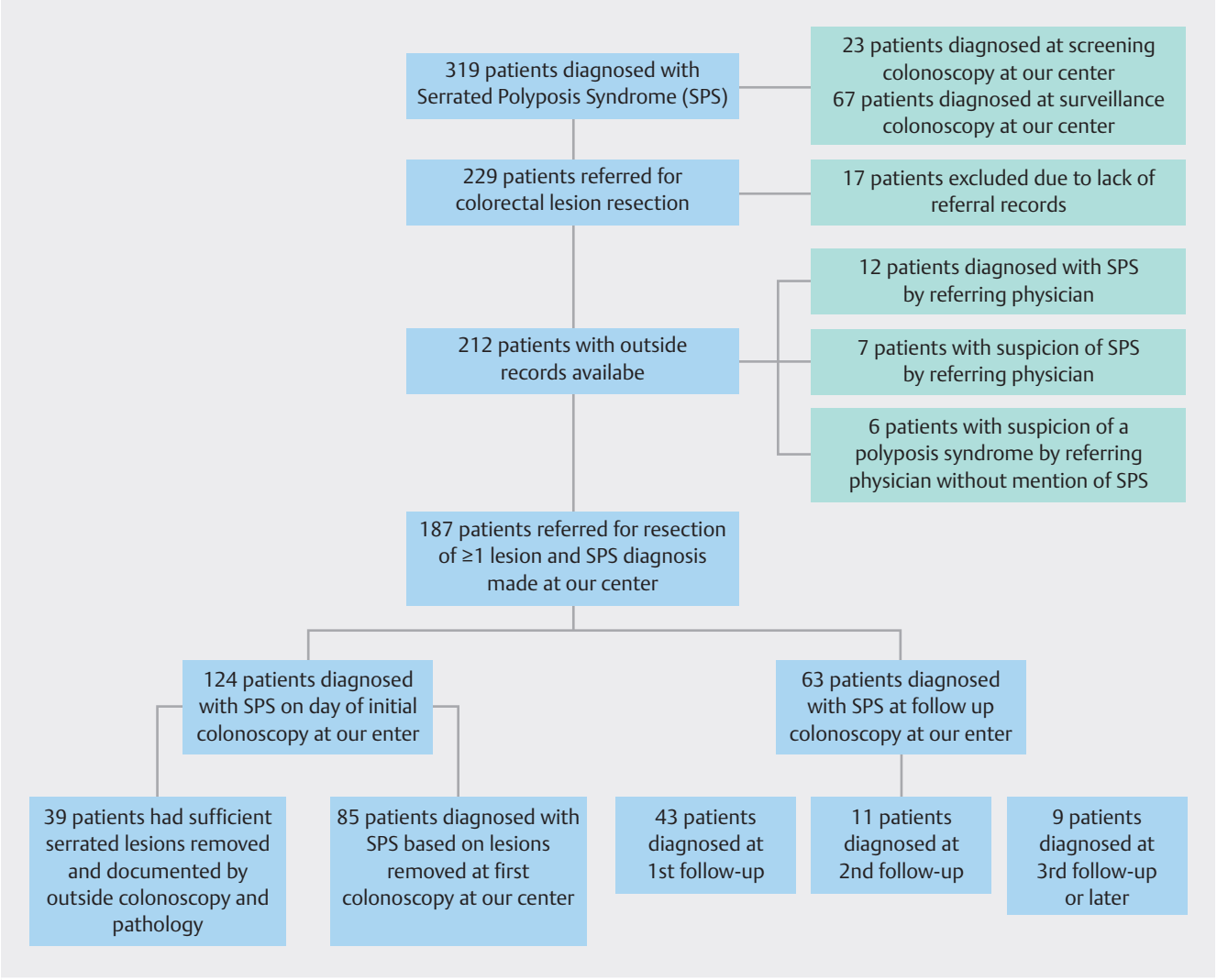
The remaining 229 patients diagnosed with SPS were referred to our center for resection of one or more colorectal lesions. Seventeen patients were excluded from the analysis due to lack of referral records.

Among the remaining 212 patients referred for resection of a lesion, medical records indicated 12 (5.7%) were diagnosed with SPS by the referring physician(s), and seven others (3.3%) were noted to have a suspicion of SPS. An additional six patients (2.8%) were noted to have a "possible" or "probable" polyposis syndrome, with no designation of serrated or hyperplastic polyposis, and in one of these the referring physician indicated suspicion of familial adenomatous polyposis. Thus, a total of 25 of 212 patients (11.8%) were either correctly diagnosed as having SPS or recognized as having a probable or possible polyposis syndrome. There were 51 patients with enough serrated lesions removed by the referring physician to make a definitive diagno-

▶ **Table 1** World Health Organization diagnostic criteria for serrated polyposis syndrome in 2010 and 2019.

WHO serrated polyposis syndrome criteria	Type 1	Type II	Type III
2010	≥5 SPs proximal to the sigmoid colon with at least 2 of these >10 mm in size	Any number of SPs proximal to the sigmoid colon in a person with a first degree relative with SPS	>20 SPs of any size, distributed throughout the colon
2019	≥5 SPs proximal to the rectum, all ≥5 mm in size, with at least 2 ≥10 mm in size	>20 SPs of any size distributed throughout the large bowel, with ≥5 proximal to the rectum	N/A

WHO, World Health Organization; N/A, not applicable; SP, serrated polyp (sessile serrated lesion, traditional serrated adenoma, or hyperplastic polyp); SPS, serrated polyposis syndrome.



▶ **Fig. 1** Flow of patients through the study.

sis of SPS, in 12 of whom (23.5%) the referring physician made an actual diagnosis of SPS.

In the remaining 187 patients (88.2%) referred to our center for resection of one or more lesions, the diagnosis of SPS was made at our center in all patients. Of these, 124 of 212 (58.4%) referred patients with outside records available had the diagnosis of SPS established at the time of their initial colonoscopy at our center. Among these, 39 were recognized by review of outside medical records to have already had sufficient serrated lesions removed and documented in outside colonoscopy and pathology reports to meet the diagnosis of SPS, but the referring physicians had not made the diagnosis of SPS. Of these 39 patients, 32 had undergone prior colonoscopy by gastroenterologists, five by surgeons, and two by primary care physicians. Of the 39 patients in this category, among those diagnosed by 2010 criteria, six patients had Type 1 SPS, one patient had Type 3, and 13 had both Type 1 and 3 SPS. Patients diagnosed by 2019 criteria included seven with Type 1 SPS and 12 with both Types 1 and 2.

There were 85 patients in whom a sufficient number of serrated lesions were not identified in outside records, but enough lesions were removed at our center in the first colonoscopy to diagnose SPS either with or without consideration of lesions removed at prior colonoscopies. Sixty-eight of these patients had their prior colonoscopies performed by a gastroenterologist, 12 by a surgeon, and five by a primary care physician. Of the patients diagnosed at our center by 2010 criteria, 18 had Type 1 SPS, four had Type 3, and 18 had both Types 1 and 3. Patients diagnosed by 2019 criteria included 28 patients with Type 1 SPS, six with Type 2, and eleven with both Types 1 and 2.

In the remaining 63 patients with SPS, the diagnosis of SPS was not made until more lesions were removed during additional colonoscopies at our center. This included the first colonoscopy follow-up at our center in 43 patients, second follow-up colonoscopy in 11 patients, and the third or later colonoscopy in nine patients.

Among patients with SPS diagnosed during screening or surveillance colonoscopy 72.2% had Type 1 SPS, or Type 1 plus

Type 3 by 2010 criteria, or Type 1 plus Type 2 by 2019 criteria compared to 87.2% of the 187 patients diagnosed after referral to our center for resection of a lesion ($P = 0.002$).

Discussion

In the largest single-center US cohort of patients with SPS, we found that SPS was firmly diagnosed by community endoscopists prior to referral in only 5.7% of patients. An additional 6.1% had language recognizing the possibility of a polyposis syndrome without specific mention of SPS. Even when the referring physician had removed sufficient serrated lesions to make a diagnosis of SPS prior to referral to our center, an actual SPS diagnosis by the referring physician was made in only 23.5% of cases. Thus, SPS remains largely underdiagnosed by community endoscopists. Most of the referring endoscopists were gastroenterologists, indicating that underdiagnosis of SPS is likely widespread among both gastroenterologist and non-gastroenterologist endoscopists.

The clinical significance of underdiagnosis of SPS is that undiagnosed SPS patients remain at increased risk for CRC. Diagnosis of SPS can lead to detailed efforts to clear the colon and also to the assignment of short surveillance intervals, such as 1 to 2 years [11, 12], which increases the opportunity to achieve complete clearing before CRC develops. These results suggest that failure to recognize SPS could contribute to the burden of post-colonoscopy CRC. It is well known that the serrated pathway contributes disproportionately to post-colonoscopy CRC [13, 14]. It is possible that an important fraction of these serrated pathway post-colonoscopy CRCs occur in patients with unrecognized SPS.

Our results indicate that failure to diagnose SPS occurred from both failure to recognize that sufficient numbers of serrated lesions had been removed to make the diagnosis and failure to recognize and remove enough serrated lesions to meet the diagnosis. These findings indicate that more should be done to educate community endoscopists about the definitions of SPS, the need to count serrated polyps over one or multiple colonoscopies, and how serrated lesions are commonly missed. High miss rates for serrated lesions have been known for some time [15, 16, 17], and previous data indicate that both practicing clinicians [16] and gastroenterology fellows [18] miss serrated lesions more often than they miss adenomas.

Sixty-three of 187 patients diagnosed at our center after referral for resection of ≥1 lesions (33.6%) were not diagnosed until they had undergone their initial colonoscopy at our center plus at least one follow-up colonoscopy. In some cases, this reflects that we did not have sufficient time to clear the colon in the first procedure at our center. In other cases, we did not remove enough serrated polyps to make the diagnosis until the second (n = 11) or third or more follow-up colonoscopy at our center (n = 9). These latter cases emphasize the importance of tracking numbers of serrated polyps over time. We typically specify in the procedure report the numbers of serrated lesions ≥10 mm, the number of lesions 5 to 9 mm, and the number <5 mm, as well as locations by section (particularly proximal to rectum vs. rectum). These details facilitate accurate diagnosis of both Type 1 and 2 SPS as the total number of resected serrated lesions increases over successive colonoscopies.

Patients referred to our center for resection of a lesion were more likely to have Type 1 SPS than those diagnosed during routine screening or surveillance colonoscopy at our center (87.2% vs 77.2%). This is consistent with expectations, given that large lesions are more likely to be referred for resection and that large lesions are essential to the diagnosis of Type 1 but not Type 2 SPS (▶ **Table 1**).

The strengths of this study include that it is by far the largest study to specifically address the issue of underdiagnosis of SPS [1, 5, 6, 7, 8, 9, 10], with outside medical records available in 92.6% of 229 patients referred for resection of a specific lesion and diagnosed with SPS. Limitations of the study include that it arises from a single center with the diagnosis of SPS largely made by a single expert endoscopist. However, the criteria for SPS have been standardized for more than a decade [11, 12]. If the ultimate diagnosis of SPS is made by endoscopists with lower sensitivity for identifying serrated polyps during colonoscopy, or endoscopists with lower awareness of the need for counting serrated polyps and searching for SPS cases, the result would be an overestimation of the sensitivity of community endoscopists for diagnosing SPS, and underestimation of the importance of SPS underdiagnosis as a potential public health problem.

Conclusions

In conclusion, SPS is severely underdiagnosed by community endoscopists. Additional efforts are needed to inform endoscopists about the need to count serrated polyps during colonoscopy and to identify and recognize serrated lesions.

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Author contributions: Connor D. McWhinney: data collection, data analysis, drafting manuscript Rachel E. Lahr: data collection, critical revision, and approval of the manuscript Douglas K. Rex: study design, data collection, and analysis, drafting and critical revision of the manuscript

Conflict of Interest

Douglas K. Rex – Consultant: Olympus Corporation, Boston Scientific, Braintree Laboratories, Norgine, Medtronic, Acacia Pharmaceuticals. Research Support: Olympus Corporation, Medivators, Erbe USA Inc, Braintree Laboratories. Shareholder: Satisfai Health. All other authors report no COIs.

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