Endoscopic Characteristics of Colorectal Serrated Lesions

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ABSTRACT

Background/Aims: With the recent changes of pathological concepts, colorectal serrated lesions can be now divided into traditional serrated adenoma, typical hyperplastic poly and sessile serrated polyp. The aim of this study is to clarify the endoscopic differences among these three groups.

Methodology: A total number of 362 serrated lesions larger than 5mm were evaluated. These were detected with ordinary view and observed also with magnifying chromoendoscopic view. The final pathologic diagnosis of the resected specimens was made blinded.

Results: There were significant differences between traditional serrated adenoma and sessile serrated poly concerning location, configuration and color. In chromoendoscopy, most of sessile serrated polyps and typical hyperplastic polyps showed star-like pattern, in contrast with traditional serrated adenomas most of which had fern- or pinecone-like pattern. The differential diagnosis between traditional sessile poly and the other two was possible with high accuracy. On the other hand, endoscopic distinction between sessile serrated poly and typical hyperplastic poly was not easy, except that the location and size were significantly different.

Conclusions: We can endoscopically differentiate between traditional serrated adenoma and sessile serrated poly or typical hyperplastic poly, but it is difficult to differentiate between the latter two.

INTRODUCTION

Now that we have various image enhancement modalities and magnification, endoscopic tissue characterization has become reality. Chromoendoscopy has been used to observe the structural patterns of the colorectal mucosa, or so-called “pit pattern” (1). It has been known to be useful not only for differentiating between neoplasia and non-neoplasia, but also for predicting the depth of cancer (2-5).

On the other hand, distinction between neoplasia and non-neoplasia may sometimes be difficult, as the concept of hyperplastic poly has been changing recently. Longacre and Fenoglio-Preiser (6) first established the concept of serrated adenoma, which mimics hyperplastic poly structurally but is still considered neoplastic cytologically, histochemically and molecular biologically. Jass \textit{et al.} (7) and Tollakovic \textit{et al.} (8) advocated that there is a group of lesions which closely resemble hyperplastic polyps but are genetically considered neoplastic and have a potential to evolve into carcinoma.

This group of lesion is now usually called sessile serrated poly (SSP) (9). Serration is a characteristic common to serrated adenomas, hyperplastic polyps and SSPs; hence the comprehensive term colorectal serrated lesions. Endoscopic characteristics of each group of colorectal serrated lesions and differential diagnosis among them have been scarcely reported. The aim of this study is to clarify the endoscopic differences among these three groups.

METHODOLOGY

A total number of 11,253 colorectal localized lesions were resected in our institute from April 2001 to June 2009. Among them 673 (6.0\%) were serrated lesions. In this study, serrated lesions more than 5mm in diameter were evaluated. The scopes used in this study were CF-H260AZI, CF-Q240ZI, and PCF-Q240ZI (Olympus, Tokyo). The insertion and withdrawal of the scope was done with ordinary view and magnifying observation was done only after a lesion was detected. Chromoendoscopy was performed with 0.2\% indigocarmine and, in addition, 0.05\% crystal violet as indicated (2). The pit patterns of serrated lesions were classified into pinecone-like, fern-like or star-like, according to our previous pilot study (\textit{Figure 1}) (10). The pit pattern diagnosis was made by reviewing the digitally recorded pictures of magnifying chromoendoscopic images of the lesions. The review was done by the

ABBREVIATIONS:

Serrated adenoma, Hyperplastic poly, Sessile serrated poly, Colorectal serrated lesions, Chromoendoscopy, Pit pattern

KEY WORDS:

Serrated adenoma, Hyperplastic poly, Sessile serrated poly, Colorectal serrated lesions, Chromoendoscopy, Pit pattern


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endoscopists who were blinded to the pathological diagnosis. Pinecone-like and fern-like patterns were considered to be characteristic for serrated adenomas. The final pathologic diagnosis was made by a pathologist who was blinded to the endoscopic findings. Serrated lesions were divided into three groups in this study: traditional serrated adenomas (TSAs), typical hyperplastic polyps (THPs) and sessile serrated polyps (SSPs).

The protocol was approved by the medical ethics committee of our hospital. All patients gave informed consent before each colonoscopic examination.

The SPSS for Windows Version 11.0 statistical software package was used for the data analysis. For the comparison of the demographic features of the subjects, Student’s t-test was applied. A p-value of less than 0.05 was considered significant.

RESULTS

The final pathology was TSA in 232 lesions, THP in 95 and SSP in 35. The average diameter of TSAs, SSPs and THPs was 12.0±9.0mm, 14.0±7.1mm and 7.9±3.6mm, respectively (Table 1). The difference of average size was significant between TSAs and THPs (p<0.001) and between SSPs and THPs (p<0.001). Traditional serrated adenomas had a preponderance of occurring in the distal colon (153 out of 232 (65.9%)), whereas SSPs were usually found in the proximal colon (29 out of 35 (82.9%)). There was a significant difference (p<0.0001) of location between TSAs and SSPs. As for the morphology of the lesions, the majority (156 out of 232 (67.9%)) of TSAs were more often (133 out of 232 (57.3%)) reddish. Again, the difference was significant (p<0.0001) between the two.

The pit patterns of the serrated lesions seen with magnifying chromoendoscopy are listed in Table 2. Eighty-five out of 95 (89.5%) THPs and 26 out of 35 (74.3%) SSPs showed star-like pit pattern (Figure 2). The proportion of TSAs that presented with star-like pit pattern was only 11.6% (27 out of 232). The rest of the TSAs showed either fern-like pattern (113 out of 232 (48.7%)) (Figure 3) or pinecone-like pattern (92 out of 232 (39.7%)) (Figure 4). Conversely, 92 out of 93 lesions (98.9%) with pinecone pit pat-
tern were TSAs. Most of the lesions with fern-like pit pattern (113 out of 131 (86.3%)) were also TSAs. However, those with star-like pattern encompassed not only THPs and SSPs but also TSAs.

According to the results of our previous pilot study we predicted that lesions with pinecone-like or fern-like pit pattern should be TSAs. The diagnostic properties of the pit pattern diagnosis were as follows: the sensitivity was 88.4%, the specificity was 85.4%, the positive predictive value was 91.5%,

<table>
<thead>
<tr>
<th>Pit pattern</th>
<th>TSA n=232</th>
<th>SSP n=35</th>
<th>THP n=95</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinecone-like</td>
<td>92</td>
<td>1</td>
<td>0</td>
<td>93</td>
</tr>
<tr>
<td>fern-like</td>
<td>113</td>
<td>8</td>
<td>10</td>
<td>131</td>
</tr>
<tr>
<td>star-like</td>
<td>27</td>
<td>26</td>
<td>85</td>
<td>138</td>
</tr>
</tbody>
</table>

TSA: traditional serrated adenoma; SSP: sessile serrated polyp
THP: typical hyperplastic polyp

**FIGURE 2** Typical case of sessile serrated polyp. **A**: A flat lesion was located over a fold in the ascending colon. **B**: Magnified view after crystal violet staining showed a star-like pit pattern. **C**: Histological view.

**FIGURE 3** Typical case of traditional serrated adenoma (i). **A**: A protruded lesion was detected in the sigmoid colon with an ordinary view. **B**: Indigocarmine spraying and magnification showed a pinecone-like pit pattern. **C**: Histological view.
negative predictive value was 80.4%, and the overall accuracy was 87.3% (Table 3). On the other hand, it seemed that pit pattern analysis was not very useful for differentiating between THPs and SSPs.

**DISCUSSION**

The reports by Longacre and Fenoglio-Preiser (6), Jass et al. (7) and Torlakovic et al. (8) have led to the new concepts of colorectal serrated lesions. A lot of pathologic and genetic studies suggest that serrated adenomas and sessile serrated polyps have potential for evolving into carcinoma, although they may resemble hyperplastic polyps at first sight. Although some of the serrated lesions may be potentially neoplastic, it would not be realistic to remove or biopsy all of them. It should be medically and economically beneficial if we could differentiate between the lesions with neoplastic potential and those without it.

Magnifying chromoendoscopy has been known to be useful for differentiating between tubular or villous adenomas and typical hyperplastic polyps (2-5). However, endoscopic characteristics of serrated adenomas and sessile serrated polyps have not been clarified enough.

Our results show that the average size of lesion was substantially bigger in TSAs and SSPs than in THPs. Traditional serrated adenomas had a preponderance of occurring in the distal colon, in contrast with SSPs (65.9% vs. 17.1%). The majority (67.2%) of TSAs presented as protruded lesions, but SSPs were mainly (74.3%) flat. Serrated adenomas were often (57.3%) reddish in color, but SSPs were usually (80.0%) normochromatic or slightly pale. In chromoendoscopy, 89.5% of THPs and 74.3% of SSPs showed star-like pattern, whereas 88.4% of TSAs showed fern- or pinecone-like pattern. In summary, a reddish and protruded lesion with pinecone- or fern-like pit pattern and can be endoscopically diagnosed as TSA. A proximally located, whitish flat lesion with star-like pit pattern is characteristic of SSP.

Thus we can differentiate between TSA and SSP or THP endoscopically, especially with magnifying chromoendoscopy. However, it is difficult to differentiate between SSP and THP except that the former is usually located in the proximal colon and is bigger in size.

Recently, a technique called narrow band imaging (NBI) has been developed (11), which changes
the optical filters of the current sequential lighting videendoscopes to spectral narrow-band filters. It enables emphasizing the images of vascular and mucosal patterns without the use of dye. We (12), and other researchers (13-15), have reported that an NBI system is a promising tool for distinguishing between neoplastic and non-neoplastic lesions, as well as predicting the depth of cancer especially when combined with magnification. We believe that the combination of pit pattern and vascular pattern should be promising for the differential diagnosis among TSA, THP and SSP, but accumulation of more cases studied with NBI is necessary for the establishment the diagnostic criteria.

REFERENCES