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Original contribution

Microscopic ileitis in diverted and nondiverted enteric segments: an underrecognized condition with a multifactorial etiology☆

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Summary Microscopic ileitis has been infrequently reported in the literature with the few reported cases usually associated with concurrent microscopic colitis. Having encountered a case of collagenous ileitis involving the diverted distal limb of a loop ileostomy and sparing the proximal limb, we examined additional cases of loop ileostomy, end ileostomy, colostomy, and the accompanying diverted colorectal segment for features of microscopic ileitis and colitis. A total of 101 cases of diverted and nondiverted enteric segments were examined from 37 loop ileostomies, 16 end ileostomies, and 12 colostomies status post–Hartmann's procedure. The patients' clinical histories, including demographics and risk factors for microscopic colitis, were obtained from electronic medical records. The index case and an additional case showed collagenous ileitis: the former in the diverted distal limb, and the latter in the nondiverted proximal limb of the loop ileostomy. The latter was associated with high ileostomy output with watery diarrhea. Two additional cases showed lymphocytic ileitis: one in the nondiverted proximal limb of loop ileostomy and the other in the end ileostomy. All 4 patients had one or more risk factors for microscopic colitis. The etiology of microscopic ileitis seems to be multifactorial, and microscopic ileitis may be underdiagnosed. The diverted enteric segment may be involved by microscopic enteritis, suggesting that additional factors other than fecal stasis and altered bacterial flora may be contributing to its pathogenesis. When microscopic ileitis is encountered, identifying associated risk factors, recognizing incipient clinical symptoms of microscopic colitis, and considering other associated diseases or conditions are warranted.

1. Introduction

Microscopic colitis is a clinicopathological entity characterized by normal or near-normal endoscopic findings, and abnormal histologic findings. Histologically, collagenous colitis shows a thickened subepithelial collagenous band entrapping small vessels, inflammatory cells, and fibroblasts

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associated with injured and sometimes denuded surface epithelium. Lymphocytic colitis shows increased intraepithelial lymphocytes (IELs) associated with crypt and surface epithelial injury [1,2]. Both may show increased inflammatory cells in the lamina propria, predominantly mononuclear cells, often with a top-heavy pattern [2]. Patients with microscopic colitis usually present with chronic or intermittent watery diarrhea; thus, exclusion of other etiologies accountable for the symptoms, such as an infectious etiology or an inflammatory bowel disease (IBD), is required to render the diagnosis [2,3].

Similar histologic findings have been documented in other parts of the gastrointestinal (GI) tract with variable clinical implications, such as in lymphocytic gastritis, celiac disease, collagenous gastritis, and collagenous sprue [4-6]. Multiple GI organs may be involved by similar processes in a given patient, such as seen in the coexistence of celiac disease and lymphocytic or collagenous colitis, and collagenous sprue with collagenous colitis [2,4,6-8].

Collagenous ileitis has been infrequently documented in the literature. The largest case series studied 13 cases of collagenous ileitis, 7 of which were associated with lymphocytic or collagenous processes of other parts of the GI tract, and 2 cases were considered to represent isolated collagenous ileitis. In 2 patients, gastric and duodenal biopsies were not available for review [4]. Additional reports of collagenous ileitis cases were all associated with either lymphocytic or collagenous colitis [9-12]. Although the pathogenesis of collagenous and lymphocytic ileitis is unknown, its frequent coexistence with colonic involvement suggests a common shared etiology and risk factors.

Recently, we encountered a case of collagenous ileitis involving a diverted distal limb of a loop ileostomy but sparing the nondiverted proximal limb that had been exposed to the fecal stream. The patient did not have a history of collagenous gastritis, sprue, collagenous colitis, or chronic watery diarrhea. This interesting observation prompted us to examine additional cases of end ileostomy, loop ileostomy, colostomy, and the resected diverted colorectal segment to evaluate the features of microscopic ileitis and colitis in these specimens. End ileostomy, the proximal limb of loop ileostomy, and colostomy would be a surrogate model for injured enteric mucosa that is exposed to the fecal stream. The diverted distal limb of loop ileostomy and resected diverted colorectal segment would be a model for diverted enteric mucosa without exposure to the fecal stream. If the features of microscopic ileitis/colitis are common in particular segments, the observation may shed light on the pathogenesis of microscopic ileitis/colitis that remains largely speculative. In addition, studying the incidence of microscopic ileitis in this setting may confirm or dispute the assertion that microscopic ileitis may be underrecognized [4].

The goals of this study are to investigate the incidence of microscopic ileitis/colitis in ileostomy, colostomy, and diverted colorectal segment specimens, and understand the pathogenesis of microscopic ileitis/colitis.

2. Materials and methods

The study was approved by the institutional review board at Albany Medical Center. In total, 37 loop ileostomies, 16 end ileostomies, and 12 colostomies status post–Hartmann's procedure were retrieved from the archived files in the Department of Pathology (2015-2017). Among these, 3 cases of loop ileostomy, 4 end ileostomy, and 12 colostomy cases accompanied a resected diverted colorectal segment. Among the 37 loop ileostomy specimens, 19 were oriented and representative sections were taken separately from proximal limb and/or diverted distal limb with designation. The remaining 18 loop ileostomy cases were not oriented and random representative sections were taken. Therefore, in total, 101 segments of enteric mucosa were examined:

1. 46 segments that were exposed to the fecal stream: 18 from proximal limb of loop ileostomy, 16 end ileostomy and 12 colostomy;
2. 37 segments of diverted enteric mucosa: 18 from the diverted distal limb of loop ileostomy, 7 diverted colon segments accompanying the loop/end ileostomy, and 12 diverted colorectal segments status post–Hartmann's procedure; and
3. 18 un-oriented loop ileostomy cases.

Archived hematoxylin and eosin slides prepared from the formalin-fixed, paraffin-embedded tissue blocks were reviewed. Cases with features suspicious for collagenous ileitis/colitis were subject to Masson trichrome staining.

Focal (<1 mm in width) thickening of subepithelial collagenous layer in association with focal epithelial injury was common in ileostomy and colostomy specimens. Therefore, an arbitrary cutoff of 30% involvement of the slide was applied. A case was considered positive for features of collagenous ileitis/colitis when, first, subepithelial collagenous thickening involved greater than 30% of the sampled ileal or colonic mucosa in a given representative section, and second, the thickness of the collagenous bands was greater than 10 μm as previously proposed [13]. Lymphocytic ileitis/colitis was defined as having more than 20 IELs per 100 surface epithelial cells [14]. Epithelium near lymphoid follicles was avoided. For the cases with features of collagenous or lymphocytic ileitis/colitis, previous and/or subsequent GI resections and biopsies from the same patient were also reviewed. The same criteria for collagenous and lymphocytic enteritis were applied during evaluation.

For diverted colorectal segments, the presence or absence of diversion colitis was evaluated. Features of diversion colitis included diffuse lymphoid follicular hyperplasia, varying degrees of activity including ulcer, erosion, cryptitis, crypt abscesses, lymphoplasmacytic inflammation in the lamina propria, and crypt architectural distortion [15].

Clinical histories were obtained from the electronic medical records. The patients' age, sex, primary