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Pathological Analysis of Lesions within Intestines Resected Due to Ulcerative Colitis

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Introduction: Ulcerative colitis (UC) and Lesniowski-Crohn's disease together constitute a type of intestinal pathology known as Inflammatory Bowel Disease. The etiology of UC still remains unknown, however some epidemiological data suggest the role of bacteria and viruses and also some habitual as well as environmental factors like smoking, diet, drugs, geographical and social status, as well as stress. The genetic predisposition is also suggested. UC affects young people in 2nd–4th decades of life. Exacerbations of the disease may result in the necessity of surgical treatment, typically in the form of total proctocolectomy accompanied by the subsequent formation of ileo-pouch-anal anastomosis. The aim of our study was to analyze morphological pictures of resected specimens. Material and methods: We analyzed 67 cases (40 women and 27 men) of UC with the special interest being focused at macro- as well as microscopic features of the intestines resected. We reviewed macroscopic characteristics of intestines (i.e. the length of resected fragments, localization, shape and diameter of the ulcers, polyps, number of resected lymph nodes), as well as microscopic descriptions concerning, among others the character and localization of inflammatory infiltrate, the architecture of glands, the presence of crypt abscesses and Paneth's metaplasia. Special attention was paid to the morphology of intestinal wall vasculature. Results: In 42% of the cases macroscopically the inflammation covered the whole length of the resected colon. In 58% macroscopically detected inflammatory changes were segmental in distribution. In four cases the disease had clinically the fulminant course and the inflammation was transmural. There were 3 cases, in which histological assessment revealed the presence of malignancy (2 cases of mucus producing adenocarcinoma and one case of carcinoma *in situ* situated in the anal canal). Generally, microscopic findings were typical for the active phase of UC. We found intensive vascularization and hyperemia of the intestinal wall to be the common features accompanying the inflammation. Conclusions: Young people in the 3rd and 4th decades of life constitute the group being relatively commonly affected by the UC, and undergo the surgical proctocolectomy. Some of the cases present with the fulminant course of the disease. A rich vascular network is a common finding in the inflamed intestinal wall. We hypothesize, that intensive vascularization may play a significant role in the pathogenesis of UC.

Introduction

Ulcerative colitis (UC) and Lesniowski-Crohn's disease together constitute a type of intestinal pathology known as Inflammatory Bowel Disease The etiology of UC still remains unknown, however some epidemiological data suggest the role of autoimmunological response triggered by the saprophytic bacteria residing in large bowel [2, 3, 8, 18, 21, 29]. Some authors discussed the possible role of viruses in pathogenesis of UC [9, 13, 26]. Its seems that some habitual and environmental factors like smoking, geographical and social status, stress, fast food, cola drinks, toothpaste, as well as antibiotics and oral contraceptives may be involved [4, 6, 7, 17]. The genetic predisposition has been also suggested [10, 11, 19, 25]. UC affects mostly young people (equally, men and women) in the 2nd–4th decades of life. Exacerbations of the disease may constitute indication for an urgent surgical in-

tervention. The usual procedure includes total proctocolectomy with the preservation of the anal canal and the anal sphincter as well as subsequent restorative proctocolectomy with the formation of ileo-pouch-anal anastomosis.

The aim of this study was to analyze the morphology of resected intestinal specimens.

Material and Methods

We analyzed material from 67patients with UC, who underwent total colectomy or proctocolectomy during the period 1993–2003.

The resections were performed due to the failure of the conservative pharmacological treatment, frequent relapses, bloody diarrhea, anemia as well as other complications of UC.

The analyzed group consisted of 40 women and 27 men (mean age of 36.5 years, ranging from 14 to 67 years). Mean period from the onset of the disease to the bowel resection was 86 months (ranging from 3 months to 45 years).

In 18 cases there was a need for the subsequent resection of the rest of the rectum due to the occurrence of unresponsive to pharmacological treatment inflammatory changes in that region. The mean interval between the first and the second resection was 18 months (ranging from 4 to 50 months).

Pathological reports consisted of macroscopic description of the resected intestinal fragments (i.e. the length of the specimen, the number, localization and size of ulcers, polyps, the number of lymph nodes resected). Microscopical description included the information concerning the localization, intensity and type of inflammatory infiltrate, the presence of crypt abscesses and Paneth's metaplasia, as well as the architecture of glands. Special attention was paid to the morphology of the vasculature within the intestinal wall.

Results

The resected specimens encompassed mainly colon, cecum and appendices. An average length of resected bowel was 82.3 cm (ranging from 30 to 160 cm).

The mean value of BMI calculated for some of the analyzed patients was 20.3 (ranging from 14.4 to 23.9). There were no cigarette smokers among the study patients.

In 28/67 cases (42%) macroscopically the inflammatory changes covered the whole length of large intestines, whereas the segmental distribution (at least 15% of the length of resected bowel) was appreciated in 39 cases. Inflammatory changes were mostly visible in the distal regions of specimens. In one case an intensive inflammation was localized predominantly in the ascending and transverse colon with skipping of distal segments (so-called right-sided colitis). In 4 cases the disease was fulminant in presentation, with the morphological characteristics typical for toxic megacolon (transmural inflammation associated with marked dilatation of the intestinal lumen, and thinning of the intestinal wall). Among common findings were inflammatory polyps of different size and longitudinal ulcers of the mucosa (Fig. 1) concomitant with the bloody-mucinous-faecal content in the intestinal lumen. In a few cases there were large areas of intestinal mucosa desquamation.

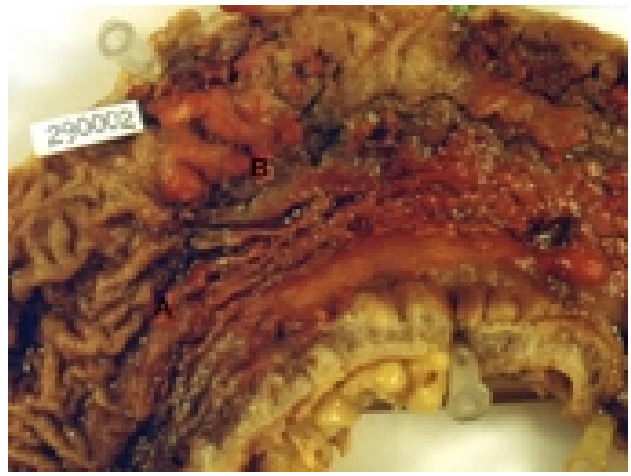

Fig. 1. Macroscopic view of resected large bowel. A – longitudinal ulceration. B – inflammatory polyp (pseudopolyp).

There were 3 cases of intestinal malignancy detected in the study material. In two cases tumors were composed of locally advanced, partially signet-ring, mucus-producing adenocarcinoma. In the third case we detected *in situ* cancer of the anal canal.

Interestingly we found relatively large number (mean of 21, ranging from 1 to 70) of peri-intestinal lymph nodes. At the microscopic level all of these nodes were found to be reactive.

Among microscopical changes most were characteristic for the active phase of UC, such as:

- diffuse mononuclear infiltrate within mucosa and submucosa,
- infiltration of the crypt wall by neutrophiles (cryptitis),
- crypt abscesses with crypt damage,
- mucin depletion in goblet cells,
- loss of epithelium with mucosal ulceration,
- loss of parallelism and branching of crypts,
- inflammatory polyps (pseudopolyps),
- Paneth's cell metaplasia.

The histological analysis of resected material revealed quite intensive vascular congestion in different layers of intestinal wall, especially within submucosa. Occasionally there were mucosal petechiae and non-neoplas-

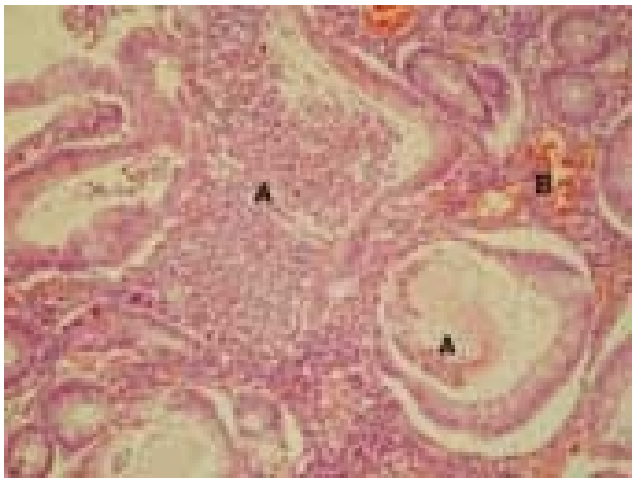

Fig. 2. Microscopic picture of UC. A – crypt abscesses. B – vascular congestion.

tic proliferation of vessels suggestive of angiogenesis (Fig. 2).

Cases with fulminant presentation were characterized by diffuse ulcerations, inflammatory infiltrates penetrating into the muscular layer, and the thinning of intestinal wall. There were also flat inflammatory infiltrates seen within the subserosa in these fulminant cases.

A microscopical evaluation of inactive cases of UC revealed no crypt abscesses, crypt distortion nor Paneth's cell metaplasia.

Discussion

We reviewed 67 UC cases (40 women and 27 men). The mean age of the patients studied was 36.5 years, which is similar to the other published series [1, 9, 14]. Mean period from the onset of the disease to the bowel resection was 86 months in contrast to 36 and 60 reported by others [14, 22].

In almost half of our cases (42%) the colon was diffusely inflamed, whereas in the series studied by Ozdil et al. the percentage of cases with pancolitis was 60.

One of the most severe complications of UC is intestinal adenocarcinoma. We recognized carcinoma in 4% of studied cases (3/67), which was similar to the data presented by Sada et al. (2.6%) [23], but less then the percentage reported by Gorfin (5.9%) [12].

According to Eaden the cancer risk in UC is rising with the duration of the disease and achieves 2% after 10, 8% after 20 and 18% after 30 years of observation [5].

Toxic megacolon, one of the severe complications, typical for the fulminant course of UC, is associated with the high risk of septicemia [28]. In our material 6% (4/67) of cases had the fulminant presentation, in contrast to 1.4% reported in the paper of Triantafillidis [27].

Macroscopic findings in intestines examined in our study fulfilled classic Morson's and Dawson's criteria [20] with characteristic bloody content, longitudinal mucosal ulcerations along the intestinal teniae and particularly the presence of inflammatory polyps (pseudopolyps).

At the microscopic level findings typical for the active phase of UC encompass changes commonly considered as characteristic for that type of colitis [20, 30], such as mucin depletion in goblet cells, distortion of crypt architecture, infiltration of the crypt wall by neutrophiles (cryptitis), crypt abscesses with the crypt damage, as well as diffuse and intensive mononuclear infiltrate (composed mostly of plasma cells) within mucosa and submucosa, with the deeper infiltration reaching muscular layers and subserosa characteristic for the fulminant cases.

Microscopic pictures were completed by vascular changes composed of dilatations of capillaries and blood congestion in all intestinal layers, especially in submucosa and mucosa. There were ecchymoses within lamina propria, sometimes just beneath the covering epithelium, as well as within ulcerated mucosa. These pictures could explain bloody diarrhea present during the active phase of the disease and macroscopic view of bloody intestinal content. In some areas of the intestinal wall there were plenty of different size vessels, some of them with features of proliferation resembling the process of angiogenesis. The role of vascular proliferation within intestinal wall in patients with UC is currently under investigation [15, 16, 24].

Conclusions

UC affects mostly young people in 3rd–4th decades of life. Exacerbations of the disease may lead to the necessity for surgical treatment, typically proctocolectomy.

Resected intestines have the characteristic morphology, typical for the acute phase of inflammation, which sometimes is associated with the fulminant course of the disease.

We hypothesize, that intensive intestinal wall vascularization may play a role in the pathogenesis of UC.

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