

RECTAL CANCER ASSOCIATED WITH SCHISTOSOMIASIS: REPORT OF TWO CASES AND REVIEW OF THE LITERATURE

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Rectal cancer is one of the most common malignancies in the West. The incidence in the developing countries is also increasing. There are various reasons for this escalation, including changes in dietary habits, particularly among urban dwellers, and parasitic infections. The risk of colorectal cancer is known to be increased in patients with long-standing schistosomal colitis. We present two male patients who had low rectal cancer (pT₃N₃M₀, and pT₃N₂M₀) for which they were treated with A-P resection and adjuvant chemoradiation. Histological examination of the specimen revealed moderately differentiated adenocarcinoma with extensive schistosomal colitis. The literature was reviewed. The relation between colorectal cancer and intestinal schistosomiasis should be considered as precancerous.

Case Reports

Case 1

A 46-year-old Saudi male patient presented with a two-month history of constipation and fecal soiling. This was associated with rectal bleeding, anal pain and loss of weight and appetite. There were no previous similar symptoms. There was no family history of colorectal polyps or malignancies. Previous history of schistosomiasis was not evident. The patient was neither a smoker nor an alcoholic.

On examination, the patient looked fairly well, without pallor, jaundice or lymphadenopathy. Abdominal examination was unremarkable. Rectal digital examination revealed a low-lying annular stricture, 1 cm from anal verge, through which we could neither pass a finger nor the colonoscope. A biopsy was taken.

The patient's blood work (complete blood count, liver function tests, urea, electrolytes, blood sugar) were within normal limits. His erythrocyte sedimentation rate was 80

mm/hour. Serum carcinoembryonic antigen was 2.2 ng/mL (<5 ng/mL). Chest x-ray showed clear lung fields. KUB showed calcification of the entire wall of the urinary bladder. Abdominal sonography demonstrated no focal hepatic lesions, but there was bilateral hydronephrosis, more on the right side. On barium enema examination, the entire rectum and part of the sigmoid colon were narrowed, irregular and ulcerated. The lateral view showed widening of the presacral space. CT scan of the abdomen and pelvis showed a narrowed rectum without focal hepatic lesions or lymphadenopathy.

The result of the rectal biopsy was moderately differentiated adenocarcinoma with schistosomal colitis.

After bowel preparation, the patient underwent A-P resection with colostomy and insertion of double-J ureteric stents. The tumor extended from the sigmoid colon to the anal verge with extensive adherence to the lateral pelvic wall. Both ureters were dilated (R>L) and adherent to iliac vessels, from which they were separated with great difficulty due to extensive fibrosis. A few para-aortic lymph nodes were excised. The pelvic peritoneum was closed.

Postoperatively, the patient developed temporary urinary incontinence. Gross examination of the specimen showed an annular tumor 10 cm long with 3 cm wall thickness. Histopathology showed a moderately differentiated adenocarcinoma of the rectum reaching perirectal fat with vascular and perineural invasion. Central nodes showed metastasis. There were also extensive calcified schistosomal mansoni eggs (Figure 1). The TNM staging was pT₃N₃M₀.

Case 2

A 55-year-old male patient presented with hematochezia and tenesmus of 3 weeks' duration. There had been a change in bowel habits, loose motions, increased frequency urgency and spurious diarrhea. The patient had lost 8 kg over 4 months. He was a known diabetic and hypertensive on medications, with no family history of colorectal neoplasms or previous history of ulcerative colitis or schistosomiasis. The systemic review was unremarkable.

Upon examination, the patient looked well. Abdominal examination was unremarkable. Digital rectal examination revealed a rectal mass extending down to 2 cm above the

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FIGURE 1. Moderately differentiated adenocarcinoma of the rectum. Calcified schistosomal mansoni eggs are seen (H&E, 250x).

anal verge. A biopsy was taken and showed invasive moderately differentiated adenocarcinoma with many schistosoma ova.

Investigations including CBC, urea, electrolytes, liver function tests, clotting profile and chest x-ray were within normal limits. Carcinoembryonic antigen was 3.03 (0-4.6 ng/mL).

CT scan of the pelvis showed thickening of the rectal wall. Colonoscopy showed a tumor in the lower third of the rectum and the rest of the colon was free. Hepatic ultrasound showed no focal hepatic lesions.

The patient underwent preoperative chemotherapy and radiotherapy (4500 cGy), followed six weeks later by abdominoperineal (A-P) resection. Postoperative recovery was uneventful. The patient received postoperative chemotherapy. The TNM staging was pT₃N₂M₀.

Discussion

Although survival rates have improved significantly over the last 25 years, incidence rates of colorectal cancer are still rising. It is the second most common malignancy in the U.K.¹

The precursors of colorectal carcinoma are adenomatous polyps and chronic inflammatory bowel diseases related to ulcerative colitis and Crohn's disease. Infectious diseases, on the other hand, are common in the tropics and some of these infections may have a relation to colorectal malignancies. Schistosomiasis is prevalent in the Middle East, Africa, and South East Asia. While the relation between urinary schistosomiasis and bladder carcinoma is well established, the etiological context between intestinal schistosomiasis and colorectal carcinoma is controversial.² Ibrahim found microscopic schistosomal deposits in some cases of rectal cancer and believed that this was merely a coincidental association,³ while mass screening programs in China using occult blood and rectoscopy showed that there was no evidence for an

association between schistosomiasis and colorectal cancer.^{4,5}

A study of 89 cases of alimentary tract malignancies in the Eastern Province of Saudi Arabia found no pathological evidence to support an etiological association between schistosomiasis and large bowel malignancies.⁶

Li studied 50 cases of colon specimens using light and electron microscopy. He found nonspecific changes in colon cancer with schistosomiasis, implying, as in the previous reports, no direct relationship between colon cancer and schistosomiasis.⁷

The relationship between colorectal carcinoma and schistosomiasis was confirmed by several studies on the basis of histological examinations. Shindo reviewed 276 cases of large intestine cancer with schistosomiasis and found significant differences between carcinoma with schistosomiasis and ordinary carcinoma in symptoms, age, sex and histological findings, suggesting that schistosomiasis induces carcinoma.⁸

A variety of pathological changes in 289 cases of colorectal carcinoma with schistosomiasis were described and found to play an etiological role in bowel malignancy.⁹ These changes included diminutive polyps, pseudopolyps, ectopically proliferating glands, disintegrated muscularis mucosae, denudation and multicentric carcinoma.

Out of 60 patients with schistosomal granulomatous disease of the large intestine without carcinoma, 36 were found to have mild to severe dysplasia. These dysplastic changes are regarded as the pathological basis for the malignant potential of schistosomal colitis and they resemble the changes found in long-standing ulcerative colitis.¹⁰

Helmstadter et al. pointed out that chronic intestinal schistosomiasis is a potentially precancerous condition.¹¹ Investigators believe that the mechanism of schistosomal injury is due to endogenous production of toxins by the eggs rather than a direct carcinogenic action of the eggs.⁷ However, Matsuda et al. believed that schistosomal ova have some effect on carcinogenesis.¹²

All types of schistosomal eggs have been found to be related to colorectal cancer. In the vast majority of the cases it was *Schistosoma japonicum*,^{2,8,12,14,15,17} followed by *S. mansoni*¹⁸ and *S. haematobium*.¹¹ Intestinal schistosomiasis induces various pathologic conditions. These include carcinoma,^{2,3,7-9,11,13-15,17,19,20} lymphoma,¹⁸ polyps,^{21,22} carcinoid,²³ and pedunculated teratoma.²⁴

Chronic inflammation and dysplasia may be a promoting factor for the development of colorectal cancer in schistosomiasis.^{2,8} Epithelial dysplasia is the initial histologic and cytologic alteration, common to all groups of patients with high risk of development of colorectal cancer.^{10,25,26} These dysplastic changes resemble those found in long-standing ulcerative colitis.^{9,10}

Molecular biology studies showed mutations in p53 tumor suppressor gene in rectal cancer with or without schistosomiasis. These mutations in schistosomal rectal cancer are the result of genotoxic agents produced

endogenously through the course of schistosomiasis japonica.¹³

The 5-year survival rate in schistosomal rectal cancer is 45.6%,²⁰ lower than that without schistosomiasis. In our case the tumor was locally advanced. This lowered survival rate may be associated with a higher percentage of negative immune response in the regional lymph nodes and higher percentage of infiltrating growth pattern of the tumor. An infection with schistosomiasis should be considered as one of the important factors in prognosis.²⁰

The risk of cancer development in schistosomiasis is related to the site of involvement. The relative risk of rectal cancer in schistosomiasis is 8.3, while it is not significantly increased in colon cancer (1.20).¹⁶

In conclusion, the biology of colorectal carcinoma in the tropics is different from that in the West. Intestinal schistosomiasis should be considered as a precancerous condition for subsequent development of colorectal carcinoma. The pathogenesis follows a chronic inflammation-dysplasia-carcinoma sequence. This sequence of events is analogous to the development of carcinoma in ulcerative colitis. The outcome is lower than that for ordinary carcinoma because of local advancement of the tumor.

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