Polymicrobial Peritonitis Following Colonoscopic Polypectomy in a Peritoneal Dialysis Patient

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Abstract

Patients undergoing continuous ambulatory peritoneal dialysis (CAPD) are at an increased risk of peritonitis following colonoscopy with or without polypectomy. Guidelines for peritoneal dialysis patients recommend administration of prophylactic antibiotics and drainage of the abdomen before colonoscopy. In this report, we describe a 53-year-old woman on CAPD who underwent colonoscopy with polypectomy and developed peritonitis within 24 hours. She presented with severe abdominal pain, typical rebounding tenderness, and turbid dialysate containing increased white blood cells with a predominance of neutrophils. A culture of the patient’s peritoneal fluid grew polymicrobial species including Escherichia coli, Klebsiella pneumoniae, and Enterococcus faecalis. She was treated with intraperitoneal and intravenous administration of combination antibiotics, and she fully recovered within 3 weeks. We suggest that nephrologists and endoscopists should be familiar with the risks and follow the guidelines to prevent such complications in CAPD patients. If peritonitis occurs, medical therapy with antibiotics should be considered before surgical intervention for catheter salvage.

Key words: polymicrobial, peritonitis, colonoscopy, polypectomy, peritoneal dialysis

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Introduction

Peritonitis is a severe complication of continuous ambulatory peritoneal dialysis (CAPD) and is the leading cause of switching from CAPD to hemodialysis (1). There are several pathogenic routes of CAPD-related peritonitis, including intra-luminal, peri-luminal, and transvisceral migration (due to intra-abdominal pathology); hematogenous spread; and vaginal leak. Intra-abdominal pathology occurs most commonly from bowel leak and often following endoscopic procedures. Few case reports on CAPD peritonitis after colonoscopy with or without polypectomy can be found in the literature (2-6). Currently, the International Society for Peritoneal Dialysis (ISPD) guidelines recommended intravenous administration of antibiotics and emptying the peritoneal dialysate before colonoscopy as preventive measures (7). However, studies on these guidelines are rare, and randomized controlled studies to support this recommendation are lacking. Here, we report our experience with a patient who developed peritonitis following colonoscopic polypectomy and was successfully treated with antibiotics alone.

Case Report

The patient, a 53-year-old woman with end-stage renal disease due to chronic glomerulonephritis, was maintained on CAPD for 4 years without previous peritonitis episodes. She scheduled a colonoscopy because of a history of colon polyps and an elevated CEA level (11 ng/mL) detected at the gastrointestinal outpatient clinic. Polyethylene glycol (PEG) was used for colonoscopy preparation, and adequate preparation was achieved. The patient also emptied her dialysate shortly before the colonoscopy, but no prophylactic antibiotics were administered. During the procedure, a total of 5 polyps were removed by snare polypectomy; 2 of these were found on the ascending colon (4 and 6 mm in size), 1 on the hepatic flexure (8 mm), and 2 on the transverse colon.
and the European Society of Gastrointestinal Endoscopy (ASGE) (10) for screening colonoscopy and 0.5-3% for colonoscopy with therapeutic intervention such as snare resection, and finally hemoclipping of the wound was performed to reduce potential procedure-related bleeding. The patient tolerated the procedure well and left the hospital uneventfully.

The following day, the patient was brought to the emergency department because of abdominal pain, a cloudy dialysate, and fever of up to 38.4°C. Physical examinations showed obvious peritoneal signs with diffuse abdominal pain and rebounding tenderness. The laboratory analysis revealed an elevated C-reactive protein of 16.34 mg/dL and leukocytosis of 13,700/L. The dialysate contained 145 white blood cells/mm³ with 99% neutrophils. Based on these findings, the patient was diagnosed with CAPD peritonitis, and the most likely etiology was related to the colonoscopic procedure.

Initially, empirical intraperitoneal antibiotics with cefazolin and ceftazidime were used to treat the patient. The following day after commencement of antibiotics, the white blood cell count of her dialysate routine elevated to 8,130/mm³ with 99% neutrophils, and she experienced severe unremitting abdominal pain. Abdominal computerized tomography (CT) was necessary to evaluate possible intestinal perforation, and the need for possible surgical intervention. However, she refused abdominal CT study and surgical treatment; hence, intravenous metronidazole was added to her treatment regimen of intraperitoneal antibiotics cefazolin and ceftazidime.

Three days later, a culture of her peritoneal fluid grew polymicrobial species including Escherichia coli, Klebsiella pneumoniae, and Enterococcus faecalis. The polymicrobial nature highlighted the pathogenic role of the colonoscopic procedure in the development of peritonitis. Intrapерitoneal antibiotics were shifted to cefazolin and ampicillin according to the bacterial sensitivity test. The patient’s fever and abdominal pain gradually improved, and the dialysate was clear after 5 days of treatment. She was discharged with maintenance intraperitoneal antibiotics with cefazolin plus ampicillin for a total of 21 days. Follow-up examination at 1 month showed a normal functioning peritoneum and a stable peritoneal dialysis course.

### Discussion

Colonoscopy is widely accepted as a safe procedure for the screening and management of colorectal cancer and precancerous polyps. In the general population, the risk of overall complication is estimated to be between 0.1-0.8% for screening colonoscopy and 0.5-3% for colonoscopy with polypectomy (8, 9). In the current guidelines of the American Society for Gastrointestinal Endoscopy (ASGE) (10) and the European Society of Gastrointestinal Endoscopy (ESGE) (11), administration of prophylactic antibiotics is recommended in the high-risk group for endocarditis, but not for CAPD patients with increased risk of peritonitis. The workgroup of the 2005 International Society for Peritoneal Dialysis guidelines recommended emptying of the abdomen and prophylactic administration of a combination of 2 to 3 antibiotics covering enteric bacteria prior to colonoscopy in CAPD patients. Although no randomized study was available, these recommendations are supported by a retrospective study by Yip et al. in Hong Kong, in which 77 CAPD patients undergoing 97 colonoscopies were evaluated (9). In that study, the risk of peritonitis after colonoscopy without prophylactic antibiotics was found to be relatively high (6.3%), but no peritonitis developed in the 18 patients who were given prophylactic antibiotics prior to the procedure. Surprisingly, colonic biopsy or polypectomy was not associated with a higher risk of peritonitis in CAPD patients.

In CAPD patients, the non-physiologic hyperosmolar glucose-containing dialysates and continuous exchange of fluids cause substantial impairment of host defense mechanisms by diluting the peritoneal macrophage, cytokine, and opsonin levels (12, 13). Also, the peritoneal catheter acts as a foreign body, thereby increasing the risk of developing and sustaining infection. Furthermore, the cautery effect associated with snare polypectomy may result in electrothermal injury of the colonic wall, causing serosal changes and hemorrhage or fibrosis of the muscularis propria (14). Serosal tear and/or mini-perforation may induce limited transmural migration of gut flora and result in localized symptoms (15). With small inoculums of bacterial migration, polypectomy can readily cause peritonitis in these immunocompromised CAPD patients. Although polypectomy did not increase the rate of complication in a retrospective study of PD patients (9), the overall complication rate of therapeutic colonoscopy in the general population had a 3- to 5-fold increase with biopsy or polypectomy. Moreover, a recent case report described a 48-year-old PD patient who developed PD peritonitis after colonoscopic polypectomy for 7 polyps (varying from 0.5 to 1.5 cm in size) despite full coverage with 3 combined antibiotics (ampicillin, gentamycin, and amoxicillin) (6). Although the endoscopic procedure was well tolerated and uneventful, the large number of polyps snared may have contributed to bacterial translocation and peritonitis in that patient. Therefore, the suspicion of colorectal malignancy and the indication of performing colonoscopic polypectomy should be carefully weighed against the increased risk of peritoneal infection in PD patients. While large-scale randomized studies are presently unavailable, endoscopists should be familiar with the present guidelines and give antibiotic prophylaxis and drain the abdomen before examination.

Polymicrobial peritonitis is more severe than single-organism peritonitis in terms of greater frequencies of hospitalization, catheter removal, permanent hemodialysis switching, and death (16). Generally, polymicrobial peritonitis in PD patients is suggestive of intra-abdominal pathology; early surgical evaluation and catheter removal are therefore
suggested (7). However, recent large-scale studies showed that most patients with polymicrobial peritonitis responded well to antibiotic therapy alone without catheter removal (16, 17). Although most of the polymicrobial peritonitis in these studies was not associated with a colonoscopic procedure, successful treatment in the present case and the cases from the previous reports (2-5) warrant a trial for conservative treatment with intraperitoneal antibiotics alone in these patients. With careful and thorough clinical monitoring, the peritoneal catheter can be salvaged without transferring the patient to hemodialysis.

Conclusion

PD peritonitis is a severe complication in CAPD patients undergoing colonoscopy, especially with polypectomy. According to the latest guidelines and our experience, we recommend dialysate drainage and antibiotic prophylaxis prior to the examination in addition to a well-prepared colon as preventive measures to reduce the risk of peritonitis. Regarding the decision to perform polypectomy in these patients, it is important to balance the risk of malignant changes of the polyps with the potential risk of subsequent peritonitis. We suggest that nephrologists and endoscopists should be familiar with these risks and follow the current guidelines to prevent such complications in CAPD patients. If peritonitis occurs after colonoscopy, a therapeutic trial with antibiotics administration should be considered for catheter salvage before surgical intervention.

The authors state that they have no Conflict of Interest (COI).

References


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