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Case report-Olgu sunumu

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Sclerosing encapsulating peritonitis; silent danger in continuous ambulatory peritoneal dialysis patients: case report and review of the literature

Sklerozan enkapsüle peritonit; sürekli ayaktan periton diyalizi yapan hastalardaki sessiz tehlike: olgu sunumu ve literatürün gözden geçirilmesi

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Abstract

Sclerosing encapsulating peritonitis is a rare complication of continuous ambulatory peritoneal dialysis. Sclerosing encapsulating peritonitis causes weight loss, intermittent bowel obstruction and decrease in peritoneal water and solute transport. Mortality may reach up to 50% due to severe malnutrition and ileus. Although the etiology is not fully known, many reasons such as frequent peritonitis attacks, bio-incompatibility of dialysate and catheter, intra-peritoneal contamination with clorhexidine, and use of beta-blockers are held responsible. Diagnosis is difficult in early stage. In this stage, abdominal computed tomography findings are important. It is often diagnosed during operation of the patients who developed complications such as bowel obstruction. Termination of peritoneal dialysis and providing nutritional support, use of immunosuppressive drugs, and surgical approach can be used for treatment. In this article, a 46-year-old male who had been using continuous ambulatory peritoneal dialysis as a renal replacement therapy for 9 years, presenting with peritonitis attacks, severe abdominal pain together with weight loss and was diagnosed as sclerosing encapsulating peritonitis is presented.

Keywords: Continuous ambulatory peritoneal dialysis, abdominal computerized tomography, sclerosing encapsulating peritonitis

Özet

Sklerozan enkapsüle peritonit, sürekli ayaktan periton diyalizinin nadir bir komplikasyonudur. Sklerozan enkapsüle peritonit kilo kaybı, aralıklı barsak tıkanması ve peritoneal su ve solid taşınmasında azalmaya neden olur. Mortalite oranı ağır malnütrisyon ve ileus nedeniyle %50'ye kadar ulaşabilir. Etyolojisi tam olarak bilinmemekle birlikte, sık peritonit atakları, diyalizat ve kateterin biyo-uyumsuzluğu, klorheksidinle intra-peritoneal kontaminasyon ve beta blokör kullanımı gibi birçok neden sorumlu tutulur. Erken dönemde tanısı zordur. Bu dönemde bilgisayarlı batın tomografisi bulguları önemlidir. Barsak tıkanması gibi komplikasyon gelişen hastalarda sıklıkla operasyon sırasında teşhis edilir. Periton diyalizini sonlandırmak, beslenme desteği sağlamak, immünsupresif ilaçların kullanımı ve cerrahi yaklaşım tedavi için uygulanabilir. Bu makalede dokuz yıldır renal replasman tedavisi olarak sürekli ayaktan periton diyalizi kullanmakta olan, peritonit atakları, şiddetli karın ağrısı ve kilo kaybı semptomları ile başvuran ve sklerozan enkapsüle peritonit tanısı alan 46 yaşında erkek olgu sunulmaktadır.

Anahtar sözcükler: Sürekli ayaktan periton diyalizi, bilgisayarlı batın tomografisi, sklerozan enkapsüle peritonit

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Introduction

Continuous ambulatory peritoneal dialysis (CAPD) is an exclusive renal replacement treatment option which is being preferred increasingly. Juvenile patients, patients with diabetes mellitus and cardiac disorders, and patients willing to have more independence and mobility prefer CAPD rather than hemodialysis. However, frequent complications such as infections (exit site, tunnel, and peritonitis), hernias (umbilical, inguinal, etc.), dialysate leakage, peritoneal adhesions and rare and mortal complications such as sclerosing encapsulating peritonitis (SEP) are the negative aspects of CAPD.

Sclerosing encapsulating peritonitis was first described by Owtschinnikow in 1907 as "peritonitis chronic fibrosis encapsulate" [1]. SEP is classified as idiopathic and secondary depending on etiologic factors. Idiopathic form was first described by Foo in 1978 [3]. This form, known as "abdominal cocoon" occurs in young girls living in tropical and subtropical regions [2]. Most frequent cause of SEP is CAPD. Secondary SEP is a rare (<1%) but potentially fatal complication occurring in patients undergoing CAPD treatment. SEP is associated with long term CAPD [4-6]. In this article, a case with SEP presenting with non-specific clinical symptoms until the complications occurred is discussed with a review of the related literature.

Case report

A 46-year-old male patient was admitted to the hospital with the complaints of nausea, vomiting, bulging, abdominal pain and weight loss of 15 kilograms during the last three months. He had been under CAPD treatment for 9 years. He had been hospitalized for subileus six months before. He already had three bacterial peritonitis attacks during the last 9 years. The first peritonitis episode was two years after the implantation of peritoneal dialysis catheter. Second episode occured six months after the first episodeand the third one occured five months after the second peritonitis attack. The isolated bacteria were staphylococcus epidermidis, staphylococcus aureus and staphylococcus epidermidis in the first, second and the third peritonitis attacks, respectively. In physical examination, patient was cachectic and had epigastric sensitivity. Laboratory values were as follows: blood urea nitrogen: 24 mg/dL (reference range 9-23 mg/dL), serum creatinine: 9.7 mg/dL(reference range 0.9-1.3 mg/dL), sodium:135 mEq/L (reference range 132-146 mEq/L), potassium: 4.2 mEq/L (reference range 3.5-5.5 mEq/L), albumin: 2.4 g/dL (reference range 3.2-4.8 g/dL), total protein: 5.9 g/dL (reference range 5.7-8.2 g/dL), triglyceride:136 mg/dL (reference range 0-250 mg/dL), total cholesterol: 111 mg/dL (reference range 0-200 mg/dL), high-density lipoprotein: 11 mg/dL (reference range 0-40 mg/dL), low-density lipoprotein: 55 mg/dL (reference range 0-100 mg/dL), aspartate aminotransferase: 18 IU/L (reference range 0-34 IU/L), alanine aminotransferase: 31 IU/L (reference range 10-49 IU/L), lactate dehydrogenase: 154 IU/L (reference range 126-246 IU/L), alkaline phosphatase: 28 IU/L (reference range 45-129 IU/L), gamma glutamyl transferase: 32 IU/L (reference range 0-38 IU/L), total bilirubin: 1.7 mg/dL (reference range 0.3-1.2 mg/dL). Complete blood count analysis results were as follows: white blood cells: 8400/mm^3 (reference range 4000-11000 cells/mm^3), hemoglobin: 8.9 g/dl (reference range 12-16 g/dL), Hematocrit: 25.1% (reference range 36-48%), and platelets: 433x10^3/µL (reference range 150x10^3-400x10^3/µL). Results of other blood tests were as follows: erythrocyte sedimentation rate (ESR): 115 mm/hour (reference range 0-20 mm/hour), C-reactive protein (CRP): 120 mg/L (reference range 0-8 mg/L), intact parathyroid hormone: 115 pg/mL (reference range 15-65 pg/mL), alpha feto-protein: 1.47 IU/L (reference range 0-7.8 IU/L), CEA: 4.53 ng/mL (normal <4.3 ng/mL), CA-125: 10.91 U/L (normal <35 U/L), CA-19.9: 11.11 U/L (reference range 0-37 U/L), CA-15.3: 33.05 U/L (reference range 0-30 U/L), PSA: 0.52 ng/mL (normal <4.3 ng/mL). Arterial blood gas results were as follows: pH: 7.36, HCO_3:19.6 mEq/L, PCO_2: 26.8 mmHg, PO_2: 90 mmHg, oxygen saturation: 96.2%. Thyroid function tests were within normal limits and autoantibodies (anti-thyroperoxidase, antinuclear antibody, anti-double stranded DNA and anti Jo-1) were negative. Fecal occult blood test was negative. Abdominal

ultrasonography (USG) revealed that the liver, gall bladder, pancreas, spleen were normal, but free abdominal fluid (peritoneal dialysis fluid) was detected. Renal USG showed that both kidneys were atrophic with grade 2-3 parenchymal echo and multiple cysts, in addition, a calculus of a few millimeters in size was found in the left kidney. Computerized tomography (CT) of the abdomen revealed segmental dilatation and wall thickening in the bowels and focal thickening of the peritoneum (Figure 1-3). Electrocardiogram showed normal sinus rhythm. Proximal gastrointestinal system endoscopy showed pangastritis and duodenitis. Colonoscopic examination was normal. Microscopic examination of the peritoneal fluid showed no cells and no bacteria was isolated in the culture. Peritoneal membrane permeability was high.

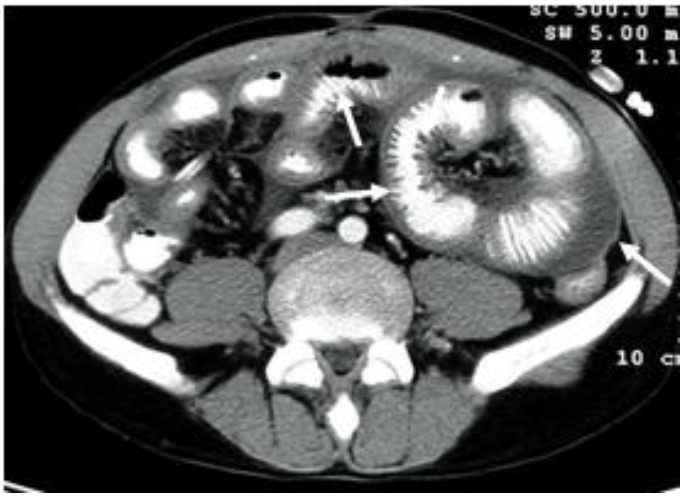

Figure1. Abdominal computed tomography image with contrast showing dilatation and wall thickening of the small bowel loops and focal peritoneal thickening (arrows).

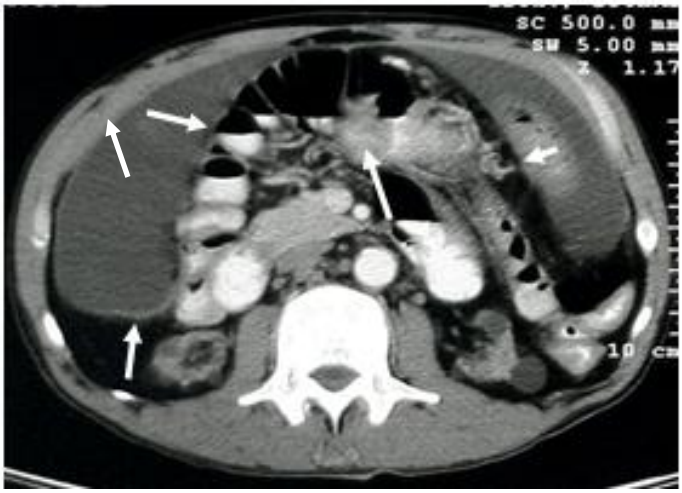

Figure2. Abdominal computed tomography image with contrast showing focal peritoneal thickening, dilatation and air-fluid levels in the loops of the small bowel, collection of small bowel loops in the midline abdomen and focal fluid collection between the small bowel loops (arrows).

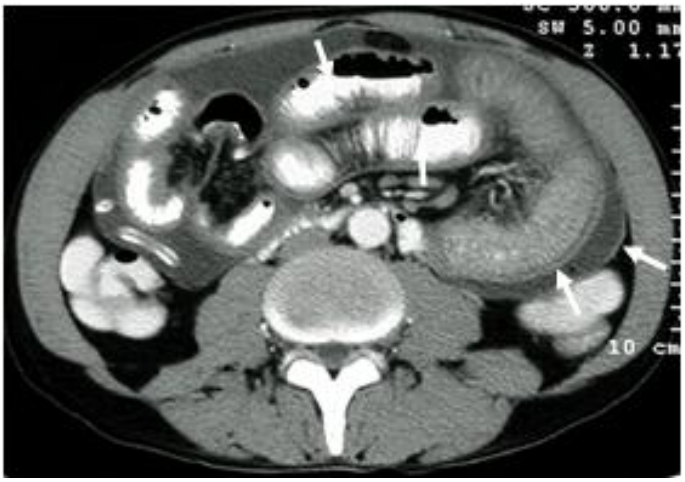

Figure3. Abdominal computed tomography image with contrast showing focal peritoneal thickening with dilatation and wall thickening of the small bowel loops (arrows).

Due to severe malnutrition of the patient and ultrafiltration failure, we decided to pull the catheter out and obtain peritoneal biopsy. Pathological examination revealed fibrinous peritonitis. Therefore, the patient was transferred to hemodialysis. He was given oral nutritional support. He gained three kilograms within three months. Afterwards, he was admitted to our emergency department with nausea, abdominal discomfort and tenderness. He was diagnosed as hemoperitoneum. Hemoperitoneum was drained by an interventional radiologist for fifteen days. After the hospital discharge, he gained six kilograms within two months and also ESR and CRP levels were reduced (78 mm/hour and 13.9 mg/L, respectively). The patient has been on low dose immunosuppressive therapy (azathioprine plus methylprednisolone). Clinical follow-up was uneventful so far.

Discussion

SEP is a rare complication of CAPD. Its prevalence is around 0.7% and changes with duration of dialysis. This ratio is 19.4% in patients undergoing CAPD longer than 8 years [6]. Etiology of SEP is still unclear but it is thought to be multifactorial. Peritoneal damage occurs as a result of long term exposure to acidic, hyperglycemic and hyperosmotic dialysates containing high glucose degradation products [7]. Glucose itself is toxic as well because of the passive glycosylation of the submesothelial tissue when mesothelium is damaged [8]. Non-CAPD etiology of SEP includes abdominal tuberculosis, sarcoidosis, systemic lupus erythematosus, beta blockers (proctalol), liver transplantation, sterilization products containing chlorhexidine and alcohol, ventriculoperitoneal and peritoneovenous shunts [9, 10], and luteinized techoma of ovary tissue [2, 5, 8, 11]. There is an association between peritonitis caused by Staphylococcus aureus, Haemophilus influenzae, Pseudomonas, and some fungi species and SEP. Our patient had a history of undergoing CAPD for 9 years and three peritonitis history in which causative microorganisms were staphylococcus aureus and staphylococcus epidermidis.

Histopathologically, proliferation of fibroconnective tissue, increase in inflammatory cells, and dilated lymphatic vessels are observed in peritoneum. Mesothelial proliferation and erosion, fibrin exudation and continuous intracavitary bacterial toxin secretion play role in the pathogenesis of SEP [12]. It is suggested that excess PGE2, IFN-γ, and IL-1 production in macrophages and lymphocytes as a response to peritoneal irritation stimulates fibroblasts resulting in collagen increase and fibrous tissue formation [13]. In vitro studies showed that high glucose concentration dialysates stimulates fibrosis in human mesothelial cells and fibroblasts and decreases the mesothelial cell proliferation capacity. These situations occurs by up-regulation of TGF-β1 signal path [14].

Inflammatory processes affecting peritoneum and transforming it to fibrous tissue result in fibrous layer formation covering the organs in the peritoneal cavity. Fibrous layer formation limits the motility of the organs and decreases the capacity of peritoneal ultrafiltration [5, 15]. Patients are often admitted to hospital with complete or incomplete bowel obstruction, peritonitis attacks, malnutrition, and loss of ultrafiltration [12, 15]. Reasons for ultrafiltration insufficiency in CAPD patients are mesothelial cellular damage and peritoneal fibrosis tissue. Repetition of this process can cause hemoperitonium and peritonitis attacks [7].

Clinical picture is characterized by repetitive acute and subacute small bowel obstruction attacks, decrease in ultrafiltration, dialysis fluid containing blood, loss of weight, nausea, malnutrition, anorexia, and palpable mass from time to time (due to bowel conglomeration) [16]. Early clinical symptoms are non-specific. Therefore, SEP must be considered in situations such as development of intestinal obstruction symptoms in long term peritoneal dialysis patients, insufficiency of ultrafiltration, and palpable abdominal mass. Our patient had nausea, abdominal pain and severe weight loss (15 kg in three months). He had subileus attacks in which he was managed with nasogastric decompression.

It is hard to diagnose SEP in the early stage. It is often diagnosed during surgical operations of patients with bowel obstruction. Definite diagnosis of SEP is made by surgical and histopathological data; however, due to high mortality and morbidity rate of SEP, surgery is done only in case of complications such as bowel obstruction when conservative therapy failed. Therefore, diagnostic radiological tests are used more commonly than histopathological tests in majority of patients [17, 18]. Diagnostic radiology tests such as barium graphy and X-ray may reveal increased duration of contrast enhancement and clear vision of the edges of bowel segments. Abdominal USG may reveal dilatation of small bowel segments with the appearance of three-layered intestinal wall, elongation and fixation of small intestine loops to the posterior abdominal wall ascites and membrane formation [19-21]. Abdominal CT may be useful in early diagnosis of SEP [19]. Characteristic findings such as peritoneal thickening, peritoneal calcification, loculated fluid collections or conglomeration, contraction, dilatation, wall thickening of bowels in midline and peritoneal contrasting can be seen in CT [17, 22, 23]. However, especially in early stage, radiological findings are usually non-specific and variable. Wall thickening observed in small and large intestines may be reactional due to intraperitoneal fluid, and also it may be secondary to intravascular volume insufficiency and infection. Stafford-Johnson et al. [18] compared CT findings of 10 CAPD patients with SEP and 71 CAPD patients without SEP and found peritoneal contrasting, contraction of small intestines and loculated fluid collections in 50, 60, and 90% of the patients with SEP, respectively. CT findings were correlated with the clinical stage of SEP. In CAPD patients without SEP, peritoneal abnormalities, local fluid collection sand intestinal dilatations were found in 7, 15 and 5.7% respectively. Other CT findings were absent in these patients. Krestin et al. [24] found peritoneal thickening, loculated fluid collections, and wall thickening of small intestine and peritoneal calcification on CT in 44, 44, 22, and 11% of 14 patients with SEP, respectively. In the study of Başaran et al. [20] peritoneal thickening, loculated fluid collections, contraction and dilatation of intestines, intestinal wall thickening, and midline conglomeration of intestines, peritoneal calcification and peritoneal contrasting were found in 100, 87.5, 62.5, 62.5, 37.5, 25 and 25% of the patients, respectively. In the same study recurrent bacterial peritonitis was present in two patients and recurrent small bowel obstruction attacks were present in two patients. Clinically, 7 patients (87.5%) had abdominal pain, 4 patients (50%) had cloudy appearance of peritoneal fluid sample and 5 patients (62.5%) had decreased ultrafiltration. All patients with SEP had peritoneal thickening on CT. Peritoneal thickening was diffuse in 7 patients (87.5%) and focal in 1 patient (12.5%). Peritoneal thickening was more obvious in abdominal peritoneum compared to pelvic peritoneum. Peritoneal calcification was present in 2 of 8 patients (25%).Both the visceral and the parietal peritonea were

calcificated in these patients [19]. Stafford-Johnson et al. [17] suggested that peritoneal thickening and calcification, loculated fluid collections, and tethering of the small bowel appear may be diagnostic for SEP [17]. In our patient, midline conglomeration of the intestines, segmental dilatation of the small intestines and wall thickening were present on abdominal CT. However, there were no peritoneal calcifications. Çakır et al. [25] pointed out that in patients undergoing CAPD, CT is important to determine the complications of the procedure and the use of appropriate radiological tests may decrease the mortality and the morbidity associated with these complications.

In brief, SEP is a rare entity in patients undergoing CAPD and it has high mortality and morbidity. The etiology of SEP is unknown and the diagnosis is difficult. The diagnosis of SEP should be kept in mind in the presence of abdominal pain, weight loss, nausea, vomiting and bowel obstruction symptoms in patients undergoing long term CAPD. Definite diagnosis is made by surgical and histopathological data; however, due to the high mortality and morbidity associated with SEP, making the diagnosis before the development of complications is important. Therefore, clinical and radiological diagnostic tests rather than histopathological analysis should be used in most of the patients. CT is an important diagnostic test for early diagnosis of SEP because it is non-invasive and more accurate than the other diagnostic tests. In conclusion, in the presence of intestinal midline conglomeration with peritoneal thickening, loculated fluid collection, segmental dilatation of small bowels and diffuse wall thickening, the diagnosis of SEP must be considered.

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