

## Eosinophilic Peritonitis in a Patient with Continuous Ambulatory Peritoneal Dialysis (CAPD)

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Eosinophilic peritonitis is defined as when there are more than 100 eosinophils present per milliliter of peritoneal effluent, of which eosinophils constitute more than 10% of its total WBC count. Most cases occur within the first 4 weeks of peritoneal catheter insertion and they usually have a benign and self-limited course. We report a patient of eosinophilic peritonitis that was successfully resolved without special treatment.

An 84-year-old man with end stage renal disease secondary to diabetic nephropathy was admitted for dyspnea and poor oral intake. Allergic history was negative, and physical examination was unremarkable. Complete blood count showed a hemoglobin level of 11.1 g/dL, WBC count was 24,500/mm<sup>3</sup> (neutrophil, 93%; lymphocyte, 5%; monocyte, 2%), platelet count was 216,000/mm<sup>3</sup>, serum BUN was 143 mg/dL, Cr was 5.7 mg/dL and albumin was 3.5 g/dL. Creatinine clearance was 5.4 mL/min. Three weeks after peritoneal catheter insertion, he was started on peritoneal dialysis with a 6-hour exchange of 2L 1.5% peritoneal dialysate. After nine days, he developed turbid peritoneal effluents with fever (38.4°C), abdominal pain and tenderness. Dialysate WBC count was 180/mm<sup>3</sup> (neutrophil, 20%; lymphocyte, 4%; eosinophil, 76% [eosinophil count: 136/mm<sup>3</sup>]). Cultures of peritoneal fluid showed no growth of aerobic or anaerobic bacteria, or of fungus. Continuous ambulatory peritoneal dialysis (CAPD) was commenced, and he was started on intraperitoneal ceftazidime (1.0 g/day) and cefazolin (1.0 g/day). After two weeks, the dialysate had cleared up and clinical symptoms were improved. Dialysate WBC count decreased to 8/mm<sup>3</sup> and eosinophils were not detected in peritoneal fluid. There was no recurrence of eosinophilic peritonitis on follow-up evaluation, but he died of sepsis and pneumonia fifteen weeks after admission.

**Key Words** : Eosinophilic Peritonitis, Peritoneal Dialysis, Continuous Ambulatory, Kidney Failure, Chronic.

### INTRODUCTION

Eosinophilic peritonitis in patients being treated with continuous ambulatory peritoneal dialysis (CAPD), was first described by Lee and Schoen in 1968<sup>1)</sup>, has been reported to mostly occur within the first 4 weeks of peritoneal catheter insertion, although it may occur as early as day 1 or as late as 6 months<sup>2-7)</sup>. Early onset of peritoneal eosinophilia has been associated with peripheral blood eosinophilia in 57% of the patients, which is only rarely associated with symptoms and

signs of hypereosinophilic syndrome<sup>2-7)</sup>.

Eosinophilic peritonitis is usually defined as an eosinophil count greater than 10% of the total WBC count when the absolute number of eosinophils is greater than 40/mm<sup>3</sup> of peritoneal effluents, or an absolute eosinophil count of greater than 100/mm<sup>3</sup> of peritoneal effluents<sup>2-4, 7, 8)</sup>.

The cause of eosinophilic peritonitis is obscure, but is probably due to an allergic reaction to some component of the peritoneal dialysis system or may be associated with atopic tendency with high serum IgE concentration<sup>3, 5, 6, 9, 10)</sup> and rapid

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intraperitoneal osmotic fluctuation<sup>2, 3</sup>.

Although eosinophilic peritonitis usually resolves spontaneously, some have reported success with intraperitoneal, low-dose hydrocortisone or oral antihistamine or oral, low-dose prednisolone for patients with abdominal pain, or to maintain catheter patency if the peritoneal fluid is markedly turbid<sup>2, 4, 5, 7, 10, 11</sup>.

We report a case of eosinophilic peritonitis developed on the ninth day after the start of CAPD in an, 84-year-old man.

## CASE

An 84-year-old man with end stage renal disease secondary to diabetic nephropathy for 1 year was admitted to hospital because of dyspnea and poor oral intake of 1 weeks duration. He had been diagnosed with gout 13 years previously, and had been managed at another clinic for glaucoma, diabetes mellitus and hypertension 10 years previously. He had a history of admission to our hospital due to chronic renal failure 1 year previously, after which he had not been followed up at our OPD unit. He did not have any allergic or family medical history. Physical examination at admission revealed blood pressure of 140/80 mmHg, heart rate of 107/min, body temperature of 36.8°C, and respiratory rate of 20/min; other findings were unremarkable. At that time, complete blood count revealed a hemoglobin level of 11.1 g/dL, WBC count was 24,500/mm<sup>3</sup> (neutrophil, 93%; lymphocyte, 5%; monocyte, 2%), platelet count was 216,000/mm<sup>3</sup>, serum BUN was 143 mg/dL, Cr was 5.7 mg/dL, uric acid was 13.3 mg/dL, calcium was 9.3 mg/dL, phosphorus was 7.4 g/dL, albumin was 3.5 g/dL, alkaline phosphatase was 94 IU/L, total bilirubin was 1.1 mg/dL, AST/ALT was 29/28 IU/L, and parathyroid hormone was 92.26 pg/mL. Urine analysis was albumin (++), blood (+), RBC count 3-5/HPF, and WBC count 20-30/HPF. Twenty-four hour urine protein level was 467 mg/day. Twenty-four hour urine creatinine clearance level was 5.4 mL/min. He was started on hemodialysis with temporary internal jugular catheter. On the twenty-fifth day after admission, a peritoneal catheter was inserted. Three weeks after peritoneal catheter insertion, he was started on peritoneal dialysis with a 6-hour exchange of 2L 1.5% peritoneal dialysate. On the ninth day after the start of peritoneal dialysis, he developed turbid peritoneal effluents with fever (38.4°C), abdominal pain and tenderness. Dialysate WBC count was 180/mm<sup>3</sup> (neutrophil, 20%; lymphocyte, 4%; eosinophil, 76% [eosinophil count: 136/mm<sup>3</sup>]).

Complete blood count was WBC of 7,650/mm<sup>3</sup> (eosinophil, 5.5%), hemoglobin level of 8.9 g/dL, and platelet count level of 337,000/mm<sup>3</sup>. Peripheral blood eosinophilia was not observed. Cultures of peritoneal fluid showed no growth of aerobic or anaerobic bacteria, or of fungus. AFB stain was negative.

CAPD was commenced, and he was started on intraperitoneal ceftazidime (1.0 g/day) and cefazolin (1.0 g/day) with heparin at 8000 unit. After two weeks, dialysate had cleared up and clinical symptoms were improved. Dialysate WBC count decreased to 8/mm<sup>3</sup> and eosinophils were not detected in peritoneal fluid (Figure 1).

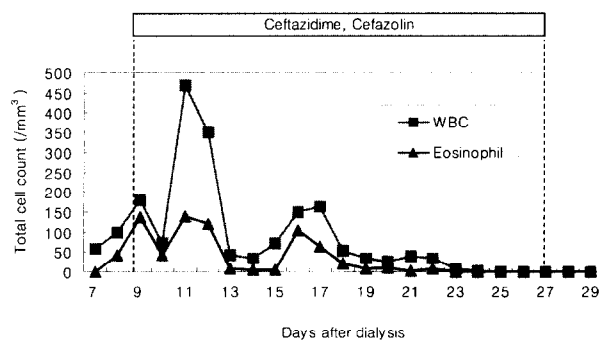


Figure 1. Serial WBC, Eosinophil counts in peritoneal effluent

There was no recurrence of eosinophilic peritonitis on follow-up evaluation and he continued with CAPD. However, he died of sepsis and pneumonia fifteen weeks after admission.

## DISCUSSION

Eosinophilic peritonitis is usually defined as an eosinophil count greater than 10% of the total WBC count when the absolute number of eosinophils is greater than 40/mm<sup>3</sup> of peritoneal effluents, or an absolute eosinophil count of greater than 100/mm<sup>3</sup> of peritoneal effluents<sup>2-4, 7, 8</sup>. Eosinophilic peritonitis in patients being treated with CAPD was first described by Lee and Schoen in 1968<sup>1</sup> and was first reported by Cho et al. in this country in 2001<sup>2, 12</sup>. Eosinophilic peritonitis has been reported mostly to occur within the first four weeks of peritoneal catheter insertion, although it may occur as early as day 1 or as late as 6 months<sup>2-7</sup>. The incidence has been reported to range from 16% to 30% in patients on intermittent peritoneal dialysis and to as high as 60% in patients on CAPD<sup>7</sup>. Early onset of peritoneal eosinophilia has been associated with peripheral eosinophilia in 57% of the patients<sup>13</sup>. In one recent retrospective study of about 112 patients undergoing CAPD for a mean of 12.6 months in this country, the incidence of eosinophilic peritonitis was reported as 4.4% and was associated with peripheral blood eosinophilia in 80% of the patients<sup>12</sup>. In this case, eosinophilic peritonitis developed on the ninth day after peritoneal dialysis, with the patient experiencing fever (38.4°C), abdominal pain and tenderness, with increased dialysate WBC counts, especially eosinophilic counts.

The cause of eosinophilic peritonitis is obscure, but is

probably associated with the hypersensitive reaction due to an allergic reaction to some component of the peritoneal dialysis system<sup>3-6, 9, 10</sup>. Possible allergens have included plastics in the catheter or plasticizer, additives such as heparin, antibiotics or dialysis bag, blood or air in the dialysate, or the dialysis fluid itself<sup>1-10, 14, 15</sup>. Other possible mechanisms have been associated with atopic tendency with high serum IgE concentration<sup>3</sup> and rapid intraperitoneal osmotic fluctuation<sup>2, 3</sup>.

The symptoms and signs of eosinophilic peritonitis are turbid peritoneal effluents, abdominal pain, or fever and so forth, and only rarely is a pruritic maculopapular rash, or arthritis or expiratory wheezing associated with hypereosinophilic syndrome<sup>2-5, 12</sup>. In our case, he developed fever, abdominal pain and turbid peritoneal effluents.

The natural history of eosinophilic peritonitis appears to be self limiting although the process can continue for as long as several months<sup>1-7, 11, 12</sup>. In general, although eosinophilic peritonitis does not require treatment, treatment may be required for patients with severe abdominal pain or who need to catheter patency to be maintained if the peritoneal fluid is markedly turbid<sup>1-3, 5, 9, 12</sup>. Treatments of eosinophilic peritonitis have reported success with intraperitoneal, low-dose hydrocortisone or oral, low-dose prednisolone<sup>2, 3, 5, 7, 11, 15</sup>. If resistance and side effects develop from steroid treatment, the use of oral ketotifen, an antihistamine, has been reported by some researchers with tried for its mast cell membrane-stabilizing effects<sup>3, 7, 10</sup>. In our case, intraperitoneal antibiotics improved the clinical symptoms and laboratory findings.

We report a case of eosinophilic peritonitis developed nine days after the start of maintenance CAPD maintenance in an 84-year-old man with end stage renal disease secondary to diabetic nephropathy.

## REFERENCES

- 1) Lee S, Schoen I. *Eosinophilia of peritoneal fluid and peripheral blood as associated with chronic peritoneal dialysis. Am J Clin Pathol* 47:638-640, 1967
- 2) Jo YI, Lee JY, Ahn HL, Lee HW, Kim SR, Kang NK, Shin SK, Song JO. *Symptomatic eosinophilic peritonitis in CAPD treated with low Dose of oral prednisolon prednisolone. Korean J Nephrol* 20: 1080-1083, 2001
- 3) Tang S, Lo CY, Lo WK, Chan TM. *Resolution of eosinophilic peritonitis with ketotifen. Am J Kidney Dis* 30:433-436, 1997
- 4) Chan MK, Chow L, Lam SS, Jones B. *Peritoneal eosinophilia in patients on continuous ambulatory peritoneal dialysis: a prospective study. Am J Kidney Dis* 11:180-183, 1988
- 5) Asghar R, Woodrow G, Turney JH. *A case of eosinophilic peritonitis treated with oral corticosteroids. Perit Dial Int* 20:579-580, 2000
- 6) Abraham G, Bhaskaran S, Padmn G. *Symptomatic peripheral eosinophilia associated with peritoneal eosinophilia in a CAPD patient. Perit Dial Int* 15:280-281, 1995
- 7) Thakur SS, Unikowsky B, Prichard S. *Eosinophilic peritonitis in CAPD: treatment with prednisone and diphenhydramine. Perit Dial Int* 17:402-403, 1997
- 8) Humayun HM, Ing TS, Daugiradas JR, Gandhi VC, Popli S, Robinson JA, Hano JE, Zayas I. *Peritoneal fluid eosinophilia in patients undergoing maintenance peritoneal dialysis. Arch Intern Med* 141:1172-1173, 1981
- 9) Piraino BM, Silver MR, Dominguez JH, Puschett JB. *Peritoneal eosinophilia during intermittent peritoneal dialysis. Am J Nephrol* 4:152-157, 1984
- 10) Solary E, Cabanne JF, Tanter Y, Riffle G. *Evidence for a role of plasticizers in 'eosinophilic' peritonitis in continuous ambulatory peritoneal dialysis. Nephron* 42:341-342, 1986
- 11) Leung AC, Orange G, Henderson IS. *Intraperitoneal hydrocortisone in eosinophilic peritonitis associated with continuous ambulatory peritoneal dialysis. Br Med J* 286:766, 1983
- 12) Jo YI, Shin SK, Song JO. *Clinical characteristics of peritoneal fluid eosinophilia in patients on CAPD. Korean J Nephrol* 22:219-227, 2003
- 13) Bujak JS, Root RK. *The role of peroxidase in the bactericidal activity of human blood eosinophils. Blood* 43:727-736, 1974
- 14) Nassberger L, Arbin A. *Eosinophilic peritonitis: hypothesis. Nephron* 46:103-104, 1987
- 15) Daugirdas JH, Leehey DJ, Popli S, Hoffman W, Zayas I, Gandhi VC, Ing TS. *Induction of peritoneal fluid eosinophilia and/or monocy-tosis by intraperitoneal air injection. Am J Nephrol* 7:116-120, 1987