Evidence for a Role of Plasticizers in Eosinophilic Peritonitis in Continuous Ambulatory Peritoneal Dialysis

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Dear Sir,

Some patients undergoing continuous ambulatory peritoneal dialysis (CAPD) have developed a culture-negative peritonitis with a high eosinophilic count in the peritoneal dialysis (PD) effluent: so-called 'eosinophilic peritonitis'. We report a case which strongly suggests the responsibility of plastic containers.

A 50-year-old man with angina pectoris and no history of allergy or atopy reached end-stage renal failure because of polycystic kidneys. CAPD was started with 4 exchanges/day of Dianeal 137 solution (Travenol Laboratories, Malton, Ont., Canada) containing 5 mg heparin in each container (Choay Laboratories, Paris, France):

two liters of solution with 3 glucose 1,36% w/v and 1 glucose 3.86% w/v. Two days after insertion of a Tenckhoff catheter, the patient developed a cloudy PD effluent without pyrexia, pain or abdominal symptoms. Cell count of dialysate drainage was 615 white cells/ μ l, with 80% eosinophils and less than 5% red blood cells. Repeated cultures of the PD fluid failed to isolate bacterial or fungal organism, or endotoxin. Before these results reached us, we begun an intraperitoneal antibiotic therapy with cefoperazone (100 mg/l) for 3 days, then trimetoprim (16 mg/l), sulfamethoxazole (80 mg/l) for 4 days. These treatments failed to improve the peritonitis. Neither the withdrawal of antibiotherapy, nor the use of another heparin in the bags (Roche Laboratories, Neuilly-sur-Seine, France), which we also stopped, influenced the cell count. We found no abdominal disease, no tunnel abscess or exit site infection, no air in the peritoneal cavity after insertion of the catheter. Plasma IgE level was 5 U/ml (normal < 10 U/ml) and IgE level in the PD fluid was

Choay heparin — Roche heparin — Cefoperazone —

trimetoprim-sulfamethoxazole —

Plastic bags

Plastic bags

5000

Γ 5,000

4,000 -

4,000
3,000
3,000
■ 5 2,000 -
2,000
p 1,000 -
1,000 α

Fig. 1. Outcome of main laboratory data during ‘eosinophilic peritonitis’ tmt-smx Tri-metoprim-Sulfamethoxazole.

f 10 20

Catheter inserted

Time, days

0 m

342

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1 U/ml. Blood eosinophil count increased to 700/ μ l on the 13th day and reached 2,800/ μ l on the 20th day. At this time, we decided to substitute glass bottles for plastic containers with 4 exchanges/day: same volumes, same glucose ratio and similar lactate dialysate (Biosedra Laboratories, Malakoff, France) without heparin. 3 days later, the white cell count in PD fluid dropped to 35/ μ l. We then reintroduced plastic bags and the eosinophilic count increased again to 800/ μ l after 10 days, then decreased spontaneously to normal ($< 100/\mu$ l) after 1 month. Blood eosinophilia disappeared after 60 days (fig. 1). Six months later, at the time of a bacteriologically documented peritonitis (*Staphylococcus aureus*), the white cell count increased to 2,500/ μ l with 75% neutrophils and no eosinophil. The patient died 13 months after CAPD was started from myocardial infarction without a new episode of eosinophilic peritonitis.

Eosinophilic peritonitis is a well-known complication of intermittent peritoneal dialysis [1], and, more recently, of CAPD [2]. The functions of eosinophils are contrasting: on the one hand, they are killer cell with a special ability to destroy metazoar parasites, on the other hand they are anti-inflammatory-immunomodulatory cells, involved in the control of the inflammatory response and capable of liberating substances that suppress the IgE-mediated hypersensitivity response [3].

Extravascular cavities could thus respond to external stimuli with eosinophils. Several mechanisms have been suggested to explain this benign reaction: presence of blood or air in the peritoneal cavity, effect of dialysate additives such as heparin, antibiotics, or povidone iodine, effect of the catheter itself [1,2]. As a matter of fact, no one of these mechanisms could be involved in our case and the works reported in the literature were not always convincing. On the other hand, the fast disappearance of peritoneal and blood eosinophils when plastic bags were replaced by glass bottles without major changes in dialysate composition and their reappearance when plastic bags were reintroduced strongly suggest a role for dialysate containers, at least in some cases. Substances used as sterilants or plasticizers added during production process can be released under certain conditions, from the bag [4]. Such a hypothesis

would agree with the fact that hemodialysis using PVC tubing has been linked with blood eosinophilia [5]. The normal plasma and PD fluid IgE levels does not point to an immediate hypersensitivity reaction. These harmful substances could induce an inflammatory reaction where PD fluid and, later, systemic eosinophilia appear to be the markers. However, at the present time, we do not know exactly what substances could be involved.

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