Eosinophilic Peritonitis – Hypothesis

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Dear Sir,

So far the causative agent(s) for eosinophilic peritonitis has not been identified. However, several possibilities have been proposed. Recently, Solary et al. [1] have presented evidence for the involvement of plasticizers in the etiology of the disease.

A common plasticizer released from PVC bags is di(2-ethylhexyl)phthalate (DEHP). However, many other components, including additives, impurities, decomposition products and reaction products, can be released from the plastic bag. Table I [2] shows different chemical substances, which have migrated from the PVC bags and have been identified in two brands of intravenous solutions. These compounds have also been found in dialysis solutions [3] and might also be implicated in the induction of eosinophilic peritonitis. It is also possible that still unidentified compounds may contribute to toxic reactions during CAPD treatment.

It is known that phthalates can be irritant [4]. However, it is also reasonable to assume, that for each substance with properties causing hypersensitivity or allergic reactions, a minimal concentration level must be exceeded before adverse reactions appear. The concentrations of phthalates in aqueous solutions in PVC bags are approximately 1,000 times lower than in blood products stored in PVC bags, due to the lower partition of phthalates into water. The concentration of DEHP in dialysis solutions is about 10 µg/l. The highest level of contamination (mg/l) is seen for cyclohexanone, a compound used in some brands of PVC bags as an adhesive [5]. Formic and acetic acid are other compounds which have been identified as impurities from PVC bags [6]. The main question to be asked about these chemical substances is; do any of these compounds possess the ability to desensitize mast cells to release eosinophilic chemotactic factors [7], which cause an influx of eosinophilic polymorpho-nuclear leukocytes, or have any of the chemicals per se eosinophilotactic properties?

It has been noticed that eosinophilic peritonitis most often appears within a short time after the start of continuous ambulatory peritoneal dialysis. Therefore, another hypothesis could be the release of a compound from the catheter device. It is proposed that the compound(s) partitions into the dialyzate and reaches a sufficiently high level to induce an adverse reaction. The mechanical irritant action of large volumes of fluid on the peritoneum may also initiate an eosinophilic response. This has been demonstrated in experimental studies [8]. The mechanical trauma during introduction of the catheter may also be an underlying cause for an eosinophilic reaction. For instance, following thoracic trauma, an increased number of eosinophils was observed in the pleural ex-udate [9].

Table I. Identified impurities in two brands of sodium chloride (9 g/l) i.v. solutions in 100 ml PVC bags [from Arbin et al., 2]

104

Nässberger/Arbin

However, since the incidence of eosinophilic peritonitis seems low, induction of this clinical condition might be due to several factors, all of which must coincide.

Since an allergic/hypersensitivity reaction cannot yet be excluded as an underlying cause, there is no place for antibiotic therapy to be initiated in asymptomatic patients, where the cloudy dialyzate contains mainly eosinophilic polymorphonuclear leukocytes.

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