

reactions [83,219], and may be sequestered in the liver and the spleen, inducing hepatic dysfunction and enhanced blood cell destruction [218,222]. Release of fragments is especially induced by over-occlusion of pump systems [220,221,223]. Pumps in which the rollers are adjusted manually induce less particle spallation than automatically occluding pumps [220].

Release of soluble factors

Dialysis systems also release soluble factors [220, 221,224–227]. One of these factors is di-(2-ethylhexyl)-phthalate, a plasticizer which has been recovered from the plasma of dialyzed patients. Apart from induction of allergy (see below), the pathophysiologic meaning of this finding remains unclear [220,221,225–228].

Plasticizer release can be reduced by the application of tri-(2-ethylhexyl)-trimellitate as a plasticizer [225,226], and/or by the coating of the inner wall of the tubings, e.g. with PVC-ethylene vinylacetate or PVC-polyurethane [220].

Another released soluble factor is ethylene oxide (EtO), which also induces allergic reactions (see below) [6,224,229–233]. Gamma irradiation for sterilization of plastic materials may result in the release of cytotoxic compounds [234].

Release of particles and of soluble factors can be reduced by adequate pre-rinsing [224,235,236].

III.3 Spallation/release

Guideline III.3

A. In order to prevent the release of fragments (solid or soluble) from the dialyzer circuit, and their accumulation in several organs of the body, adequate dialyzer pre-rinsing according to the manufacturers instructions should be performed. If no manufacturer instructions are given, the dialyzers should be pre-rinsed using at least 2 l of rinsing solution. Over-occlusion of the roller pumps should be avoided as well.

(Evidence level: B)

Commentary on Guideline III.3

Spallation or leaching can be defined as the slow dissolution of solid-phase entities or soluble compounds from material used in the dialyzer circuit into the surrounding blood, and from there into the body organs.

Release of solid materials

Fragments of dialysis system materials, especially of tubings, are released in the circulation of dialysis patients. These fragments may contain silicone, polyvinylchloride (PVC), polyurethane, or any other polymer used for the assembly of dialysis circuits [218–222]. These fragments induce inflammatory