

CLINICAL IMPLICATIONS OF THE PRESENCE OF REFRACTILE PARTICLES IN THE LIVER OF HAEMODIALYSIS PATIENTS

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Summary

In a retrospective study we have examined 20 liver specimens from haemodialysis patients with a mean time on treatment of 27 months. Thirteen specimens were biopsies, the remaining came from autopsies. The presence of refractile particles was found in 55 per cent of biopsies and 100 per cent of autopsies. Its presence was not constantly associated with morphological lesions of the liver. We believe that the deposition of this material could be a fortuitous finding with uncertain clinical implications.

Introduction

Liver dysfunction is a common problem in haemodialysis patients. Recently, the presence of particles of silicone in the liver of these patients has been described by Leong et al [1]. The association of this finding with morphological abnormalities of the liver, led these authors to consider that silicone could induce liver damage and/or help to prolong a pre-existent hepatic lesion. This prompted us to review our experience to determine whether or not the presence of silicone particles has any clinical significance.

Material and methods

A retrospective review of all the liver biopsies and liver tissue of autopsies from haemodialysis or grafted patients obtained in our Unit from January 1975 to December 1981 has been made. Thirteen liver biopsies were performed in nine patients (7 male, 2 female, 25–54 years old). Five biopsies were obtained in four transplant patients. Liver tissue was obtained at autopsy from seven patients dying of causes unrelated to the liver (3 male, 4 female, 16–46 years old). Percutaneous needle biopsies were performed because of the presence of symptoms and/or biochemical alterations suggestive of liver damage. In the seven cases who came to autopsy there was no evidence of pre-existing liver damage.

Liver tissue for light microscopy was fixed in formalin and stained by conventional methods with haematoxylin and eosin, trichrome, reticulin, periodic acid-Schiff with diastase and Perls' Prussian blue for iron. Fresh tissue for electron microscopy was available in three cases. It was fixed in buffered glutaraldehyde and stained with uranyl acetate and lead citrate. The grade of fibrosis and/or inflammation were estimated following the criteria of Leong et al [1].

Results

The particles were not easily visible and presented as refractile unstainable material. They were more evident when the refraction was increased by partially

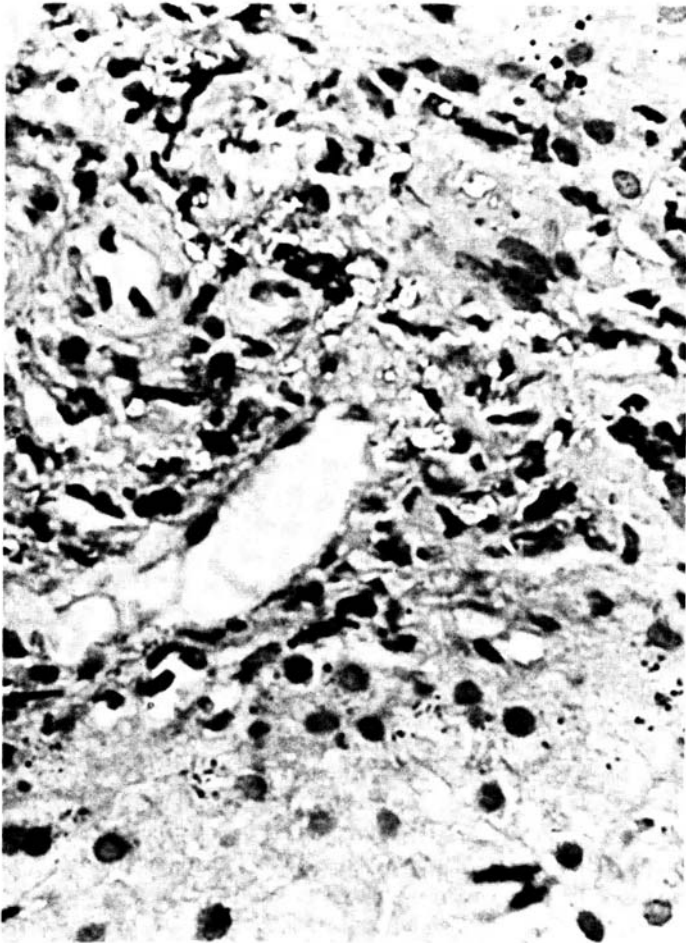


Figure 1. Portal tract with refractile silicone particles in giant cells and free in the interstitium (H and E, X 500 – reduced for publication)

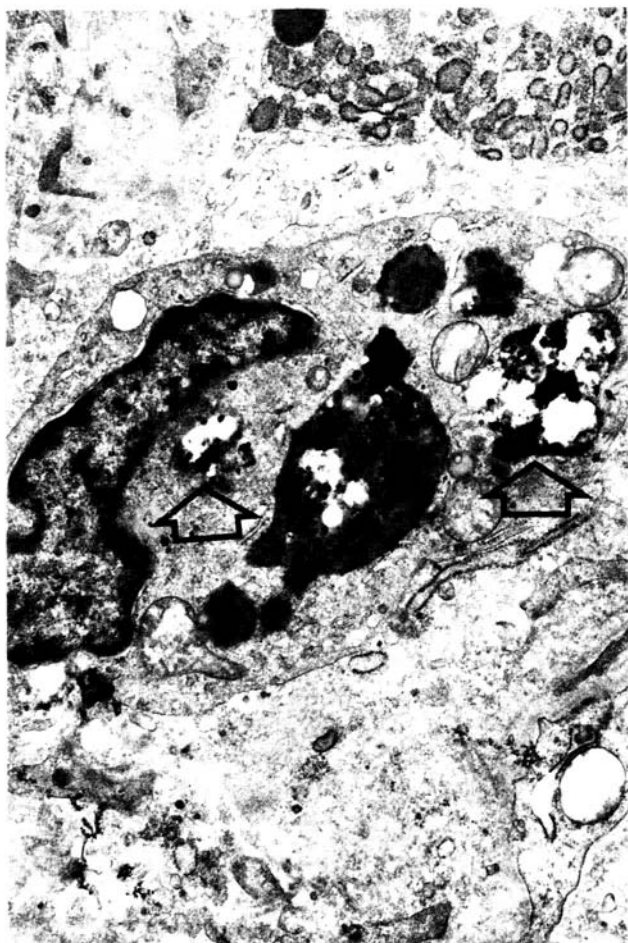


Figure 2. Electronlucent material within the lysosomes of a macrophage (Uranyl acetate and lead citrate, $\times 25600$ – reduced for publication)

occluding the diaphragm of the condenser and did not show birefringency with the polarising plate. Its presence was as free particles in the portal interstitium or as intracellular aggregates in macrophages and giant cells (Figure 1). In all cases but one they were also found in Kupffer cells lining sinusoids. In the three cases where an ultrastructural study was performed the presence of electronlucent material lying free as well as within the lysosomes of the macrophages (Figure 2) was observed.

Table I contains the results obtained in the biopsy series. In the first liver biopsy the refractile particles were found in only two of the nine cases. The particles appeared in the second biopsy of three cases. The overall incidence of the particles was 55 per cent. Its presence was in general coincidental with the

TABLE I. Histological and clinical features in the liver biopsy series

Biopsy No.	Case No.	Duration of haemodialysis months	Silicone score	Grade of fibrosis	Grade of inflammation	Duration of biochemical alterations months	Histological diagnosis
1	1	9	0	0	1	6	Residual acute hepatitis
2	2	7	0	0	0	18	Residual acute hepatitis
3*	3	5	0	0	0	8	Residual acute hepatitis
4*†	4	51	1	1	1	9	Mild portal fibrosis, Siderosis
5*	5	24	1	1	1	6	Persistent chronic hepatitis
6	6	18	0	0	0	8	Siderosis
7	7	15	0	0	1	3	Persistent chronic hepatitis
8	8	21	0	0	0	6	Siderosis
9	9	16	0	0	0	9	Without alterations
10†	1	50	1	1	1		Chronic active hepatitis (mild)
11*†	2	35	1	1	1		Chronic active hepatitis (mild)
12*	3	5	2	1	1		Chronic active hepatitis (mild)
13	1	62	2	2	2		Chronic active hepatitis (moderate)

* Biopsies obtained in patients with a functioning kidney graft

† Ultrastructural studies performed

finding of similar degrees of fibrosis and inflammation. Table II contains the results obtained in the autopsy series. All the cases showed the presence of refractile particles. Nevertheless it was not always coincidental with morphological changes of fibrosis or inflammation. No correlation was found between the degree of particle deposition and duration of haemodialysis treatment.

Discussion

Our results confirm the presence of silicone particles in the liver of chronic haemodialysis patients. The liver biopsy does not seem, in our experience, to be an adequate method of estimating the incidence of the particles. The incidence in our autopsy series seems to indicate, in agreement with Leong et al

TABLE II. Histological and clinical features in the autopsy series

Autopsy No.	Duration of haemodialysis months	Silicone score	Grade of fibrosis	Grade of inflammation	Silicone in other tissues	Biochemical alterations	Histologic diagnosis
1	34	1	1	0	—	absent	Minimal changes
2	18	2	0	0	—	absent	Siderosis
3	25	1	0	1	—	absent	Siderosis
4	19	3	2	2	spleen marrow	absent	Mild portal fibrosis
5	12	2	1	0	spleen	absent	Mild portal fibrosis, steatosis
6	25	1	0	0	spleen	absent	Minimal changes
7	12	1	1	1	—	absent	Chronic active hepatitis, (mild) steatosis

[1], that every patient will have refractile particles if silicone tubing is employed in dialysis.

We have not found a correlation between morphological changes such as inflammation and fibrosis and the presence of silicone particles. In addition in some of our cases its presence is accompanied by a remarkable absence of morphological changes. These facts, together with the absence of clinical and biochemical alterations in our autopsy series, lead us to believe that the finding of refractile particles of silicone in the liver of haemodialysis patients could be fortuitous and have uncertain clinical implications.

Reference

- 1 Leong ASY, Disney APS, Gove DW. *N Engl J Med* 1982; 306: 135

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