The prevention of hepatitis in haemodialysis units

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Summary
The efforts that have been made to prevent outbreaks of hepatitis in haemodialysis units are briefly reviewed.

Human immunoglobulin is of doubtful value in prophylaxis.
The preliminary results of screening for Australia antigen and the prompt isolation of carriers are encouraging.

It is now well established that hepatitis is a particular hazard to patients and staff in haemodialysis units. General awareness of the problem resulted from reports of outbreaks in units in the United Kingdom and in other countries (Jones et al., 1967; Eastwood et al., 1968; Ringertz & Nyström, 1967; London et al., 1969). Most of the outbreaks were considered, on the basis of epidemiological evidence, to be of serum hepatitis. In some instances, however, infectious hepatitis seemed to be indicated.

Several factors combine to make the occurrence of outbreaks of hepatitis more likely in haemodialysis units than in other hospital situations. It is well known that hepatitis may be transmitted by apparently healthy blood donors (British Medical Journal, 1967). Patients maintained on long term dialysis often require blood transfusions and many have had repeated blood transfusions before beginning treatment in the unit. Moreover, patients with irreversible renal failure tend to respond to the infection by becoming persistent symptomless carriers of the infecting agent for long periods (Turner & White, 1969). Clearly, the long term treatment of such patients by haemodialysis presents a repeated risk of infection to the staff and to other patients in the unit.

Some general preventive measures
Efforts have been made in many units to reduce the risk of outbreaks by various means, for example:

(1) The reduction in the number of blood transfusions to the minimum compatible with the well-being of the patient.

(2) The improvement of general conditions within the units, the avoidance of overcrowding and the provision of new units.

(3) The restriction of the use of non-disposable equipment to individual patients and the use of disposable equipment where possible.

(4) The observance by staff and patients of sensible precautions against cross-infection. Codes of practice have been drawn up for the guidance of staff. These vary from unit to unit in detail. There are of course difficulties in striking a balance between emphasizing too many details — thereby diluting the most important — and failing to make all the dangers clear enough.

A detailed account of precautionary measures is available (Public Health Laboratory Service, 1968b).

Prophylaxis
Human normal immunoglobulin is the only material available at present for the prophylaxis of hepatitis. Its usefulness is established in the prevention of overt attacks of infectious hepatitis (Public Health Laboratory Service, 1968a), but it is of doubtful value in the prevention of serum hepatitis. Supplies of human normal immunoglobulin are available to all consultants in charge of dialysis units who wish to use this material.

Public Health Laboratory Service survey
Reports of outbreaks of hepatitis are valuable for drawing attention to, and providing information about, the problem initially but they form an unreliable basis for assessments of the general risk, to patients and staff in dialysis units, of developing hepatitis. This is so for several reasons: firstly, reports of some outbreaks may not be published or published long after the event; secondly, methods of analysis of the data are rarely similar in all reports and lastly, accounts of the absence of hepatitis are not published. Moreover, the number of haemodialysis units and the number of patients under treatment in the United Kingdom increase each year. The hepatitis risk in haemodialysis units...
cannot be reliably assessed unless many individual units regularly supply standard information for analysis. Not only is this information necessary for assessment of the risk of hepatitis but it is essential for the evaluation of possible methods of prevention.

In January 1968 a survey was begun at the Epidemiological Research Laboratory, Central Public Health Laboratory with the collaboration of consultants in charge of twenty dialysis units in the United Kingdom. The aims of the study were to determine the incidence of hepatitis in staff and patients in the units and to assess the incidence in relation to the prophylactic use of human immunoglobulin.

Personal records were completed for all patients and staff in the collaborating units. Special records were completed for each case of hepatitis. For staff who had left the units permanently inquiries were made by post to discover whether jaundice had occurred within 6 months of the date of leaving.

A controlled trial to assess the prophylactic value of human immunoglobulin was not considered feasible. Whether or not immunoglobulin was used was decided by the consultant in charge of each unit. In less than half the units doses were offered to staff at regular intervals. In the remainder, doses were not offered unless an outbreak of hepatitis occurred or seemed likely to occur.

A detailed account of the results of this study will be published in the near future. The preliminary results show that new outbreaks of hepatitis did not occur in any of the survey units in 1968 although one outbreak, which was in progress before the survey began, continued. It seemed possible that general measures were combining to prevent outbreaks. The results in 1969 showed that this was not so: two new outbreaks began in the survey units and another unit entered the survey when a case of hepatitis occurred.

Information about the value of human immunoglobulin is inconclusive. There is no evidence that the general use of immunoglobulin after cases of hepatitis began to occur affected the course of any of the outbreaks which arose during the period of the survey.

Tests for Australia (hepatitis-associated) antigen

The possibility of adding specific laboratory investigations to the original study was presented by the discovery of an antigen—the Australia or hepatitis-associated antigen—in the blood of patients with serum hepatitis.

A pilot study

In July 1969 a study was made to detect hepatitis-associated antigen in serum samples from patients in eighteen of the survey units. Samples from fifteen units were examined at the Virus Reference Laboratory, Central Public Health Laboratory. Samples from three units were examined at the local public health laboratories.

The results showed a clear association between the occurrence of outbreaks of hepatitis and the presence of the antigen. In each of four units with outbreaks which began or continued in 1969 the antigen was found in the serum of one or more patients. The antigen was not detected in any samples from the other fourteen units in which outbreaks of hepatitis did not occur during the period of the survey, i.e. 1968 and 1969.

Laboratory tests confirmed the view that the common occurrence of outbreaks of hepatitis and their continuance are dependent upon persistent carriage of the infecting agent by patients without clinical evidence of hepatitis.

The observations made during and after the pilot survey indicated that prospective studies, in units in which outbreaks of hepatitis had not occurred, might afford valuable information. There were, however, several difficulties in undertaking the study, these were:

1. The gel diffusion test, which was the only method economical enough of antibody and labour to be used for a large number of tests, was not completely sensitive.

2. Supplies of antibody were scarce.

3. Most units had little or no accommodation for dialysing patients in isolation and there is little point in reporting positive results unless adequate action can be taken, i.e. removal of the case or carrier from the open unit for dialysis elsewhere.

Despite these problems it was decided to proceed.

Study of the value of regular screening tests for hepatitis-associated antigen

The aims of this study, which began in January 1970, were to find how the antigen is introduced into dialysis units, to detect carriers of the antigen and to determine whether spread of infection could be prevented by the isolation of cases and carriers of the antigen.

At the outset specimens of serum from all patients and staff in the collaborating units were tested. Subsequent tests are made of sera from all patients at regular 3-monthly intervals. Specimens from all newcomers to the units are tested.

Blood intended to be transfused to patients in the unit is tested before use whenever possible. Blood transfused in an emergency is tested retrospectively.

When the antigen is found in a specimen efforts are made to remove the carrier from the open unit. Samples from all patients and staff in the units concerned are tested at weekly or 2-weekly intervals.
Prevention of hepatitis in dialysis units

503

until the likelihood of an outbreak is considered to have passed or, should an outbreak occur, until the outbreak is considered to have ended.

Preliminary results of the studies in 1970 indicate that regular screening tests for hepatitis-associated antigen and prompt isolation of carriers and suspected cases, together with sensible precautionary measures, would seem to afford the best means available at present of preventing outbreaks of hepatitis in renal dialysis units. Regular screening facilities and isolation accommodation should be made available for all dialysis units.

References


Prevention of hepatitis in dialysis units

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