there is no doubt that post-anaesthetic vomiting is infrequent. Vomiting is certainly less common than after ether anaesthesia, when the patient's recovery is in addition often attended with the unpleasant taste and smell of the anaesthetic.

Trichlorethylene does not produce good muscular relaxation and should never be employed with this object. Its low volatility demands some form of apparatus for its administration, the simplest being the Marrett type of inhaler, while it appears unwise to employ the drug in the closed-circuit machine. It is unsuitable for the maintenance of anaesthesia for children and in intrathoracic surgery, owing to the ease with which a severe tachypnoea is produced in both cases.

Uses

The three ways in which the agent may be used in modern anaesthetic practice are as follows.

Induction.—The non-irritant properties of trichlorethylene stamp it as an excellent anaesthetic for this purpose. Much larger amounts of the drug may be given for this short period than should be administered for the maintenance of anaesthesia. Endotracheal tubes can be conveniently passed "blind" after the establishment of narcosis with thiopentone, followed by the inhalation of about six breaths of a mixture containing N_2O , O_2 , trichlorethylene, and CO_2 .

Maintenance.—Trichlorethylene may be usefully employed as outlined above for all cases not requiring profound muscular relaxation. This embraces almost all operations outside the peritoneal cavity, and includes the bulk of neurosurgical, orthopaedic, ear-nose-and-throat, and ophthalmic practice.

Maintenance with Curare.—We have found trichlorethylene an excellent drug to use with curare for abdominal operations, and consider it preferable to ether, cyclopropane, or repeated doses of thiopentone (Ostlere, 1947). The anaesthesia is exactly the same as for cases not requiring muscular relaxation, curare being added intravenously when necessary.

Summary

A report is made of 40,000 administrations of trichlorethylene unattended by any fatality implicating the anaesthetic. The reported toxic effects of the drug are discussed, as well as its practical advantages and disadvantages. The three ways in which trichlorethylene may be used in modern anaesthetic practice are briefly described.

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HOMOLOGOUS SERUM JAUNDICE

BY

K. B. SCOTT, M.R.C.S., D.R.C.O.G.

AND

GEOFFREY H. TOVEY, M.D.

Regional Blood Transfusion Officer, Southmead, Bristol

The following case history is reported to remind clinicians of the importance of considering homologous serum jaundice whenever a patient shows clinical signs of hepatitis.

Case History

A primipara aged 19 was admitted to Southmead Hospital because of an abscess in the right breast. On admission she was seen to be jaundiced. The jaundice was said to have been present for 14 days. Its onset was accompanied by nausea and anorexia and had been preceded by diarrhoea and lassitude for three days. The stools had been pale and the urine dark. A diagnosis had been made at home of "catarrhal jaundice."

When admitted the patient's temperature was $101^{\circ} F.$ ($38.3^{\circ} C.$), pulse 100, and respirations 20. Definite jaundice was present, and the liver was just palpable and tender. The stools were bulky and pale; the urine was dark and contained bile. Laboratory investigations agreed with a clinical diagnosis of hepatitis (blood count, mild hypochromic anaemia, reticulocytes 1%; van den Bergh reaction, biphasic; serum bilirubin, 1.9 mg. per 100 ml.; serum alkaline phosphatase, 22.8 units). The pyrexia subsided in 48 hours after incision and penicillin, and on a high-protein and high-carbohydrate diet the patient made a steady recovery. Her urine became free from bile 15 days after admission. The patient had been feeding a neighbour's baby as well as her own. Neither baby showed signs of jaundice.

Comments

It was discovered that because of a post-partum haemorrhage the patient had received a transfusion of two bottles of plasma and one bottle of group O Rh-negative blood 79 days before the onset of the jaundice. The relatively high incidence of hepatitis following plasma transfusions (5–10%) would make it seem probable, therefore, that this was a case of homologous serum jaundice.

Fortunately this patient made a complete recovery; but fatal cases have been reported (*British Medical Journal*, 1946, 2, 423), and the incidence of this complication following plasma or serum transfusions is great enough to constitute a grave deterrent to the transfusion of these fluids except for the express purpose of saving life.

The agent responsible for the hepatitis is thought to be carried by certain batches of plasma only. Batches at present issued may contain 500 or more bottles, and to minimize the risks of patients developing homologous serum jaundice following a plasma transfusion it is necessary that all remaining bottles of possible infective batches should be withdrawn from circulation as soon as a batch is suspected of carrying the infecting agent. The probability that this patient's jaundice was connected with the plasma transfusion had been overlooked by her doctor, and it seems likely that no more would have been heard of her jaundice had not the breast abscess supervened to bring her into hospital. It is possible that other cases of homologous serum jaundice are being missed in the same way, and we would stress the need to inquire into a history of a plasma, serum, or blood transfusion during the previous six months whenever a patient shows signs suggestive of hepatitis. Details of cases with a transfusion history should be brought to the notice of the regional blood transfusion officer so that these officers in all other regions may be informed of the serial number of the offending batch or batches and may take steps to withdraw from

Addressing the Pharmaceutical Society of Great Britain on "Modern Knowledge of Protein Structure and its Pharmaceutical Significance," Dr. Adrien Albert said that Ernest Gale, of Cambridge, had shown that Gram-positive organisms, especially the cocci which depend on an external source of glutamic acid for the synthesis of the proteins, were prevented by penicillin from taking up this substance from the surrounding medium. He had also shown that organisms which become resistant to penicillin have learnt to synthesize their own glutamic acid.

hospital stores all remaining bottles. We are reminded, of course, of the great importance of clearly and accurately recording in the patient's notes the batch numbers of all transfusion fluids given, for without a record of these numbers it is not possible to detect and withdraw from circulation the infected batches.

We are indebted to Dr. F. J. W. Lewis for the laboratory investigations.

HOMOLOGOUS SERUM JAUNDICE IN INFANCY

BY

JOHN APLEY, M.D., M.R.C.P.

AND

HUGH R. E. WALLIS, M.B., M.R.C.P., D.C.H.

(From the Children's Hospital, Bristol)

The indications for intravenous plasma therapy in paediatric practice are many. Since plasma possesses all the therapeutic properties of whole blood, except those conferred by the red cells, it is especially indicated in shock with haemoconcentration and in hypoproteinaemia. In practice it is widely employed in the treatment of such conditions as burns and severe gastro-intestinal affections.

Despite its widespread use, the complications and sequelae of plasma therapy in infancy are surprisingly uncommon; homologous serum jaundice, for example, appears to be extremely rare. We have been able to discover only one possible case in the literature (Scheinberg *et al.*, 1947), though another more fully substantiated case, following not plasma but blood transfusion in an infant, has recently been described (Bruyn, 1947). In later childhood, however, jaundice has followed the use of convalescent serum in several instances (Propert, 1938; Beeson *et al.*, 1944), while in adults it is a common complication of plasma therapy (*British Medical Journal*, 1946, 2, 423), occurring in 7.3% of cases in one large series (Spurling *et al.*, 1946). Various explanations may be advanced for the relatively low frequency of occurrence in infancy: a temporary passive immunity to the causative virus may be present at this period of life, hepatitis may occur but remain symptomless, or jaundice in infants may fail to be correlated with previous transfusion treatment. The history of the recognition of the condition in adults suggests that the last possibility is not unlikely to prove correct. For this reason two cases of fatal homologous serum jaundice occurring in infants are recorded, together with an inquiry to determine the incidence of this sequel after transfusion with reconstituted dried plasma.

Case 1

T.B., a male child who had never been inoculated or vaccinated, had had no illness until the age of 7 months. He was then admitted to hospital with bronchopneumonia. He was treated with sulphathiazole and recovered from the pneumonia, but before discharge developed diarrhoea and vomiting. With these he became so severely dehydrated that he was treated with intravenous fluids, including reconstituted pooled plasma (120 ml. on each of two occasions, with an interval of six days), and subsequently made an uneventful recovery.

Four months later, at the age of 1 year, he was admitted to another hospital. He had been sleepy and jaundiced for two days. He had not vomited, though his appetite was poor, and his motions had been pale. On examination he was jaundiced and comatose. The pupils were pin-point but reacted to light. There was no neck rigidity. The liver was palpable one finger-breadth below the costal margin. His temperature was 98.4° F.

(36.9° C.) on admission, but later in the illness it rose to 102° F. (38.9° C.). Coma continued for two days, and convulsive movements occurred occasionally. The child died after four days' illness.

The interval between the first infusion of plasma and the onset of jaundice was 122 days.

Necropsy Findings.—A post-mortem examination was carried out 60 hours after death. The child appeared plump and was moderately jaundiced. There were no haemorrhages on the body surface. Abnormal findings were as follows. *Lungs*: A small number of recent haemorrhages had occurred into the parenchyma posteriorly on both sides. The *spleen* was slightly enlarged (weight, 25 g.), and on section the pulp was firm and the surface flat. *Small intestine*: Peyer's patches appeared hyperaemic but were not ulcerated. The *kidneys* were very pale, but histological study showed no change in architecture. The *gall-bladder* contained some rather pale bile which was easily expressed into the duodenum. The *liver* showed some post-mortem hypostases. It was of normal size (weight, 350 g.), and the surface was smooth and pale yellow in colour. On section the liver tissue was firm, appeared extremely fatty, and was slightly jaundiced. No haemorrhages were seen. The bile ducts were not dilated.

Histology.—Unfortunately, post-mortem changes obscured the histological picture, but despite the short history of illness there was subacute hepatic necrosis with a lymphocytic cellular infiltration around the portal areas. The number of recognizable liver cells was greatly reduced, and most of the survivors contained fat vacuoles. The bile ducts were unaffected; they were not dilated, and contained no bile thrombi. A frozen section confirmed the impression that all the surviving liver cells were heavily laden with fat.

Case 2

S.J., a female child, had had no illnesses until she was 11 weeks old, when she developed diarrhoea and vomiting, and was admitted to hospital. She was severely dehydrated, and was at once given intravenous saline and dextrose with 200 ml. of reconstituted pooled plasma. She recovered and was discharged well after two weeks. Six weeks later she began to pass frequent stools. After five days her urine was noticed to be bright yellow and she started vomiting. Next day she became jaundiced and was readmitted to hospital. On admission she was slightly jaundiced, but well nourished and not dehydrated. No other abnormality was noted. Two days later she had two convulsions and vomited some blood. Next day the convulsions became more severe and frequent, and she died.

The interval between the infusion of plasma and the onset of jaundice was 63 days.

Necropsy Findings.—A post-mortem examination was carried out three hours after death. The infant appeared well nourished, and there was slight jaundice with some cyanosis. No superficial haemorrhages were seen. Abnormal findings were as follows. In the *lungs* a small number of subpleural haemorrhages were present, and there were some small foci of collapse but no consolidation. The *spleen* was dark red in colour, and was enlarged to three times the normal size; histologically it showed only venous congestion. The *liver* was smaller than normal, with a smooth mottled yellow surface.

Histology.—Sections from the left and right lobes of the liver showed a uniform degree of subacute necrosis. There was almost complete disappearance of the columns of liver cells, only a few islands of extremely fatty liver cells surviving in places. The liver sinusoids were intact and there did not seem to be any gross haemorrhages. The material between the sinusoids consisted of amorphous debris, with a cellular infiltration composed partly of polymorphonuclear leucocytes but chiefly of mononuclear cells. There was some early bile-duct proliferation, but no evidence of obstruction of any of the bile ducts.

Comment

The diagnosis of homologous serum jaundice in these two cases seems reasonably certain. The intervals between