ANAPHYLACTIC REACTION TO DEXTRAN

A Case Report

BY

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SUMMARY

A case is reported in which an anaphylactic reaction occurred in a healthy 18-year-old girl in association with the infusion of 7 ml of dextran. Although this complication is very rare, it is important to be aware of the possibility. It is suggested that rapid infusion of plasma or whole blood, rather than the use of vasoconstrictor drugs, is the treatment of choice in this situation.

The clinical dextrans represent the nearest approach so far to the ideal plasma volume expander. These are glucose polymers with an average molecular weight of between 70,000 and 150,000 depending on the specifications in different countries. They possess most of the desirable properties of a plasma volume expander, but are antigenic and may interfere with blood grouping and blood coagulation. These side effects are directly related to the size and degree of branching of the molecules. In a small percentage of individuals, allergic reactions are seen a few hours after infusion, usually itching, urticaria and joint pains, while vasomotor manifestations, such as flushing and headache are less common (Wylie and Churchill-Davidson, 1966). Its potential antigenicity is well documented and the relevant literature has been reviewed by Shephard and Vandam (1964). In experimental work on volunteers allergic reactions are common but in therapeutic use they are rare and for some reason, not yet known, they are seldom seen in anaesthetized patients. Such reactions may occur in patients being given dextran for the first time, as small quantities of antidextran occur naturally in some individuals. This is because there are cross-immunological relationships between clinical dextran formed by Leuconostoc mesenteroides and the dextrans which are either ingested as contaminants of sugar or formed in the body by various strains of pneumococci and streptococci. Since 1954, strains of Leuconostoc mesenteroides have been used in dextran manufacture throughout the world which give molecules approximating to a simple unbranched 1:6 alpha polyglucose and this, together with the removal of high molecular weight constituents, has reduced antigenicity to a very low level (Squire et al., 1955).

Anaphylactic reactions were rare with the earlier clinical dextrans (Maycock, 1952) and since 1954 only three such cases have been recorded (Shephard and Vandam, 1964; Henley, McPhaul and Albert, 1958; Getzen and Speiggle, 1963). They all occurred in middle-aged or elderly patients in poor general health. The following report is of such a reaction in a healthy young lady.

CASE REPORT

An 18-year-old female university student underwent laparotomy for intestinal obstruction of 3 days duration. Three months previously she had undergone appendicectomy at another hospital, and a year before that she had been treated for iron-deficient anaemia. At preoperative clinical assessment she was not anaemic, the pulse rate was 92 beats/min, the blood pressure was 120/70 mm Hg, and the heart and lungs were normal. She was mildly dehydrated and a 4.3 per cent dextrose in 0.18 per cent saline infusion had been set up using a cannula (Braunula) at the right wrist.

Premedication consisted of pethidine 50 mg and atropine 0.6 mg given by intramuscular injection nearly 2 hours before operation. Anaesthesia was induced using thiopentone 150 mg and this was followed with suxamethonium 50 mg. After intubation, anaesthesia was maintained using 70 per cent nitrous oxide and 0.5 per cent halothane in oxygen with intermittent gallamine as a relaxant (total dose 180 mg). A mechanical ventilator (Cyclator; B.O.C.) was used to maintain passive pulmonary ventilation. Atropine 0.6 mg and neostigmine 1.25 mg were given at the end of the operation.

On opening the peritoneal cavity a gangrenous loop of terminal ileum approximately 25 cm in length was observed. This had been caused by adhesions in the right iliac fossa. A 50-cm length of ileum was resected and ileo-caecal anastomosis performed; penicillin and sulphadimidine powder 5 g was placed in the peritoneal
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The diagnosis of dextran anaphylaxis has to be made clinically by the time relationship between the infusion of only a few millilitres of dextran and vasomotor collapse of the patient, with or without other signs of allergy. This is particularly difficult in a patient who is already on the verge of, or actually in, hypovolaemic shock (the usual reason for giving a plasma volume expander) unless one is aware of its possibility. Delay occurs whilst other causes are considered. Symptoms of burning or tightness of veins throughout the body and a sensation of impending death without loss of consciousness have been noted in this and other case reports (Shephard and Vandam, 1964; Henley, McPhaul and Albert, 1958). Skin testing is, unfortunately, not sufficiently reliable to confirm or refute the diagnosis after the patient has recovered (Heyre and Neills, 1946; Report to National Research Council, May 8, 1952).

Treatment with adrenaline or hydrocortisone with a vasopressor might be expected to restore the cardiovascular system to its previous state. However, this alone may not be sufficient. In one case (Henley, McPhaul and Albert, 1958), in whom treatment with adrenaline and antihista-
mine drugs failed, a noradrenaline infusion and hydrocortisone were needed for 5 days to maintain a satisfactory level of blood pressure. It has recently been shown (Hardaway and Anderson, 1967) that in the states of shock of non-cardiac origin the most important factor in treatment is fluid volume administration, often in excess of the patient's estimated fluid volume, which increases venous return and hence cardiac output. When hydrocortisone and metaraminol had failed in the case described here, rapid infusion of plasma and whole blood was quickly effective and no further drugs were required. This is preferable to trying a variety of drugs if the patient's blood volume is already low when the sudden increase in vascular capacity occurs.

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References


REACTION ANAPHYLACTIQUE AU DEXTRAN: RAPPORT D'UN CAS

On rapporte un cas dans lequel il se produisit une reaction anaphylactique chez une jeune fille de 18 ans, en rapport avec une transfusion de 7 ml de dextran. Bien que cette complication est tres rare, il est important de savoir qu'elle peut exister. On propose de pratiquer une transfusion rapide de plasma ou de sang complet, ce qui represents le traitement de choix dans cette situation, plutot que d'employer des medicaments vasoconstricteurs.

ANAPHYLAKTISCHE REAKTION AUF DEXTRAN: BERICHT EINES FALLES

ZUSAMMENFASSUNG
Es wird von einem Fall berichtet, bei dem eine anaphylaktische Reaktion bei einem gesunden 18-jährigen Mädchen, im Zusammenhang mit der Infusion von 7 ml Dextran, auftrat. Obgleich diese Komplikation sehr selten ist, erscheint es wichtig, an diese Möglichkeit zu denken. Es wird vorgeschlagen, daß die schnelle Infusion von Plasma oder Vollblut, statt der Gabe von gefäßverengenden Mitteln, die Behandlung der Wahl in dieser Situation sei.

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