ANAESTHETIC DEATHS IN A FAMILY

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SUMMARY

A local family is described in which there have been ten deaths attributable to general anaesthesia.

The pattern of inheritance of the abnormality is compatible with that due to an incompletely penetrant dominant gene or genes.

Spinal anaesthesia produced no ill effects when used in the one member of the family who survived a reaction following a general anaesthetic.

A number of members of a local family have died during or shortly after general anaesthesia. This was brought home forcibly to the authors when a young man nearly died following a general anaesthetic for a compound fracture of the leg (Denborough and Lovell, 1960).

It is felt that the existence of an inherited sensitivity to general anaesthesia should be widely appreciated, and for this reason the history of this patient is reported with some details of the incidence of the condition in his family.

CASE HISTORY

The patient, a male aged 21, was admitted to hospital with a compound fracture of the tibia and fibula on April 8, 1960. He was less concerned about the fracture than about the fact that he was likely to need a general anaesthetic, as several of his relatives had died following the administration of ether. Because of this serious history a local anaesthetic had been used when he had needed an appendicectomy in childhood. The parents and the patient's general practitioner were interviewed and the story was confirmed. It was believed that in each case the reaction had been due to ether. It was decided to proceed cautiously avoiding ether and to be ready to stop if there were any untoward signs.

The patient was premedicated with pethidine 100 mg and atropine 0.6 mg and was anaesthetized with thiopentone 250 mg followed by nitrous oxide 2 l./min, oxygen 1 l./min and halothane, using a Boyle apparatus with closed circuit and soda lime absorption. Halothane was administered up to a maximum of 2 per cent and was then reduced to 1.5 per cent. Ten minutes later the halothane concentration was reduced because the blood pressure had fallen from 120 mm Hg to 100 mm Hg. The total time during which halothane was administered was 15 minutes. After another 10 minutes the patient looked pale and cyanosed, the blood pressure had fallen to 80 mm Hg, and the pulse rate had risen from 100 to 160 b.p.m. Anaesthesia was stopped and the operation was concluded in the next 10 minutes. However, he remained deeply unconscious for a further 30 minutes and his skin was hot and sweaty. He was rubbed down with ice-cold cloths and given a blood transfusion. He gradually recovered over the next 14 hours and his subsequent course was uneventful.

After recovery several investigations were made but none was abnormal. The investigations included chest radiogram, electrocardiogram, estimations of urinary porphyrins, catecholamines and corticosteroids, liver function, serum cholinesterase, proteins, calcium, phosphorus and alkaline phosphatase. He was given subcutaneous injections of atropine increasing from 0.001 mg to 0.6 mg without side effects.

On March 24, 1961, the patient was again admitted to hospital, this time for the removal of a calculus which had been impacted at the lower end of the left ureter for 3 months. He was given a spinal anaesthetic with 1.4 ml of 0.5 per cent cinchocaine, and the stone was removed uneventfully. During the operation the blood pressure was kept at 120 mm Hg by intermittent intravenous injections of metaraminol.

Inquiry shows that of the thirty-eight relatives of the propositus who have had general anaesthetics ten have died. In all these cases it appears that the anaesthetic agents used were ethyl chloride and ether. Three of the affected members were cousins of the propositus and seven were uncles or aunts (fig. 1).
DISCUSSION
Where it has been possible to obtain records of the deaths following anaesthesia in this family the course of events has been similar. In all except one the operation has been minor and successful and so was very unlikely to have been the cause of death. In the three best documented patients, who were females aged 39, 16 and 12, each had been returned to the ward after operation in an apparently good condition, only to die following convulsions about 30 minutes later. In two, the temperature was taken and found to be 43°C and 42°C respectively. At postmortem examination no abnormalities were found. The propositus is the only affected member who has survived.

The pattern of inheritance is compatible with that due to a dominant gene or genes, with one exception. The grandmother of the propositus, who it might be expected would have been affected, survived the administration of chloroform for eclampsia (fig. 1). This suggests that sometimes there may be incomplete penetration of the responsible gene or genes. Alternatively, affected members may be able to survive light anaesthesia.

The nature of the inherited anomaly is not known. Recently a postanaesthetic death due to a phaeochromocytoma has been reported (Coates and Rigal, 1961). This patient had tachypnoea, tachycardia, peripheral vasoconstriction and sweating, and these features prompted us to examine the urinary excretion of catecholamines in the propositus, but this was normal.

The fact that the patient had no side effects from spinal anaesthesia is important for the future management of this family.

REFERENCES

SOMMAIRE
On décrit une famille indigène pour laquelle on peut attribuer dix cas de décès à l’anesthésie générale. Le schéma d’hérédité de cette anomalie est compatible avec celui d’une dominance imparfaitement pénétrante d’un ou de plusieurs gènes. Une anesthésie spinale ne produisit aucun effet secondaire défavorable quand on en fit usage chez un des membres de la famille qui survécut à une réaction à la suite d’une anesthésie générale.

ZUSAMMENFASSUNG
Es wird über eine ortsansässige Familie berichtet, in der es zu zehn Todesfällen gekommen ist, die als Narkosefolge angesehen werden können. Der hereditäre Aspekt der Anomalie entspricht einer auf eine unvollständige Dominanz eines oder mehrerer Gene zurückzuführenden Vererbungsscheinung.

Bei einem Mitglied der erwähnten Familie, das eine Reaktion auf eine Narkose überlebt hatte, rief die Anwendung einer Rückenmarksanästhesie keine schädlichen Wirkungen hervor.