"PUT NOT YOUR TRUST IN TUBES"

A Case Report of Cerebral Irritation following Respiratory Obstruction

BY

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SUMMARY

A case is described of cerebral irritation following respiratory obstruction during anaesthesia, caused by occlusion of an endotracheal tube by overinflation of the cuff. The patient made a full recovery after prompt dehydration therapy combined with hypothermia.

The following case illustrates once again that the presence of an endotracheal tube is, in itself, no guarantee of a perfect airway.

CASE REPORT

A healthy female patient, aged 45 years, was admitted for repair of a right femoral hernia. Nothing abnormal was detected on pre-operative examination. Premedication was atropine 0.6 mg and morphine 10 mg, administered subcutaneously 45 minutes before operation. Anaesthesia was induced with methohexitone 80 mg and, after suxamethonium 75 mg, the trachea was intubated with a No. 8 cuffed rubber Magill endotracheal tube. Anaesthesia was continued with 50 per cent nitrous oxide in oxygen. The flow rate was 4 l./min. 1 per cent halothane was administered from a Fluotec vaporizer, and intermittent positive pressure respiration was carried out by hand, a circle absorber being included in the circuit.

There was an almost immediate airway resistance to pulmonary inflation. Assuming that this was due to bronchospasm, aminophylline 500 mg was given intravenously; this did not lead to improvement in the respiratory resistance. Cyanosis gradually developed, heart rate increased, the pulse became bounding in character, and circulation began to fail. Unfortunately, however, the cause was not detected at once. The legs were raised to combat hypotension, and the anaesthetic gases switched off.

It was only then that the possibility of a fault in the endotracheal tube was considered. Acting on this assumption, release of the cuff resulted in the return of spontaneous respiration with a rapid improvement in the patient's colour. Methylamphetamine 30 mg was given intravenously to correct the hypotension.

The endotracheal tube was removed, a new one inserted, and the operation quickly completed. After extubation the patient started screaming in a high-pitched tone, and was very restless. The similarity of the cry to that of babies after birth trauma was striking. The pupils were dilated, with only a sluggish response to light. Bilateral extensor plantar responses were elicited. A diagnosis was made of cerebral irritation from cerebral oedema as a result of a period of hypoxia and hypotension.

Inspection of the endotracheal tube had shown aneurysmal dilatation of the cuff leading to total respiratory obstruction.

The patient was treated using hypertonic plasma, obtained by mixing the dried plasma from 3 pints of blood with 400 ml of distilled water (Maciver et al., 1958). This was infused rapidly in just under 1 hour. The patient's temperature was lowered to 97.2°F using a wet sheet and fan.

There was a gradual quiescence and return to consciousness over the course of 1½ hours. Pupils reacted normally and plantar responses were obtained. Slight mental confusion persisted for about 6 hours. After this time there were no abnormal neurological signs and the patient appeared mentally normal. She complained of nausea and retching, but not of headache. Promethazine 25 mg with chlorpromazine 25 mg was given intramuscularly as a sedative and anti-emetic, and to prevent shivering. Active cooling was stopped and the patient allowed to rewarm gradually. From then on she made good progress and was allowed home one week later.

When seen in out-patient department for routine postoperative examination one month later, she was considered normal in every way and was discharged.

DISCUSSION

Two main points emerge: the rapid development of cerebral oedema subsequent to a brief period of cerebral hypoxia and hypotension, and its successful treatment; and the possibility of respiratory obstruction arising from a faulty endotracheal tube.

Many cases of respiratory obstruction have been recorded with an endotracheal tube in situ. Tubes may kink (Gillespie, 1948), connections may be occluded (Rollason, 1956). Foreign bodies in the tube or connections may cause blockage and res-
piratory obstruction. Hewer (1956) described a case in which a facepiece spigot was discovered in a Cobb's union, causing valvular obstruction; Jenkins (1959) found half a Magill tube cleaning brush inside an endotracheal tube; and Haselhuhn (1958) described a case in which an endotracheal tube was occluded by the rubber tip used over the adaptor of an Abbot "Venopak". Deaths, when they occur, have been mainly from cerebral hypoxia (Forrester, 1959).

To avoid such mishaps, careful inspection of tubes and connections is necessary. Greasy lubricants which weaken rubber may be better avoided. Buckley (1952) recommends tragacanth paste in preference. Over-inflation of the cuff is the other main weakening factor and one should use only the minimum pressure for an airtight seal. Another cause of cuff deformity is the traction effects of corrugated tubing leading to the anaesthetic machine especially with a short endotracheal tube which is slightly over-inflated. This is particularly likely when the patient's position is altered after intubation, e.g. turning from supine to prone position or vice versa.

Recognition of respiratory obstruction with an endotracheal tube in situ may be difficult unless this possibility is constantly borne in mind. All the types of obstruction mentioned simulate severe bronchospasm which itself is generally considered to be rare. The test is obviously to deflate the cuff and/or change the tube.

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REFERENCES

"NE VOUS FIEZ PAS AUX TUBES"

SOMMAIRE
Description d'un cas d'irritation cérébrale survenue après une obstruction respiratoire au cours d'une anesthésie, l'obstruction faisant suite à l'obturation du tube endotrachéal par surgonflement du ballonnet. Le malade s'est complètement rétabli après un traitement énergique de déshydratation combiné à l'hypothermie.

"VERLASSE DICH NICHT AUF DEN KATHETER"

ZUSAMMENFASSUNG
Ein Fall von zerebraler Reizung im Gefolge einer respiratorischen Obstruktion, während der Anästhesie wird beschrieben, der durch den Verschluß eines Intubationskatheters durch übermaßige Luftfüllung der Manschette verursacht wurde. Der Zustand des Patienten normalisierte sich vollständig nach prompt durchgeführter Dehydrierung in Verbindung mit Hypothermie.