References


A FATAL ACCIDENT CAUSED BY A DEFECTIVE FLOWMETER

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Several anaesthetic accidents due to delivery of hypoxic mixtures resulting from various defects in flowmeters have been documented. But there have been very few reports of the cause being a worn-out washer at the top of the flowmeter bank.

CASE REPORT

During a subtotal thyroidectomy under oxygen : nitrous oxide : relaxant anaesthesia with a Boyle anaesthesia apparatus, it was observed that with an oxygen : nitrous oxide flow in 1 : 2 proportion, the patient developed cyanosis. The patient was suspected to have bronchospasm, and was treated accordingly. Later on with an oxygen : nitrous oxide flow in 1 : 1 proportion, the course of anaesthesia was smooth thereafter.

The next patient to be operated on the same operating room was a 42 years old lady. She was to undergo a laparotomy for suspected post-operative adhesions. She had been on emetine hydrochloride till two days prior to surgery. She was also anemic (Hb : 10.50%)

After premedication with pethidine 75 mg. and atropine 0.5 mg, anaesthesia was induced with thiopentone 250 mg. and suxamethonium 100 mg. The trachea was intubated and anaesthesia was maintained with d-tubocurarine and oxygen and nitrous oxide in 1 : 2 proportion in circle system. When the skin incision was made, blood was seen to be dark. The cyanosis disappeared when the oxygen was raised to 50%. The system was inspected for any possible cause; but none could be detected.

The only intra-abdominal pathology was

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the presence of abundant round worms in the intestines. These were removed through an enterotomy. While this was being done, the anaesthesiologist charged hands with another; and at this time failed to inform the new colleague about the initial episode of cyanosis. After a few minutes, the new person reduced gas flows to 500 ml of nitrous oxide as the hospital was having a shortage of anaesthetic gases at that time. In a few minutes the patient went onto bradycardia. Immediately nitrous oxide was cut off and 100% oxygen was given; but by this time the patient had gone onto cardiac arrest. She was resuscitated in about 2½ minutes, but she never regained consciousness and expired on the third postoperative day.

Two factors were considered causative at that time. One was emetine-toxicity, and the other, a possible defect in the flowmeter. A hissing noise could be clearly heard during IPPV when the flowmeter was auscultated with a stethoscope. The Boyle’s machine was kept away till it could be examined by an expert. Subsequent examination showed that oxygen was leaking out through the top of the flowmeter bank as a washer was worn out.

It was later learnt that during the two days prior to the fatal accident, two different anaesthesiologists had observed cyanosis under anaesthesia with the usual flow-rates.

DISCUSSION

Most anaesthetists tend to take the correct functioning of the flowmeters for granted. But inaccuracies can result due to several factors. An important one is, inaccuracy resulting from accumulation of static electricity. Another is the presence of cracks in the flowmeter tubes.

Apart from these, a recently recognised factor is a defective washer or a missing washer on the top of the flowmeter bank.

The one report of a missing washer appeared in 1976 (Thompson, 1976). In this instance, a flowmeter bank, which had been serviced and tested only a day or two before, was subsequently found to be missing a sealing washer at the top of the flowmeter of a Cape-Waine Ventilator. This could be immediately recognised as an oxygen-concentration meter was used in the system, and therefore caused no harm.

Probable the first and only other report of a flowmeter defect caused by a worn-out washer also appeared in 1975 (Gupta and Varshneya, 1975). The defect caused two successive anaesthetic accidents, the second of which was fatal.

The simple procedure of auscultation of the flowmeter is likely to give evidence of a leak in flowmeter—whether it is caused by a missing or worn-out washer or by a crack in the flowmeter tube. But this will have to be differentiated from the flow murmur which is heard normally on auscultation of a flowmeter. The recommendation by Eger et al (1963) that the oxygen flowmeter be placed nearest the outlet from the collecting chamber of the flowmeter bank deserves immediate implementation though arguments against it also have been raised (Thompson, 1976). Anyway, it is imperative that at the slightest doubt of a malfunction, the machine is kept away till it is experimentally proved to be accurate.

SUMMARY

A fatal accident caused by a leak in the flowmeter bank due to worn-out washer is described. It is suggested that auscultation of the flow-meter bank may give some indication of a leak when it is suspected.

REFERENCES


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EMERGENCE PHENOMENA AFTER KETAMINE IN INDIAN PATIENTS

Effect of educational status and urbanisation on its incidence

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Psychological disturbances following injection of ketamine hydrochloride, for anaesthesia are widely reported. The disturbances are in the form of vivid dreaming, hallucinations, delirium, agitation and sensory and perceptual misinterpretations. These have been termed as 'emergence phenomena'. A study of literature shows that the reported incidence of psychic reactions with this drug in India is very low compared to that reported in the Western countries. The incidence reported in the Indian patients have varied from 1-25% to 19-0% (Dhruva et al, 1971; Gudi et al, 1972, 1976; Lamba, 1974; Dasgupta et al, 1975; and Bhatia et al, 1975). In the Western countries, Morgan et al (1971) reported a 32-0% incidence of dreaming. Ten percent of their patients had terrifying dreams and refused to take the drug a second time. Knox et al (1970) reported dreaming in 48-0% and delirium in 36-0% of their patients with a 51-6% non-acceptance for a repeat administration of the drug. Garfield et al (1972) reported 33-3% incidence of dreaming with half of the patients not willing to take the drug again. Harvey and Hudson (1972) found that 35-8% of their patients had dreams following injection of ketamine, the dreams being unpleasant in 32-0%.

This prospective study was planned to investigate whether the differences in the incidence of 'emergence phenomena' from ketamine reported in our country and in the West were real, and whether these could be explained on the basis of differences in the educational status and urbanisation.

METHODS

Thirty five patients of either sex between the ages of 16 and 50 years (mean 28-0 years) were studied. Their weights varied from 37 to