A DANGER OF A NASAL CATHETER USED AS A MEANS OF OXYGENATION POSTOPERATIVELY

BY

E. S. N. FENTON

Broadgreen Hospital

CASE HISTORY

The patient was a woman of 47 years, weighing 10½ stone (65.5 kg). Mitral stenosis had been diagnosed five years previously. Her disability was not then severe, but dyspnoea was increasing and she had recently developed a dry cough. She had never been in cardiac failure.

On examination. No cyanosis—regular pulse.


Lungs. Dry.

B.P. 140/80. Haemoglobin (Haldane) 90. Vital capacity 2,120. Maximum breathing capacity 60 litres/min.

X-ray showed some enlargement of left auricle.

E.C.G. showed no marked abnormality except for a flat P wave in lead I and notched and somewhat spread QRS complex.

Cardiac catheter showed a mean P.A. pressure 38 mm/Hg.

On account of the moderate pulmonary hypertension, operation was decided upon.

Anaesthetic.

She was premedicated with papaveretum ½ grain (20 mg) and scopolamine 1/150 grain (0.45 mg) two and a half hours before operation. On arrival in the theatre she was given oxygen to breathe for two minutes from a face mask and bag.

Induction was with nitrous oxide and oxygen 6:1½ litres and she was given d-tubocurarine chloride 25 mg when consciousness was lost. A No. 9 cuffed endotracheal tube was introduced and connected to a “to and fro” absorption circuit. Anaesthesia was maintained with nitrous oxide and oxygen 2:1 litres.

The operation lasted for two and a half hours and was without abnormal incident. A good split of the mitral valve was obtained.

At the end of the operation, atropine 1/50 grain (1.3 mg) and neostigmine 5 mg were given and the patient was returned to the ward with satisfactory respiration and responding to questions. For her journey from the theatre to the ward a nasal catheter was introduced and this was connected to the oxygen cylinder carried on the trolley. No flow meter was used and the rate of flow was simply guessed by the feel of it. When the delivery tube was first connected to the catheter there was some belching and it was thought that the catheter must have passed beyond the nasopharynx and into the oesophagus. It was therefore withdrawn and strapped to the forehead. On arrival in the ward a matter of two or three minutes later, the oxygen on the trolley was disconnected and the patient put in an oxygen tent.

One hour later, the patient’s condition was found to have deteriorated and her abdomen was discovered to be in a state of...
gross distension. A stomach tube was passed and a small amount of bloodstained fluid was withdrawn but no gas. A flatus tube was passed without result. A straight X-ray of the abdomen and chest revealed a gross pneumoperitoneum and no pneumothorax.

The gas was withdrawn and a nor-adrenaline drip was started to combat the circulatory failure which had developed. Her condition improved during the next two and a half hours and then she suddenly deteriorated and died.

Postmortem examination revealed that conditions in the chest were those expected following valvotomy. Gas was present in the peritoneal cavity. The stomach showed signs of enormous distension, the muscle fibres were laminated and separated and a minute tear was present in the mucosa. Extensive bleeding had occurred into the stomach and small intestine. There was no sign of gastric ulcer and sections of the stomach wall were normal.

DISCUSSION

Throughout the operation inflation was carried out through a cuffed endotracheal tube. The only positive pressure from a mask took place just before intubation and this was only for a few moments. The gross distension of the abdomen which was seen later in the ward would certainly have been noticed had it been there when the patient was on the operating table.

It seems likely, therefore, that it only developed after the patient left the theatre, and that the flow of oxygen from the nasal catheter must have caused it. The patient was rather the short necked type and the catheter must have reached beyond the cricopharyngeus muscle, even after withdrawing it, and the flow of oxygen must have been delivered into the oesophagus. The cardiac sphincter must have been relaxed and the pylorus in spasm in order that the stomach could be so grossly distended. This seems unusual shortly after the administration of neostigmine.

The cylinder on this trolley was fitted with a simple pin type regulation valve. Presumably the cricopharyngeus muscle was an efficient sphincter and the oxygen continued to flow into the oesophagus and stomach, causing inflation and finally rupture.

It must be emphasized that if a nasal catheter is to be used for delivery of oxygen care must be taken firstly to ensure that the oxygen cylinder is fitted with an efficient reducing valve of the low pressure Adam’s type which will limit the extent of any possible build-up of pressure, and secondly to see that the catheter lies in the nasopharynx and has not passed through the cricopharyngeal sphincter.