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Unusual Failure of an Oxygen Flowmeter

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Erratic behavior in the action of the oxygen flowmeter was noticed in a Model 64-134 anesthesia machine manufactured by the Chicago Anesthesia Equipment Company. At indicated oxygen flow rates of less than 4–5 l/min, the rotometer bobbin behaved normally. When the flowmeter needle valve was adjusted to increase oxygen flow rates, the flowmeter bobbin bounced up and down erratically. A delivered flow of more than 6–8 liters could not be obtained consistently.

The flowmeter was dismantled and the rotometer tube cleaned with ether. The needle valve was also checked for dirt or obstruction. However, after reassembly and leveling, there was no improvement in the behavior of the flowmeter. It was then apparent that there must be some obstruction distal to the oxygen flowmeter. The metal couplings and tubing leading from the flowmeter were sequentially disassembled. At the first metal coupling connecting the output of the oxygen flowmeter to the internal copper tubing system, a small metal sphere resembling a BB shot was found. The origin of this foreign body was not immediately apparent. However, it was evident that the shot was acting as an intermittent ball valve. At low oxygen flow rates, it would allow the stream of oxygen to pass. At higher flow rates, the turbulence of the gas in the coupling would propel the shot into the central gas stream, where it would impinge upon the central opening in the tubing coupling. This opening was too small to permit the shot to pass through it, but did act as an effective valve seat.

In an attempt to locate the source of this foreign body, the other flowmeters on the same machine were disassembled. Other rotometer bobbins were found to have identical shots cemented within their hollow interiors. Figure 1 is a photograph of the bobbin-separated shot.

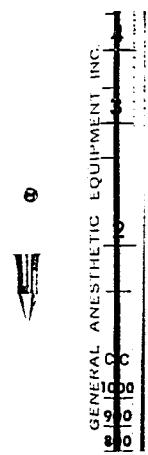

FIG. 1. Exploded view of the bobbin and separated shot.

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rated shot and its parent flowmeter. It is likely that the cement originally holding this shot within the bobbin failed, allowing it to be propelled by a high gas flow out of the bobbin and flowmeter tube into the metal tubing system of the machine. The shot was recemented into the bobbin, the flowmeter reassembled, and the calibration verified. Flowmeter behavior has been normal since.

An attempt to contact the Chicago Anesthesia Equipment Company to notify them of this incident was unsuccessful. However, several other sources contacted stated that this firm went out of business approximately seven years ago and has no representative at present.

The purpose of this report is to draw attention to this potential defect in other anesthesia machines still in use made by this manufacturer. Erratic behavior of any of the flowmeters on these machines should be cause to investigate the possibility of bobbin failure as described here.

Prolonged Intraoperative Bleeding Caused by Propylthiouracil-induced Hypoprothrombinemia

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Although hypoprothrombinemia as a result of propylthiouracil therapy was first reported more than 20 years ago,[1] the syndrome is rare, and its existence not generally recognized. In all cases reported previously the initial manifestation was a bleeding tendency, generally associated with metrorrhagia,[2] hematuria,[3] epistaxis,[1] or oropharyngeal bleeding.[4] We present a case of prolonged and troublesome intraoperative bleeding due to hypoprothrombinemia secondary to propylthiouracil therapy, and not recognized prior to operation.

REPORT OF A CASE

A 52-year-old woman was admitted to St. Mary's Hospital with recurrent hyperthyroidism. Three years previously she had developed tremor, palpitations, sweating, and weight loss, for which she underwent subtotal thyroidectomy. The symptoms recurred and, ten months later, the operation was repeated. Despite therapy with methimazole, the symptoms recurred and the patient was clinically hyperthyroid. There was no history of heavy alcohol intake, hepatic disease, or bleeding tendency. On physical examination at the time of admission the pulse rate was 80/min, blood pressure 120/70 mm Hg, and oral temperature 98.6 F. Examination disclosed no abnormalities except an enlarged right lobe of the thyroid. Chest x-ray demonstrated mild cardiomegaly, and the electrocardiogram evidenced left ventricular hypertrophy. Serum electrolytes were normal, as were transaminase and lactic dehydrogenase levels. The hemoglobin was 14.0 g/100 ml and the hematocrit 43 per cent. The leukocyte count was 4,900, with a normal differential and platelets described as adequate. Radioactive iodine uptake was 43.5 per cent, and scan demonstrated that most of the activity was concentrated in the right lobe of the thyroid. Methimazole was discontinued 13 days before operation and replaced by propylthiouracil, 200 mg orally every six hours, and reserpine, 0.1 mg orally daily. Reserpine was discontinued after three days (ten days preoperatively), and propylthiouracil was stopped five days before operation. Lugol's solution, 10 drops three times per day, was started on the seventh preoperative day and continued until the day before operation. The patient was anesthetized with thiopental, nitrous oxide, oxygen, and halothane for right thyroid lobectomy on the thirteenth day after admission. The anesthetic course was uneventful. However, profuse bleeding occurred at the operative site, was controlled only with difficulty, and continued as a troublesome ooze into the postoperative period.

The patient received no blood transfusion during operation. In the Recovery Room prothrombin time was determined to be more than 200 seconds, with a control of 12 seconds. Partial thrombo-

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