CASE REPORTS

FATAL TRACHEAL COMPRESSION AFTER HAEMORRHAGE INTO THE AXILLA

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SUMMARY

We report a case of fatal ventilatory obstruction as a result of haemorrhage into the axilla after a comminuted spiral fracture of the upper one-third of the humerus. Guidelines are presented as to the early recognition of such complications and their subsequent management.

KEY WORDS


CASE REPORT

A 68-yr-old woman fell on her outstretched left hand, and sustained a comminuted fracture of the upper left humerus with involvement of the shoulder joint. She presented to the Accident and Emergency department, where no brachial or radial pulse could be felt, and the circulation to her left arm was noted to be very poor. She was scheduled for urgent exploration of her left axillary artery.

Her general health was good, apart from mild hypertension, treated with beta blockers.

No difficulties were anticipated in tracheal intubation, and there was no sign of airway difficulty or hoarseness.

She had had a cup of tea shortly before the accident.

Anaesthesia

Before induction of anaesthesia her arterial pressure was 180/100 mm Hg. As she was not starved, a rapid sequence i.v. induction was performed with etomidate 12 mg and suxamethonium 100 mg. Laryngoscopy showed a good view of the cords, and the trachea was intubated easily with an 8-mm cuffed oral tracheal tube.

The lungs were ventilated using a Manley Pulmovent. The measured expiratory tidal volume was 680 ml and the inflation pressure 20 cm H₂O. Fresh gas flow was oxygen 2 litre min⁻¹ and nitrous oxide 4 litre min⁻¹, with 0.6 % enflurane.

Analgesia was provided with fentanyl 200 ng with two further doses of 50 μg. Atracurium 25 mg was given after recovery from the suxamethonium. Three additional doses of 25 mg were given at 30-min intervals.

Apart from an episode of moderate hypotension (75/55 mm Hg), which responded rapidly to i.v. fluids, there were no anaesthetic problems during surgery.

Blood loss was difficult to estimate, with losses onto drapes, surgical gowns and an unknown volume soaking through to the operating table. During operation, Hartmann's solution 2 litre and whole blood 2 u. were given i.v. via a blood warmer.

There were no attempts to insert a central venous catheter, or perform a brachial plexus block.

Surgery

The axillary artery was torn and there was considerable haematoma in the axilla. It was decided to bypass the damaged segment of the axillary artery with a synthetic graft. The operation was technically difficult and blood flow was poor through the graft, despite passage of a Fogarty catheter on several occasions.

After 150 min it was decided that further surgery was not warranted. The wound was closed, dressings applied and the arm immobilized with the forearm against the chest by means of a collar and cuff, supplemented with wide mesh bandage.

Postoperative course

Residual neuromuscular block was antagonized with atropine and neostigmine. Spontaneous ventilation returned quickly and the patient woke up within 15 min. She was in the right lateral position, with good ventilation, eyes open, obeying commands. Immediately after tracheal extubation, the patient developed signs of ventilatory obstruction. Initially, this was thought to be laryngospasm, and 100 % oxygen was applied by face mask. As the patient was becoming cyanosed, she was returned to the supine position and laryngoscopy performed. The tongue was grossly swollen and the epiglottis could not be seen. The patient became unconscious and, despite vigorous ventilatory movements, there was no air entry into the lungs and no bubbles in the larynx to guide intubation.

A tracheal tube was passed blindly, but hand ventilation produced no chest movement. Oesophageal intubation was suspected and the tube removed. The patient was becoming deeply cyanosed and it was decided to perform cricothyroidotomy.

The bandages covering the throat were cut and at this point it was discovered that the tissues from the mandible to the clavicles were distended and hard.

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No landmarks could be felt and the position of the larynx could not be determined. A horizontal incision was made 5 cm above the suprasternal notch. The subcutaneous tissues were hard and filled with blood clot. The trachea could not be located. By this time the ECG was showing only occasional broad bizarre complexes, no pulse could be felt, and ventilatory movements had ceased. Attempts to perform a tracheotomy were abandoned.

Pathology

At postmortem, the neck and anterior mediastinum were discovered to be full of blood clot, approximately 1 litre being recovered. The larynx and trachea were normal, but extensively compressed and distorted by the blood clot, as was the upper half of the oesophagus.

The thyroid was enlarged by nodular colloid goitre and there was moderate left ventricular hypertrophy. There were no other abnormal findings, apart from the operation site.

The source of the blood was confirmed to be the upper axilla which produced the poor flow through the graft, despite the patency of the vessel to a Fogarty catheter.

DISCUSSION

Ventilatory obstruction from haemorrhage into the neck is a recognized complication of thyroid surgery [2] and may occur as a result of other neck operations [3], trauma [4, 5], attempted central venous catheterization [6], and so on. It has also been reported to occur spontaneously in anticoagulated patients [7]. This is the first report of ventilatory obstruction as a result of haemorrhage into the axilla. There were no other predisposing factors and no evidence of impaired coagulation.

Whatever the source of the bleeding, if diagnosis is delayed until ventilatory obstruction occurs, the patient is in grave danger. Emphasis should be placed on early recognition of the problem, and prompt treatment.

In the awake patient, complaints of sore throat, hoarseness and dyspnoea should arouse suspicion, and examination may reveal a neck mass. Any dressings should be removed to permit full inspection of the neck.

Treatment requires surgical decompression and control of the source of the bleeding. In the case of post-thyroidectomy bleeding, removal of the sutures on the ward may produce dramatic improvement. In other subjects, however, urgent tracheal intubation is necessary.

Tracheal intubation in these circumstances may be very difficult, or impossible. Management of this difficult intubation may include awake fiberoptic, retrograde or blind nasal intubation, gas induction and tracheotomy. The assumption underlying all these methods is that the airway is secure until induction of anaesthesia. In the case of ventilatory obstruction caused by haemorrhage, patency of the airway is lost, and speed is essential.

There may be a place for awake fiberoptic intubation in the early case, if an experienced endoscopist and all the equipment are immediately available. Other techniques for awake or blind intubation are unlikely to help. Cricothyroidotomy is impossible and so retrograde passage of an extradural catheter is not an option, nor is transtracheal jet ventilation, as the compressed oedematous trachea cannot be located with certainty.

Manual ventilation with a face mask or laryngeal mask obviously is usually impossible, if the trachea is occluded.

As there would seem to be little advantage in keeping the patient awake, we would advocate swift...
induction of general anaesthesia and attempts at intubation by an experienced anaesthetist using the methods with which s/he is most familiar.

It is particularly important to maintain spontaneous ventilation as the usual landmarks may be unrecognizable, and the presence of small bubbles in the sputum may be the only guide to the laryngeal inlet.

REFERENCES


