A CASE OF POSTOPERATIVE PULMONARY COLLAPSE

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SUMMARY: A case of gross postoperative pulmonary collapse together with its treatment by emergency bronchoscopy is presented.

Introduction

A 27 year old Corporal was admitted to British Military Hospital, Rinteln as an "acute abdomen". The symptoms and signs suggested acute appendicitis but a perforated duodenal ulcer could not be excluded. The patient admitted to being a heavy smoker (40 cigarettes daily) and to having a chronic "smoker's cough". Auscultation of his chest revealed the presence of scattered rhonchi. Chest X-ray was normal.

First anaesthetic

Anaesthesia was induced using a standard crash induction technique. Intravenous injections of atropine 0.6 mg. sodium thiopentone 300 mg and suxamethonium chloride 100 mg were given. Following endotracheal intubation, fentanyl 0.2 mg and gallamine triethiodide 120 mg were given intravenously. Automatic ventilation was maintained by means of a minute volume divider ventilator (Manley), the patient receiving a minute volume of 9 litres/minute with a tidal volume of 600 ml. A size 12 suction catheter was passed down the endotracheal tube, and a small amount of thick greenish mucous was aspirated. At operation an acutely inflamed appendix was removed.

At the end of the operation, residual muscle relaxant was reversed with atropine 1.2 mg and neostigmine 5.0 mg. Naloxone 0.2 mg intravenously was also given. Postoperative Omnopon (20 mg 4 hourly p.r.n.) and ampicillin (500 mg 6 hourly) together with routine postoperative physiotherapy were prescribed.

Postoperative complication

The first postoperative day started uneventfully. At 20 hours postoperatively one of the authors (Gauci) was asked to see the patient who was in severe respiratory distress, complaining of retrosternal pain and a "cloggy feeling" in the chest.

Clinical findings

The patient looked very ill. He was sitting up in bed using the accessory muscles of respiration, sweating profusely and was slightly cyanosed. The respiratory rate was 40 p.m., temperature 38.5°C, pulse rate 120 p.m. and blood pressure 120/80. The right side of the chest was not moving and the trachea was markedly shifted to the right. Auscultation revealed complete absence of air entry in the right lung. A diagnosis of total right pulmonary collapse was made and confirmed by radiography (Fig. 1).

Management

The patient was transferred to the special care unit and subjected to vigorous physiotherapy under Entonox analgesia for an hour. This did not confer any benefit.

Subsequently preparations for emergency bronchoscopy were made. Pulse and blood pressure monitoring were initiated and the patient preoxygenated for 3 minutes.

Second anaesthetic

Intravenous injections of atropine 0.6 mg, sodium thiopentone 250 mg and suxamethonium chloride 100 mg were given. The patient was then hyperventilated with 100 per cent O₂ for 1 minute following which the glottis and trachea were sprayed with 2 per cent xylocaine. A size 13 suction catheter was passed into the left main bronchus and attached to a Mapleson A (Magill) circuit which had the expiratory valve tightly shut: insufflation with 100 per cent O₂ (10 litre/minute) was effected. A fibre light adult Chevalier Jackson bronchoscope was introduced and copious amounts of green tenacious mucous were aspirated from the trachea, right main bronchus and all the lobar bronchi. The right upper lobe bronchus was not aspirated. Normal saline lavage of the right lung was performed. A specimen of the aspirate was sent off for bacteriological examination. Every three minutes the bronchoscope was withdrawn to the carina and a size 8 plain oral endotracheal tube was inserted into the top of the instrument and by means of a Mapleson A circuit with its expiratory valve slightly open the patient was hyperventilated with 100 per cent O₂ for 45 seconds in order to obviate hypercapnoea. Throughout the procedure, anaesthesia was maintained with intermittent intravenous thiopentone (300 mg total) and muscular relaxation with intermittent suxamethonium (150 mg total).

The catheter was withdrawn to the carina and the left main bronchus aspirated. It was then withdrawn completely and the patient intubated with a size 9 cuffed oral endotracheal tube and ventilated manually with 100 per cent O₂ until the effect of the muscle relaxant had worn off and full spontaneous ventilation had been re-established. The pharynx was aspirated, the patient placed in the left lateral head down position and extubated. The whole procedure lasted 30 minutes.

Subsequent course

The patient was returned to the special care unit. His condition was very much improved. The right side of the chest was now moving with respiration and there was definite air entry in the right lung.

Humidified O₂ (via nasal catheters) together with hourly physiotherapy was administered throughout the night. The next morning, second postoperative day, the patient was sitting up in bed looking very well, feeling hungry and helping himself by coughing. His temperature was 37.3°C. There was good air entry in the right lung but also scattered patches of bronchial breathing. A chest X-ray (Fig. 2) revealed right upper lobe collapse.

Fig. 1. Massive right pulmonary collapse.

Fig. 2. Residual right upper lobe collapse with tracheal and right hilar deviation.

Fig. 3. The collapse is resolving and the tracheal and hilar deviations are much less prominent.

Fig. 4. Status quo ante!

The nasal catheters were removed and the patient fed. He was very sensible and co-operated well with the physiotherapist. Each session of physiotherapy was preceded by an intramuscular injection of Omnopon 20 mg. The patient was subjected to four such sessions a day.

By the next morning, the third postoperative day, the patient was in an excellent condition. There was still some bronchial breathing in his right upper lobe, but a chest X-ray (Fig. 3) showed that the collapse was clearing. He was discharged back to his own ward. Antibiotics and thrice daily physiotherapy were continued and early ambulation encouraged.

By the fifth postoperative day, clinical examination showed complete resolution. This was confirmed by radiography (Fig. 4) and the patient was discharged from hospital.

Discussion

Postoperative pulmonary collapse is not an uncommon condition, usually occurring in patients who have some underlying pathology in the respiratory tract, often nothing more than a cold or cough.

In the case of emergency surgery, predisposed patients should if possible be given physiotherapy pre-operatively. This was not done in this case as the patient had severe abdominal pain and the chest was not giving cause for concern.

On inducing anaesthesia, it is wise to insert a suction catheter through the endotracheal tube and aspirate any mucous that may be in the tracheobronchial tree. Postoperatively, physiotherapy must be given. It is remarkable that although this patient's chest was clinically good, his tracheobronchial tree was aspirated and he was given postoperative physiotherapy, he still developed a life threatening collapse.

When faced with a *fait accompli* one usually subjects the patient to vigorous physiotherapy and if unsuccessful, after an hour or so, and depending upon the clinical state of the patient, one has to consider emergency bronchoscopy. This procedure is not without risk, but, as in the case of our patient the clinical state may be so bad that one has no option but to proceed.

After bronchoscopy, physiotherapy must be continued in order to prevent recurrence. Our patient had a residual right upper lobe collapse due to the fact that suitable instruments to aspirate this part of the lung were not available. This collapse cleared on physiotherapy alone. It is essential for the sessions of physiotherapy to be covered by suitable analgesia to make them really effective. Entonox analgesia is eminently suitable. Antibiotics are necessary to prevent the onset of pneumonia.

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