A CASE OF TOTAL RUPTURE OF THE RIGHT MAIN BRONCHUS AFTER CLOSED CHEST INJURY

BY

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SUMMARY

The case is described of a male who sustained rupture of the right main bronchus in a road traffic accident. There was no apparent skeletal injury. A successful outcome followed operative repair under one-lung anaesthesia. The diagnosis of bronchial rupture must be suspected when tension pneumothorax or large air leak is associated with mediastinal and deep cervical emphysema.

Rupture of the main bronchus has been described with increasing frequency since 1945, apparently associated with the motor-car accidents. The first emergency repair was described by Scannel in 1951—late repair having been reported by Griffiths (1949). Owing to the diagnosis being missed, repair has frequently been performed months or years after injury (Eijgelaar, 1969; Al-Omeri, 1969).

CASE REPORT

A male aged 18 years was admitted to the St Jozef Ziekenhuis, Heemskerk, on August 20, 1969, after being thrown to the ground unconscious some 45 minutes before, when his bicycle collided with a heavy lorry. He was conscious on arrival, very pale and moderately dyspnoeic. The pulse rate was 100 beats/min. and the blood pressure 90/60 mm Hg. The most important physical signs were the absence of the right radial and brachial pulse, fullness in the right supraclavicular region, and hyperresonance of the right chest with tracheal deviation, all signs being indicative of a right pneumothorax.

X-ray examination confirmed the diagnosis of right-sided pneumothorax and the radiologist also suggested the possibility of bronchial rupture, in view of the broadened superior mediastinal shadow and deep cervical emphysema (fig. 1).

Treatment at first consisted of the insertion of an intrapleural catheter—which served to demonstrate a continuing severe air leak—and intravenous infusion of plasma substitute followed by blood. A central venous catheter was inserted and showed a reading of 2 cm H₂O above the right atrial level. Bronchoscopy was then performed, the patient receiving methohexitone 60 mg and atropine 0.5 mg after pre-oxygenation for 5 minutes; suxamethonium in a dose of 70 mg and thereafter 25 mg was then administered. The patient's pulse became extremely feeble twice during the 3 minute procedure. A large defect in the bronchial wall was noted through which the lung could be seen floating freely in the pleural cavity.

A left-sided Carlens tube was then inserted quickly and anaesthesia continued through the left lung only using 50/50 nitrous oxide/oxygen and trichloroethylene to ensure adequate analgesia, tubocurarine in increments of 5 mg being given to ensure relaxation. Ventilation had initially to be carried out by hand owing apparently to pulmonary contusion—the airways having been aspirated of blood—but inflation became easier within 15 minutes and the Manley ventilator could be used. Pulse, blood pressure, e.c.g. and central venous pressure were monitored.

The operative findings were as follows. The right lung was found collapsed on opening the chest. The right main bronchus was completely divided about 2 cm from its origin, there being a 3-cm gap between the segments; the tear extended as far as the upper lobe bronchus (fig. 2). The hole was repaired with silk and after ensuring that the lung inflated correctly the chest was closed, two drains being inserted.

Atropine 1 mg and neostigmine 2.5 mg were injected intravenously at the end of operation. It was decided not to ventilate the lungs postoperatively in view of the patient's excellent condition and for fear of damaging the suture site. Blood-gas estimations at the time of leaving the theatre (3 l./min oxygen by nasal catheter) were as follows: Pco₂ 37; pH 7.37; oxygen saturation 90 per cent.

The low oxygen saturation gave some cause for alarm, particularly in view of the suspected pulmonary contusion but there was an improvement in oxygen saturation to 95 per cent and further progress was uneventful apart from initial collapse of the right upper lobe which responded to bronchial suction and physiotherapy. A complete left oculomotor paresis developed on the third postoperative day but resolved spontaneously after 1 month.

Differential bronchiospirometry performed after 1 year (Dr Hrouda) showed gas exchange to be identical in both lungs—i.e., a recovery of the right lung to 80 per cent of normal function.

DISCUSSION

The mechanism of bronchial rupture in this case appeared to be a sudden rise in intrapulmonary pressure due to the vehicle striking the right supraclavicular region with possible simultaneous
occlusion of the trachea. In common with many other reported cases in patients under 30 years there was no skeletal injury; indeed the flexibility of tissues in the young may be a contributory factor.

FIG. 1
Thorax X-ray on admission.

Bronchoscopic followed by immediate operation is clearly indicated in all cases although in those presenting with less explosive symptoms surprisingly good results have been obtained from late closure. Associated injuries both in the lungs and other areas of the body may complicate the situation. In the above-mentioned case these were confined to minor pulmonary contusions and an oculomotor palsy.

The importance of having facilities for one-lung anaesthesia even in small hospitals is emphasized.

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REFERENCES

FIG. 2
Drawing to show bronchial lesion.

The diagnosis must be suspected when tension pneumothorax or a large air leak is associated with mediastinal and deep cervical emphysema (Eijgelaar and Homan van der Heide, 1970). Haemoptysis is usually present but not severe.
TOTAL RUPTURE OF THE RIGHT MAIN BRONCHUS

OBSERVATION D'UN CAS DE RUPTURE COMPLETE DE LA BRONCHE PRINCIPALE DROIT, CONSECUTIVE A UN TRAUMATISME FERME DU THORAX

SOMMAIRE
Il s'agit de l'observation d'un sujet de sexe masculin ayant présenté une rupture de la bronche principale droite à l'occasion d'un accident de la circulation. Il n'existait aucune atteinte apparente du squelette. L'intervention chirurgicale réparatrice, sous anesthésie limitée à un seul poumon, a été couronnée de succès. Il convient d'envisager le diagnostic de rupture bronchique lorsque l'on constate la présence d'un pneumothorax sous tension ou d'une importante fuite d'air associée à un emphysème médiastinal ou cervical profond.

TOTALER ABRISS DES RECHTEN HAUPTBRONCHUS NACH STUMPFEM THORAXTRAUMA: KASUISTISCHER BERICHT

ZUSAMMENFASSUNG

UN CASO DE ROTURA TOTAL DEL BRONQUIO PRINCIPAL DERECHO DESPUES DE TRAUMATISMO TORACICO CERRADO

RESUMEN
Se describe el caso de paciente varón que sufrió rotura del bronquio principal derecho en un accidente de tráfico en carretera. No había ninguna lesión esquelética aparente. Se obtuvo buenos resultados con una reparación operatoria bajo anestesia de un pulmón. Es necesario sospechar el diagnóstico de rotura bronquial cuando un neumotórax hipertensor o una pérdida grande de aire están asociados con enfisema mediastínico y cervical profundo.

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