FOUR CASES OF COUGH FRACTURE

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IN the past seven years four cases of cough fracture with eight fractures were found at Killadeas Hospital and the Chest Clinic, Erne Hospital, Enniskillen. No previous record of cough fracture of a rib in Northern Ireland is known to the writer. Yet any patient with a history of cough followed by pleuritic pain may be suffering from one. Other conditions predisposing to fracture may also be present.

Stress fracture is commoner than cough fracture. Unlike cough fracture it usually occurs in the first rib. As the name implies, the cause is muscular strain. Two cases with stress fracture of the first rib and one of the tenth were described in the Ulster Medical Journal ten years ago (Warmington, 1956). A typical example was encountered recently in a physical training instructress. "Fatigue fracture" of the first rib is merely a form of stress fracture affecting hitch-hikers and others who for long distances carry a heavy ruck-sack by a strap over the shoulder (Shanks and Kerley, 1962). Stress fracture of the first rib is often asymptomatic and is usually of little clinical importance.

Cough fracture is easily overlooked. The symptoms are those of the resulting pleurisy. Pleural effusion often follows. Pneumonitis may be mimiced or haemoptysis occur due to bruising or puncture of the lung by the rib ends (Shanks and Kerley, 1962). Pneumothorax or haemopneumothorax may distract attention from the underlying fracture. Also cough fracture usually affects the lower ribs in the axilla. Here rib curvature and tissue density are greatest on a postero-anterior X-ray and combine to obscure a fractured rib. For this reason Shanks and Kerley (1962) state that two oblique films are essential in every radiological investigation of rib fracture from whatever cause. Frequently separation of the fragments in cough fracture is so slight that a fracture is not seen until several weeks after symptoms have disappeared, when callus draws attention to it.

Case 1. G.K.; a male aged 54 on the date of his first cough fracture. He is a life-long bronchitic and asthmatic who for the past ten years has spent much of his time in bed with exacerbations and pneumonitis with uncontrollable cough. Although a tall, strongly built man, the ribs on X-ray are noticeably slender. The frequence of his pneumonitis is seen from the following: Dec. 1963 (right side), Jan. 1964 (left side), June 1964 (left side) and July 1964 (right middle lobe consolidated). The January 1964 pneumonitis was followed by a rib fracture on the same side, observed eight weeks later. In July 1965 a left sided pneumonitis was followed in a few days by a rib fracture on the same side.

His first observed cough fracture occurred in April 1959. It was of the 9th rib on the right side. In May 1963 callus was observed at the site of a presumed cough fracture of the 10th rib on the left side. Two further fractures were seen on the left side, namely of the sixth rib in March 1964 and the seventh rib in July 1965. An encysted pleural effusion overlay the latter fracture in which the rib ends were widely separated.

In November and December 1965 the carbon dioxide combining power was found to be elevated to 40 M.Eq. per litre (Normal 21-28 M.Eq. per litre). The blood urea (48 mgm. per 100 ml.) and the serum calcium (9.6 mg. per 100 ml.) were normal. The alkaline phosphatase was temporarily increased to 16 K.A. units, falling to 10 K.A. units a fortnight after. The plasma proteins showed an increase in gamma globulin to 2.0 gms. per 100 ml. The specific gravity of the urine reached 1020, with neither glycosuria nor proteinuria.

Case 2. R.F., a male aged 68. He was dyspnoeic on hills and slightly in bed also. A hard

cough appeared in February 1964, followed a month after by pain and tenderness over a rib below the angle of the left scapula. On 9th April 1964, X-ray showed a widely displaced (5 mms.) fracture of the 8th rib. No emphysema or costo-chondral calcification were visible on X-ray. The serum calcium was 10 mg. per 100 ml. on 25th July 1964, when he attended as an out-patient and the fracture was seen to be forming callus normally.

Case 3. I.C., aged 24, a married woman with two children born in July 1960 and September 1962. Neither child was breast fed. X-ray revealed slender bones, even for a woman. In February 1964 a cold was followed by severe cough, and this in turn by acute pain in the right chest, aggravated by breathing or coughing. No X-ray was taken until March 1964, after the pain had gone. This showed infiltration typical of pulmonary sarcoidosis, more marked on the right side, with fractures of the seventh and ninth ribs on the same side showing callus already present.

Case 4. T.A.McE., a dairy farmer aged 32. He became dyspnoeic in December 1965, worse following a "cold" on 18th January 1965, and accompanied by a cough. About 26th January he developed acute right-sided chest pain. A 100 mm. film on 27th January was suggestive of farmer's lung but did not show a rib fracture. On 9th February 1966 the clinical picture, serological investigation and history confirmed the presence of farmer's lung. A displaced fracture of the seventh rib on the right side, the side of maximal infiltration, was now clearly shown. He had lost 13 lbs. in weight since December 1965 and felt tired. No other cause predisposing to fracture was found. He stated that no impact or muscular strain preceded the fracture.

Discussion

Cough fracture has been found on both sides from the sixth to the tenth ribs inclusively. Pleuritic pain was present always and pleural effusion frequently, while haemoptysis followed cough fracture in Case 1. In two of the four cases fractures were multiple. In Case 1 four ribs were broken consecutively and in Case 2 two ribs simultaneously. In contrast, stress or fatique fracture commonly affects the first rib alone, when it is often without symptoms, and complications do not occur.

Homolateral pneumonitis occured before two consecutive fractures in Case 1. In cases 3 and 4 mavimal infiltration was on the same side as the fractures. Thus in 5 of 8 cough fractures homolateral pulmonary disease visible on X-ray preceded fracture.

Complications in these four cases included pleural effusion and haemoptysis. Pneumothorax, haemopneumothorax, tension cyst, lung abscess and areas of bruised lung resembling atelectasis are noted as complications by Shanks and Kerley (1962).

Cough fracture should direct attention to a possible predisposing cause, particularly if more than one rib is broken. Predisposing factors were most obvious in Cases 1 and 3 in which fractures were multiple.

In the present cases, predisposing factors included immobilisation in bed and emphysema (Cast 1), slender bones, sarcoidosis, debility and weight loss (Case 3). It is speculative whether respiratory alkalosis might have reduced ionisation of calcium and therefore its deposition in bone in Case 1. James (1965) found a malignant metastasis presenting as cough fracture, and had another case of cough fracture probably predisposed to by sternal depression. Shanks and Kerley (1962) note the occurence of cough fracture with Paget's osteitis deformans, multiple myeloma, osteomalacia, following heavy dosage of X-rays in radiotherapy for breast cancer and in deficiency of the organic bone matrix such as occurs in osteogenesis imperfecta. Cushing's syndrome and the prolonged use of corticosteroid

drugs predispose to fracture; likewise the osteodystrophies of renal origin (milk alkali syndrome and hyperparathyroidism). Either cough or spontaneous fractures following radiotherapy may be multiple, occur in the axis of the therapeutic beam, and usually fail to unite (Shanks and Kerley, 1962). Hence cough fracture and its predisposing causes should be considered in cases with unexplained pleuritic pain.

Summary

In cough fracture the lower ribs are most commonly affected, particularly the sixth to the tenth inclusively. Pleuritic pain is the outstanding symptom. Cough fracture has recently been found on the side of maximal pulmonary infiltration when this is present, whether the infiltration is due to such different causes as pneumonitis, farmers' lung, or sarcoidosis. When more than one rib is broken, whether simultaneously or after a long interval, a cause predisposing to fracture is often present. Some predisposing causes and complications of cough fracture are listed. Both are often serious. Hence cough fracture, though easily overlooked, should be carefully sought, particularly when examining the chest film of any patient with cough and unexplained pleuritic pain.

References

JAMES, E. F. (1965). Personal communication.

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BOOK REVIEW

CUNNINGHAM'S MANUAL OF PRACTICAL ANATOMY. Revised by G. J. Romanes, B.A., Ph.D., M.B., Ch.B., F.R.C.S.Ed., F.R.S.E. Thirteenth Edition. Vol. 1. Upper and lower limbs. (Pp. viii+256; figs. 175. Paper 25s.; boards 35s.). London: Oxford University Press, 1966.

THIS well known dissecting manual has been thoroughly revised and recast to bring it into line with the present day requirements of the medical student. The text has been largely rewritten using the *Nomina Anatomica* (1961) throughout and it is now represented in two columns but on a slightly larger page than formerly. All the illustrations have been redrawn and, where possible, simplified by the removal of many of the leaders which tended to confuse the older diagrams. New drawings have been added to illustrate the functional aspect of various structures but some of the radiographic illustrations have been omitted as most departments now have available ample teaching material of this type. The general impression gained from handling this new edition is extremely favourable. The medical student using it will find his work has been made easier as a result of the changes which sacrifice none of the essentials of a first rate guide to dissection. It will be welcome everywhere as a worthy successor to the long line of previous editions and it can be thoroughly recommended as suitable for use by students. W.R.M.M.