PARALYSIS OF THE DIAPHRAGM AFTER PNEUMONIA AND OF UNDETERMINED CAUSE

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Unilateral paralysis of the diaphragm not due to some obvious cause such as neoplasm or pulmonary tuberculosis has been said to be uncommon (Freedman, 1950). I present 16 such cases found during two years in a chest clinic. My purpose is to show that this is a comparatively common condition and that it may be caused by simple pulmonary inflammation (referred to in this paper as pneumonia). Clinical and radiological data about the 16 cases are summarized in the Table.

DIAPHRAGMATIC PARALYSIS ASSOCIATED WITH RECENT PNEUMONIA

Five cases (Nos. 1, 2, 3, 4, 5) were considered to be due to recent pneumonia on the side of the paralysis. Four of these (Nos. 1, 2, 3, 5) were referred to the clinic because of recent pneumonia which had been successfully treated at home, and of these Nos. 2 and 3 still showed opacities in the right lower lobe. In the remaining case (No. 4) there was a history of recent respiratory infection, and the radiograph showed an opacity in the right lower lobe which later cleared. Of these five cases, Nos. 1, 3, 4, and 5 completely recovered diaphragmatic function, the duration of paralysis varying between two and 12 months. In Case 2 there was partial recovery after 15 months with residual paralysis of the anterior and medial part of the diaphragm while the posterior and lateral part moves normally. This condition of dissociated paralysis described by Fox (1948) was also shown by Case 16. In these five cases these pleural changes with the diaphragm adherent to the chest wall which are so frequent after pleurisy were not present; there was a true diaphragmatic paralysis.

The finding of a paralysed diaphragm after pneumonia inevitably leads to the suspicion that a bronchial carcinoma may be present. In these cases further investigation, including bronchoscopy, and continued observation have excluded this possibility.

DIAPHRAGMATIC PARALYSIS OF UNDETERMINED CAUSE

In the remaining 11 cases the cause of the paralysis is not clear. In two of them (Nos. 8 and 16) previous radiological examination had shown normal diaphragms. One case (No. 13) was possibly congenital in origin, as the patient was known to have had abnormal physical signs 40 years previously. The other cases must be considered to be of uncertain aetiology and of uncertain duration. In Cases 6, 8, 10, and 14, there was recent dyspnoea which may have been related to the onset of the paralysis; there is, however, no evidence to support this.

DISCUSSION

The association of diaphragmatic paralysis with pneumonia was first described by Humphrey and Sherwood (1929) and more recently by Freedman (1950). Cases 1 to 5 can be accepted as belonging to this group. The commoner causes of diaphragmatic paralysis could be excluded, as could such uncommon causes as poliomyelitis (Abeles and Leiner, 1944), herpes zoster (Halpern and Covner, 1949), and cystic disease of the azygos lobe (Rees-Jones, 1944).

In Cases 6 to 16, no cause could be found for the paralysis. The label "eventration" is frequently applied to such cases of unexplained paralysis. Eventration has been described by Feldman, Trace, and Kaplan (1935) as an abnormally high position of the diaphragm caused by aplasia or atrophy, and they state that movements may be normal, absent, or paradoxical. Kinzer and Cook (1944) describe the high position, regular arched contour, and possible changes in excursions. Kirklin and Hodgson (1947) define eventration as abnormal elevation and marked thinning of the hemi-diaphragm.

Published accounts (Feldman and others, 1935; Kinzer and Cook, 1944; Kirklin and Hodgson,

TABLE
SUMMARY OF CLINICAL AND RADIOLOGICAL FINDINGS IN 16 CASES OF DIAPHRAGMATIC PARALYSIS
AFTER PNEUMONIA AND OF UNDETERMINED CAUSE

Case No.	Age and Sex	Symptoms	Previous Examinations	Radiology	Progress
1	81 Male	<i>Diaphragmatic Paralysis Associated with Recent Pneumonia</i> Referred to clinic 26.7.51 after pneumonia right lower lobe	Nil	High and paralysed right diaphragm	Complete recovery by 24.4.52
2	50 Male	Recent right pneumonia. Referred to clinic 13.3.51 complaining of cough and dyspnoea	"	High and paralysed right diaphragm. Opacity right lower lobe	5.6.51 opacity cleared. 1.7.52 diaphragm partially recovered
3	65 Male	Referred to clinic 3.9.51 after recent pneumonia, still complaining of cough and dyspnoea	"	High and paralysed right diaphragm. Linear opacity right lower lobe	Opacity rapidly cleared. Diaphragm paralysed 14.8.52, but recovered by October 1952
4	59 Male	Referred to clinic 20.12.51 with recent respiratory infection	"	High and paralysed right diaphragm. Opacity right lower lobe	21.1.52 shadows cleared, some diaphragm movement. October, 1952, diaphragm normal
5	34 Female	Referred to clinic 20.3.52 after recent pneumonia right lower lobe	"	High and paralysed right diaphragm	24.4.52 some diaphragm movement. 24.7.52 diaphragm recovered
6	69 Male	<i>Diaphragmatic Paralysis with No Obvious Cause</i> Referred to clinic 17.5.51 with recent dyspnoea and cough	Nil	High and paralysed left diaphragm	No change up to December, 1952
7	58 Female	Mass radiography 27.11.50. No symptoms	"	High and paralysed right diaphragm	" " "
8	59 Male	Referred to clinic 22.1.51 with recent cough and dyspnoea	Known to be normal 4 years ago	High and paralysed left diaphragm	" " "
9	48 Male	Mass radiography 9.1.51. No symptoms	Nil	High and paralysed right diaphragm	" " "
10	44 Male	Referred to clinic 27.3.51 with recent dyspnoea	"	" " "	" " "
11	54 Female	Referred to clinic 30.4.51 with recent cough and haemoptysis	"	" " "	" " "
12	48 Male	Referred to clinic 2.5.51 with cough and sputum	"	High and paralysed left diaphragm	" " "
13	70 Female	Referred to clinic 17.5.51 with cough and sputum	Known to have had abnormal physical signs 40 years previously	High and paralysed right diaphragm	No change up to December, 1951
14	57 Male	Referred to clinic 22.4.52 with recent dyspnoea	Nil	" " "	No change up to December, 1952
15	17 Female	Mass radiography 16.7.52. No symptoms	"	" " "	" " "
16	54 Female	Mass radiography 5.11.52. No symptoms	Normal chest and diaphragm June, 1949. Raised right diaphragm March, 1951	Anterior and medial half of right diaphragm raised and paralysed. Posterior and lateral half moves normally	" " "

1947 ; Shanks and Kerley, 1950 ; Evans and Simpson, 1950) lay emphasis on the preponderance of left-sided eventration. In the course of 412,149 routine radiographs of recruits Kinzer and Cook (1944) found 30 left-sided and three right-sided eventrations, and Evans and Simpson (1950) describe eight on the left with no right-sided cases ; most series of eventrations gave much the same proportions.

Eventration is a purely descriptive term referring to the anatomical condition of the diaphragm

which may be due to previous diaphragmatic paralysis or to congenital aplasia. The cases described in this paper had all the characteristics of diaphragmatic paralysis. Two of the patients (Nos. 8 and 16) were known to have had normal diaphragms at a previous examination. Excluding the cases associated with recent pneumonias eight were right-sided and three left-sided, a distribution quite unlike those found in published series of eventrations.

SUMMARY

Sixteen cases of paralysis of the hemidiaphragm were observed in a chest clinic during two years. In five it was associated with recent pneumonia, and was temporary, although recovery was incomplete in one. In the remaining 11, no obvious cause was found.

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