succeeded by pneumonia? Brandy and milk, with gallic acid and tincture of opium, were ordered.

On October 28th, the pulse was 110, and the temperature 98.5 deg.; and on the following day the pulse was 120. There was great pain in the right side; the physical signs were unchanged; the sputa were very copious. There was no material change in the patient's condition till November 1st, when he began to pass blood by the bowels. He died on November 3rd.

Necropsy.—The body was much emaciated; the right lung was adherent in front and strongly so behind; it was pneumonic at the extreme base. The bronchial tubes were filled with sanguineo-purulent matter. There was an aperture at the lower part of the lung communicating with an abscess. The left lung was adherent.—*Liver:* The greater part of the tissue appeared tolerably healthy; behind, the capsule was greatly thickened; between it and the abdominal wall, beside the ribs, there was an abscess communicating with the right lung through an opening in the diaphragm.—*Intestines:* The colon was greatly thickened, especially towards the sigmoid flexure; numerous ulcers were present. No communication existed between the abscess and the bowels.

These two cases very closely resemble each other in their history, their course, and their *post mortem* appearances. I have seen two other cases where the symptoms were very similar to those which I have described, and in which, I believe, an abscess connected with the posterior part of the liver had burst into the lung. One case terminated fatally, but no necropsy was obtained; in the other, the patient recovered; so that in neither instance was it possible to verify the diagnosis which was made.

I was summoned in 1873 to see, in consultation, a gentleman who had had some symptoms supposed to be due to pleurisy. A friction-sound was heard in the lower part of the right chest. He did not, however, improve under the treatment recommended; and at the time I saw him, he had begun to expectorate a good deal. He had been in India, and had been told that he had disease of the liver. He had suffered from pain in the right side for many months, nay, even some years, he said. On examination, I found some dullness with crepitation at the base of the right lung, but no signs of lung-disease elsewhere. There was a good deal of sputum, which resembled that of the two patients whose cases I have detailed. Looking at the history of the patient and the peculiar character of the expectoration, my diagnosis was that he was suffering from hepatic or perihepatic abscess which had opened into the lung. I saw the gentleman two or three times. The expectoration continued of the same character, and the general symptoms remained for some time severe. He ultimately recovered.

Again, I saw in consultation, in the spring of 1875, a lady, living in the north of Lancashire, who had symptoms very similar to those of the last case. She had been ill for four or five months. She had had symptoms of disordered liver. There had been a slight attack of a dysenteric nature. She had never been in a tropical climate. She had suffered from cough; and had, on more than one occasion, brought up a large quantity of sputa. A pleuritic rub had been heard in the right pleura; and there had been dullness over the lower part of the right back. The case had been looked upon as one of lung disease. When I saw the patient, she was pale, sallow, but not emaciated. There was a severe barking cough, with expectoration which was reddish and free from fœtor. It was very similar to that of the other cases I have referred to. The pulse was 92. There was no evidence of disease at the apex of the lung; nor were there any general symptoms of phthisis. The point for consideration was whether the case was one of abscess of the lung, or of abscess connected with the liver which had burst into the lung. My opinion was in favour of the latter view. The patient died about a fortnight after I saw her; but no *post mortem* examination was made.

These four cases presented, during life, symptoms and physical signs of a very similar character. Three of them, when seen in their earlier stages, were considered to be cases of chest disease; nor would it have been possible, perhaps, before the abscesses had burst, to say that the pleuritic rub or the dullness at the base of the lung, was not due to primary disease within the chest.

In cases of this kind, what is the proper treatment to adopt? It is most important that a correct diagnosis should be made, so that you should not be treating as a primary disease of the lungs one which is only secondary. Your object must be to support your patient well, in the hope that the abscess may ultimately close. The bursting of an abscess, connected with the liver, into the lung, and the discharge of the matter through the bronchial tubes, is not the most satisfactory mode by which such an abscess may make its exit, because the lung may become so disorganised during the process that death may result. If an abscess burst into the colon, for example, and the discharge take place through

the bowels, the latter may not become at all disorganised, and the chances of the patient's recovery are greater than if the abscess make its way into the chest.

Can anything be done, in such cases as I have referred to, as regards opening the abscess or drawing off its contents? It is quite clear that, when an abscess forms in the situation of those which we discovered on *post mortem* examination, it cannot be reached. Indeed, you could not accurately diagnose its seat, even if you surmised its existence before it had burst. All, therefore, that you can do is to rely on general measures.

REMARKS

ON

THE MORTALITY OF PLEURISY CONSIDERED IN RELATION TO THE OPERATION OF PARACENTESIS THORACIS.*

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THE treatment of pleural effusions by means of paracentesis has of late become very widely extended, and mainly through two causes: firstly, through the greater sense of security afforded by the use of small trocars, together with the more effectual means used for avoiding the entrance of air into the cavity of the pleura; and, secondly, owing to the vigorous and enthusiastic support which it has received from some of its partisans. It is now taught in many quarters that it is a perfectly safe and innocuous operation; that it ought to be practised in all cases when absorption is delayed beyond two or three or four weeks, or even as soon as any fluid is discovered in the pleural cavity; that no dangers attend it when carefully performed; and, further, that it presents the advantages of shortening the duration of the disease and of promoting fuller expansion of the compressed lung.

These forcible statements have exercised a considerable influence on the profession in general, as well as on myself, though in my own practice I have hesitated to perform the operation in very early stages of the disease, or without distinct indications for its necessity. My personal experience, though limited, may be said to have been so far favourable that, out of sixteen cases which have either been under my care or which I have had opportunities of observing, only four have died; two of these being tubercular, another being a case of pyopneumothorax, and another dying of lardaceous degeneration after long-continued suppuration. A perusal of the cases published by others has, however, led me to believe that the experience of no single observer can be deemed adequate to represent all the aspects of this question. I therefore resolved to review the statistics of the operation as given by those who have largely practised it; and the results of this inquiry, as shown in the accompanying table (No. III) would appear to indicate that, even at the present day and with the most approved methods of operation, thoracentesis cannot be altogether regarded as such a life-saving operation, nor yet, I believe, as so completely innocuous as is asserted by some of its advocates.

I am anxious to state *in limine*, that I by no means hold the opinion that it is an operation to be discouraged when indications exist for its performance. These indications are, grave dyspnoea; threatened failure of cardiac action; prolonged hectic, indicating the presence of pus; signs of septic infection, or other constitutional disturbance endangering life; and lastly, in some cases, absence of, or undue delay in, the natural process of absorption. Unless, however, one or more of these be present, I think that the results of recent experience would call for greater caution than is at present inculcated in its performance by not a few recent writers on this subject.

In the tables which I have constructed, I have endeavoured to contrast the mortality of all pleurisies collectively with that observed in cases of paracentesis. I am aware of the fallacies which attend this plan; for, in the first place, hospital statistics include many cases of mild forms of the disease; and, secondly, in the earlier cases of paracentesis, those may have been selected for publication which showed favourable results (though this is probably unimportant); or,

* Read in the Section of Medicine at the Annual Meeting of the British Medical Association in Manchester, August 1877.

on the other hand, they may have been specially severe in their character. During recent periods, also, all hospital statistics probably include some cases of thoracentesis, though, as far as I can judge of those of Vienna and Prague, and even of the London hospitals, these have been comparatively few in number. To those of Paris I shall have again to allude.

With regard to the cases collected by different authors, many are repetitions. They are mostly included in Dr. Evans's paper. Those by Anderl are, however, principally from foreign sources. I have not given collections of cases (of which many exist among French authors) which appear to have been selected to show the advantages of the operation; but I have given all those coming under my cognisance, without exception, which represent individual experience, where the observers have published all the cases operated upon by them, and where the data are sufficiently precise to enable them to be stated in a tabular form.

It will be admitted that, before active medicinal or surgical interference is introduced into the treatment of any disease, it is desirable to know the results of other systems of treatment; and still more, when such is possible, what is the natural tendency of such a disease, either to recovery or to death, or to the production of subsequent impaired health. Great difficulties beset the acquisition of this knowledge, and I have found them considerable in the case of pleurisy. The results of this inquiry in relation to the mortality of this disease are embodied in the accompanying table (No. 1).

TABLE I.—Showing the Mortality per cent. of all Cases of Pleurisy in different Hospitals.

Hospitals.	No. of Cases.	Percentage of Deaths.
Allgemeine Krankenhaus, Vienna, 29 years, 1847 to 1845 (a) ..	8825	17
Ditto, maximum mortality, 1867 (b) ..	222	23
Ditto, minimum mortality, 1850 ..	352	9
Rudolf-Stiftung, Vienna, 9 years, 1865 to 1872 ..	839	17
Allgemeine Krankenhaus, Prague, about 8 years (c) ..	183	13
Paris Collective Hospitals (d), 1861 ..	594	10
Ditto ditto 1862 ..	666	7
Ditto ditto 1867 ..	(?)	7
Ditto ditto 1868 ..	(?)	11.5
Ditto ditto 1869 ..	(?)	11
Ditto ditto 1870 ..	(?)	12
Ditto ditto 1872 ..	(?)	13
Ditto ditto 1873 ..	(?)	15.6
St. Thomas's Hospital, 13 (?) years, 1861 to 1874 (e) ..	213	20
Guy's Hospital, 3 years, 1861-65-67 (f) ..	99	7
London Hospital, 3 years, 1864 to 1866 (g) ..	48	6
St. Bartholomew's Hos., 7 years, 1860 to 1865; and 1874 (h) ..	207	15
St. George's Hospital, 7 years ..	291	15
Franz-Joseph Kinderspital, Vienna, 25 years, 1842 to 1866 (i) ..	623	1.6
Children's Hospital, Manchester, 3 years (?) ..	30	12
Ewald, Berlin, Serous Effusion without Paracentesis ..	178	2.2
Ditto, of more than three weeks' standing ..	143	2.7

(a.) In different years in the Vienna returns there are occasionally slight discrepancies between the numbers "treated" and the numbers "admitted", sometimes the former and sometimes the latter being in excess. The aggregate of all these discrepancies balanced against one another amount only to an excess of 198 "treated" over the admissions for the 29 years. This aggregate, whether added to or deducted from the total number, modifies the proportionate mortality in either direction by less than one per cent. Subdivision of the whole period into decades shows but little variation. Thus 1847-56, mortality 18 per cent.; 1857-66, mortality 20 per cent.; 1867-75, mortality 18 per cent. The mean mortality of the whole period in the males, 5,915, was 18 per cent.; in 2910 females, 14 per cent.

(b.) This was nearly equalled by another year, 1857: 317 cases, 70 deaths = 22 per cent.

(c.) Different reports in the *Prager Vierteljahrsschrift*, vols. xi, xix, xxii, 1, and li.

(d.) The returns for 1860-61 are official. Those for the later years are given by Besnier, *Union Médicale*, 1873.

(e.) "Pleurisy + Empyema."

(f.) Ditto.

(g.) Ditto.

(h.) Include hydrothorax and empyema.

(i.) These give the remarkable return of only 11 deaths in 623 cases. They are, however, authenticated by the well known names of Loeschner and Lamb.

These hospital statistics certainly show a higher mortality than I had expected to find; and I take it that, in all such returns, the cases were admitted with pleurisy as the predominant symptom; and that it was not, at least in the majority, a mere complication arising in the course of other diseases during the patients' stay in hospital. It may fairly, also, be considered that, in the large majority of instances, patients are only admitted as in-patients when the disease has attained a more or less considerable severity. The mean total mortality may, however, be fairly estimated as from 10 to 17 per cent., though in some years and in some institutions this is considerably lower, falling to 6 or 7 per cent. The remarkably small mortality from the

disease in the Franz Joseph Kinder-Spital requires, however, especial notice.

Contrasted with this are the statements of such observers as Louis, Walshe, and Gairdner, that uncomplicated pleurisy only proves fatal under the most rare and exceptional conditions. Louis' statement* was based on 150 cases; and it has received a remarkable confirmation by M. Cozin,† who, in 224 instances of effusion in young male adults, comprising a large proportion of cases of great severity and treated without paracentesis, only met with one fatal case, due to pericarditis. Similar statements with respect to the prognosis of acute primary pleurisy in childhood have been made by Barthez and Riilliet, by Verliac, and by Roger.‡ Louis' statement has been impugned of late by M. Lebert; but an analysis of Lebert's cases shows that, out of 201 cases, only 10, or 5 per cent., were free from grave complications. Very similar evidence is afforded by Table II, which shows that in uncomplicated pleurisy the mortality varies from 3 to 9 per cent.

TABLE II.—Showing the Relative Mortality of Complicated and Uncomplicated Pleurisy.

Hospital or Author.	Number of Cases.	Mortality per cent.	Complicated Cases—Mortality per cent. of all Cases.	Uncomplicated Cases—Mortality per cent. of all Cases.	Complicated with Phthisis, Mortality per cent. of all Deaths.
Allgemeine Krankenhaus, Vienna, 7 years, 1868 to 1874 inclusive (a) ..	1584	17	8	9	53
Rudolf-Stiftung, Vienna, 5 years, 1869 to 1873 (b) ..	488	19	12	7	37
Prague, 5 years (?) 1845-46, 1850-51, 1857-59 ..	118	14	11	3	(?)
St. George's Hospital, 5 years, 1867 to 1871 ..	239	14	7	7	(?)
Lebert, Klinik der Brustkrankheiten (c) ..	201	13	8	5	32

a, b. These are the only years in the returns in which this classification is possible.

c. M. Lebert gives as a total return 250 cases with 54 deaths, or 21.6 per cent. He, however, only analyses 201 cases with 27 or 28 (?) deaths, and these I have taken as the basis for this table. The proportion of complicated cases I have taken from the abstracts given of those fatal. Lebert himself states the mortality as 14 per cent. (*Loc. cit.*, vol. ii, p. 774.)

Post mortem records also confirm this very strongly. Wrany, in 216 *post mortem* examinations of pleurisy, only found 17 uncomplicated, or 7 per cent.: a proportion very closely corresponding to that found in the clinical returns.§

If we turn from these data to the mortality of pleurisy after paracentesis (Table III), no one can help being struck with the high mortality which has attended the cases operated upon, reaching, as a mean of recent observations, to 27 per cent., and only falling to or below 10 per cent. in the hands of observers the large proportion of whose operations have been confined to serous effusions in the early stage; while in others it has ranged as high as 52 to 45 per cent.

This high mortality, taken both collectively and also in the experience of individual observers, is undoubtedly due in many instances to the nature and to the severity of the cases and of their complications.

Nevertheless, I think that very careful attention should be devoted to the mortality of serous effusions; for it is to the propriety of early operation in such cases that my remarks are principally directed. The mortality of these in the collected cases, as shown in the first series of Table III, is equal to that of many of the major operations of surgery; and no small proportion even of these operations were performed with instruments adapted to exclude air. That, however, of recent operators, who have all used comparatively perfect instruments, amounts collectively to 17 per cent.: a mortality for serous effusions alone nearly equaling the average mortality of all cases, whether empyemata or complicated cases, taken collectively in the hospital returns, and greatly exceeding that of the majority.

If, on the other hand, we inquire what number of cases of serous effusions produce fatal results apart from paracentesis, we shall, I think, find it very small. My own experience has not, as far as I can remember, nor has my analysis of the case-books of my own hospital,

* *Bull. Acad. Méd.*, 1836, p. 123.

† *Etudes Cliniques de Médecine Militaire*.

‡ *Bull. Acad. Méd.*, 1872, i, 651. Of 122 cases by Roger of acute primary pleurisy, 118 recovered. All the patients who died had rickets. Roger says that large effusions are less common in childhood than in the adult.

§ *Prager Vierteljahrsschrift*, vols. xciv, xcv, xcix. This number of cases of pleurisy was found in 1,287 *post mortem* examinations. They are obtained by adding two returns. In the first, 92 cases of pleurisy were all complicated; in the second, 124 cases had 107 complicated (or 17 uncomplicated = 13 per cent.

den death may be caused by effusions of this nature is, however, a fact to which I shall have again to allude.

It behoves us, therefore, to inquire very carefully what is the cause of this high mortality after the operation of paracentesis in serous effusions. A large number of the recorded cases give no reliable data on this point; but a sufficient number, I think, exist to allow a fair conclusion to be formed; and the results of an analysis of these are shown in Table IV.

TABLE IV.—Showing the Causes of Mortality in Paracentesis of Serous Effusions in Pleurisy.

	Total Operations.	Total Deaths.	Purulent Trans-formation.		Tubercle of Lung or elsewhere.		Acute Dis-ease of Lung or opposite Pleura.		Malig-nant Disease.		Grave General Complica-tions and Miscell.	
			Deaths.	Per cent.*	Deaths.	Per cent.*	Deaths.	Per cent.*	Deaths.	Per cent.*	Deaths.	Per cent.*
Dr. Evans .. (collected)	101	32	6 a	28	6	28	4 b	20	3	14	2 c	10
Anderl**.... (collected)	38	21	7 d	43	4	25	1	6	0	..	4 e	25
Dr. Bowditch .. (collected)	26	6	6	100	..	..	..	..	..	..	..	..
Ewald††....	36	7	7 f	100	..	..	..	..	..	..	..	..
Tutschek....	21	6	3 g	50	3	..	..	..	..	..	..	..
Zeroni	24	6	0	0	4	..	..	..	..	..	2	..
Fraentzel....	16	1	0	0	1	..	..	..	..	..	..	..
Verliac.....	5	1	0	0	1	..	..	..	..	..	..	..
Martineau ..	22	1	1 h	100	..	..	..	..	..	..	..	..
Oeri	34	4	2 k	50	1	50	..	..	..	..	1	..
Hillier	1	0	..	..	..	..	..	..	..	..	..	..
Lebert†††....	8	0	..	..	..	..	..	..	..	..	..	..
Bonilly	21	12	..	..	..	..	..	..	..	..	2 l	..
Totals.....	353	87	32	45	20	28	5	7	3	4	11	15
			18 m	25	30 n	42	5	7	3	4	14 o	18

* The percentage is calculated on the number of deaths accounted for. In Evans's tables 11 deaths, and in Anderl's statistics 5 deaths, or a total of 16, are not accounted for.

** Dr. Evans's and Anderl's cases do not appear to be identical.

†† See note to Table III.

††† One of Lebert's cases died five months later, probably of tubercle. He does not include one case (p. 759), where a serous effusion proved fatal after purulent transformation.

a. 1 tubercle, 1 abscess liver. b. 1 double hydrothorax, 2 bronchitis, 1 pneumonia opposite lung. c. Cirrhosis of liver = 1, erysipelas + cancer = 1.

d. Tubercle = 3, fractured ribs = 1. e. Sudden death = 2, reaccumulation = 1, hæmorrhage pleura = 1.

f. 10 underwent purulent transformation. 7 died: of these 7, pneumonia and abscess lung = 1, phthisis = 3.

g. 1 tubercle.

h. Patient a drinker; much exhausted.

k. Both phthisical.

l. Both from intercurrent complications.

m. Obtained by deducting all cases of phthisis and of grave complications.

n. Obtained by adding all cases where phthisis was present in purulent transformation.

o. Obtained by adding a, d, h.

Here, in 353 cases, we have 87 deaths, or a mortality of 24 per cent.; but in 71 only of these fatal cases is any account given of the events subsequent to the operation.

Out of these 71 cases, no fewer than 32, or 45 per cent., underwent a purulent transformation of the effusion subsequently to paracentesis; and, of these 32 cases, only 14 were complicated by phthisis or by other grave maladies. Suppuration of the pleura was, therefore, the probable sole cause of the fatal issue in 25 per cent. of the whole number of deaths accounted for; and it proved fatal in at least 9 per cent., or, excluding complications, in at least 5 per cent., of all the cases operated upon, or, more properly, in 10 and 5 per cent. respectively, if we make due allowance for the number of deaths not accounted for.*

Phthisis also accounts for a large share of the remainder of the deaths; but, in 6 out of 27 cases where this was present, purulent transformation had also occurred. I shall presently allude to some facts which appear to show that phthisis *per se* has not a strong influence in the production of the latter event.

Now, the tendency of the operation to be followed by the purulent transformation of a previously serous effusion has been warmly con-

tested, and notably by the late M. Trousseau; but the fact is, I think, placed beyond dispute by the results shown in Tables IV and V.

TABLE V.—Showing the Frequency of Purulent Transformation of Serous Effusion after Paracentesis.

Authors.	Cases of Serous Effusion.	Purulent Transformation.			Remarks.
		No.	Per cent.	Deaths.	
Bowditch	26	6	23	6	Aspiration
Ewald	36	10	27	7	1. Pneumonia with abscess of lung; 2. Phthisical
Tutschek	21	3	14	3	Aspiration
Bourdon	6	4	66	2	Aspiration. <i>Bull. de la Soc. Méd. des Hôp.</i> , 1872
Bucquoy and Bouilly (a) ..	21	2	10	(?)	<i>Union Méd.</i> , 1874; <i>Mouvement Méd.</i> , 1873
Férol	10	1	10	(?)	<i>Bull. Soc. Méd. des Hôp.</i> , 1872
Martineau ..	24	3	12	1	<i>Mém. Méd. Soc. des Hôp.</i> , 1874
Oeri	34	2	6	2	Both cases phthisis
Evans (b)	101	8	8	6	One case phthisis
Anderl	38	7	18	7	Three cases tubercle; one fractured ribs

a. Twenty-four cases punctured, but fluid obtained in only two. Both the cases of purulent transformation were complicated.

b. In four cases, pus was found in a second paracentesis; in four more, pus was found in the pleural cavity where death ensued after a single operation. *St. Thomas's Hospital Reports*, 1871.

Both tables also evidence the fatality of the change; for, out of 43 cases in Table V in which it took place, and in which the result is stated, death occurred in 34, or in 79 per cent. This tendency is also admitted by many observers, and different explanations are given of its occurrence. M. Moutard-Martin has stated that it pre-existed in these cases, and that it is shown by cloudiness of the serum emitted on the first puncture. I think it open to the gravest doubt whether, as a natural event, a slight cloudiness of the serum does necessarily and without paracentesis lead to empyema; and, as a matter of fact, in 14 of the cases where this transformation occurred, and where data are given respecting the character of the fluid first evacuated, it is only stated to have been cloudy or lactescent in 3. Such lactescence of the serum is also not certainly thus followed by pus. In five of Zeroni's cases where it was observed, neither purulent transformation nor reaccumulation occurred in any.

Moreover, in a considerable number, purulent transformation has only occurred after repeated punctures, performed at a late date of the disease, and when the fluid evacuated at the first or second operation was clear, and only became lactescent, or eventually purulent, after further repetitions of tapping.

By some, it has been ascribed to the admission of air, but in the majority of cases this appears to have been carefully guarded against; and further, there is a considerable body of evidence to show that the admission of air to the cavity of the thorax, when serous effusion exists, does not necessarily induce purulence. I may, however, remark that such an accident should be regarded as dangerous; but it is a danger not always easy to avoid, and it should be taken seriously into account among the risks of the operation.

By others, and particularly by Ewald,* it has been ascribed to the existence of pyrexia at the time of the operation; but any distinct influence of this nature is disproved by experience. Oeri had only one case of purulent transformation out of twenty-four operated on during pyrexia, and one other when the patient was non-febrile at the time of the operation. In ten febrile cases, operated on by Zeroni, none underwent this change. Pyrexia may possibly be a contraindication to the operation, and it is certainly desirable to wait until it has subsided, when no grave indications exist for immediate interference. This would, however, I believe, in the large proportion of cases of serous effusion, demonstrate the non-necessity of the operation, inasmuch as such subsidence of the fever is commonly followed by spontaneous absorption (though this may occur even while fever persists); but, in some of the cases where the operation is most imperatively called for, the presence or absence of pyrexia is only a minor element for consideration. The presence of pyrexia is, however, a sign of a certain intensity of the inflammatory process, and this appears likely in some cases to be augmented by the operation. The effects of the operation are, however, on the other hand, occasionally though not constantly marked by the reduction of pyrexia when this is present.

[To be continued.]

* These 16 deaths not accounted for exist in 138 cases, with 53 deaths among Dr. Evans's and Anderl's cases. The proportion to be deducted from the cases operated upon is therefore 45 (53 : 138 : 45). Deducting these 45 cases from 353 (the whole number of operations), we get 308 operations with 32 cases of purulent transformation, of which 18 were uncomplicated, representing respectively a mortality of 10 and 5 per cent.

* Ewald explains that in 9 of his cases the fluid was opalescent in 4, and in 4 others the operation was either performed before the end of the fourth week, or on febrile patients.