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LOBAR PNEUMONIA IN A BASE HOSPITAL IN FRANCE.

A CLINICAL AND PATHOLOGICAL STUDY, WITH SPECIAL REFERENCE TO THE FATAL CASES.

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AND
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Pneumonia is ever old and ever new, and, as it is such a serious disease, it is always worthy of study. We feel that this brief account of seventeen fatal cases out of a total of sixty-five of lobar pneumonia may be of interest, because the type of patient, the conditions under which they were living and working and under which they were treated, were all so different from those met with in ordinary private and hospital practice. We also hope that others may report similar series of cases from war hospitals so that the various aspects of the disease, seen under war conditions, may be fully displayed. All the cases with which we shall deal were of primary disease of the respiratory tract, and were in the hospital between January 1 and the middle of July, 1917. Statistics are always brittle things to handle, and in our small series of cases we do not wish to lay too great stress upon this side of the question. Whilst we have to do primarily with the fatal cases, reference will be made from time to time to those which recovered.

In the matter of treatment of the patients in a base hospital, we are of the opinion that owing to the excellent arrangements as regards food for the Army, to the unlimited supply of blankets, pillows, back-rests, etc., from the Ordnance Department, to the variety of drugs obtainable from the Army Base Medical Stores, and to the extra comforts supplied by the Red Cross, the sick have been at little disadvantage. An abundant supply of fresh eggs and milk has always been to hand.

The patients were concentrated in one hut which forms a part of the "line" under the charge of one of us. Cases of pneumonia, lobar or bronchial, occurring in connexion with wounds of the thorax or other parts of the body, were kept in the surgical wards, and these fall outside the limit of this study. It was deemed advisable to have the cases of pneumonia together in one hut, for several reasons which we shall point out below. Most of the cases diagnosed "pneumonia" and admitted from convoys, had already reached the convalescent stage before being moved down from the Front, and were retained in the medical ward which was receiving for that particular day. But if the patients received from local units or from convoys were in the early or critical stages of the disease, they were seen by Lieut.-Col. John McCrae, officer in charge of Medical Division, and were immediately transferred to the "pneumonia hut." By this arrangement, apart from the economy and division of labour, we have thought that the best interests of the sick have been served. They were thus put into a quiet and restful place, a consideration of the greatest import in the treatment of pneumonia. The
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patients were not disturbed during any admissions of convoys, or during evacuations, as would have been the case in a large ward where there is so much coming and going. Nor were they upset by the necessary noise and bustle of an ordinary ward at mealtime, and by the inevitable gramophone. Many of the patients, too, have experienced relief in breathing on being transferred to the hut and on leaving the “Woodbine” atmosphere of a general ward. We have as far as possible in all weathers kept windows and doors open wide, and this would have been impossible in the presence of “up” patients. Indeed, so far have we considered fresh air of importance, that often the patients’ beds were moved outside upon the grass beside the hut. In the “pneumonia hut” are about a dozen beds, and we have been allowed more nurses in proportion to the number of patients than is the case in the rest of the hospital, except perhaps in the hut reserved for wounds of the chest. Skilled nurses have thus been enabled to devote their whole time to the small number of patients. We have also been well supplied with orderlies. In the small kitchen under the same roof it has been possible to prepare special diets for the very sick. Although lobar pneumonia is classed in the Army as an infectious disease and broncho-pneumonia is not, we have made it a point of segregating both varieties of cases. The “pneumonia hut” has been under the care of one medical officer, who has had fewer patients to look after in his “line” than those in charge of other wards, and has thus been able to spend more time on those suffering from this disease. One of us (A. M.) who has looked after these patients in the ward has also been present and taken part in the autopsies which were performed by the other (L. J. R.). This we have felt to be a rare opportunity of correlating the symptoms and signs in the course of the disease with the findings at autopsy, of seeing one’s mistakes, and of learning the limitations in attempting a diagnosis of certain of the complications.

All the patients admitted to the hospital were soldiers, with one exception, and he was a member of a civilian railway troop. The men had all been passed for active service, and except for a few in certain labour companies, were of remarkably good physique. The majority were between 20 and 40 years of age. Of the seven fatal cases in men of 40 or over, five came from “local” units, and were on active service at the base or on the lines of communication. We found that some of these men in their patriotism and desire to “do their bit,” underestimated their age, and thus were taken on for foreign service. What a contrast with ordinary hospital work in a large city! Here on active service we have chosen for us, so to speak, what we should expect to be the most favourable class of patient, both as regards state of health and quality of physique. How many of the cases of pneumonia at home occur in poorly nourished men from the slums, in men who are habitual alcoholics, and in those who are already handicapped at the onset of the illness by some chronic cardio-renal, arterial, or respiratory disease. It is of some interest to note that many peoples from many climes within the British Empire were represented, and in the ward men from the British Isles lay side by side with Australians, New Zealanders, Canadians, and British West Indians. There were 47 British cases admitted and 16 died; 7 Australian or New Zealanders, and none of these died; 5 Canadians, and of these 1 died. We had only five negroes in this series and none of these died, although pneumonia in them seemed to take on a new aspect, characterized by long duration. Other hospitals have had more British West Indians and we
cannot speak confidently at present on pneumonia as seen in them. Our one Maori, aged 23, died on the eighth day. A Fiji Islander was a rather remarkable case of lobar pneumonia, for he had high continued fever of 103° F. or more until the sixteenth day, when recovery by crisis occurred.

Month.—Five cases of lobar pneumonia, which had been admitted in December, 1916, were still in the ward in January, 1917, when our series begins. Seven cases of lobar pneumonia were admitted in the month of January and there were two deaths during this month. February was the heaviest month with 17 admissions and 6 deaths; March, 12 admissions and 3 deaths; April, 10 admissions and 2 deaths; May, 8 admissions and 2 deaths; June, 5 admissions and 2 deaths. During the first half of July there was one admission and no death.

Age.—Eight of our patients were below 20 years of age and none of these died. Between the ages of 20 and 29 there were twenty-six cases with a mortality of five, i.e., 19·2 per cent. Of those aged between 30 and 39, sixteen patients were admitted and five died, a mortality of 31·2 per cent. Fourteen of these cases of lobar pneumonia were from 40 to 49 years of age and six ended fatally, i.e., a mortality of 42·8 per cent. One patient who died was 59 years of age. We had no other cases above 50 years of age. The mortality in all patients treated, was seventeen in sixty-five, i.e., 26·1 per cent. As we shall point out below, thirteen of these seventeen cases showed bilateral involvement.

Local or Convoy Admissions.—Thirty-eight of our cases were local admissions, and of these nine died, a mortality of 23·6 per cent. The mortality in cases admitted by convoy, i.e., from the Front, was considerably higher, twenty-seven cases with eight deaths, a mortality of 29·6 per cent. When we hold that it is wrong even to allow a patient suffering from pneumonia to exert himself in bed, and when we consider the fatigue which must be caused by a railway journey and ride in an ambulance, then the contrast in the percentages given above is as we should expect.

The convoy patients were admitted with a variety of diagnoses, but those of “pleurisy” or “pleurisy? pneumonia” were the most frequent. Some were sent to us diagnosed “pneumonia.” Other diagnoses were “bronchitis,” “P.U.O.” (pyrexia of uncertain origin), “D.A.H.” (disordered action of the heart), “D.A.H. and P.U.O.,” “influenza,” “laryngitis,” and “debility.” All this, we think, goes to show the difficulties, due to rush of work, with which the medical officers at Front area hospitals have to contend. At the same time, we feel that if at the Front there is a strong suspicion that the case is one of pneumonia the patient should not be sent to the base whilst the disease is beginning, is at its height, or is in the early convalescent stage. A grave mistake was made in sending down on the seventh day, with the diagnosis of “pneumonia,” a patient whose illness had been characterized at its onset by “pain in the right upper chest, cough, rusty sputum.” He was extremely ill on his arrival, and died twenty-four hours after his admission to our hospital.

Field Service.—In contrast with “Total Service” this means service with the Expeditionary Force, and in the fatal cases it varied from one day to two and a half years. Our figures do not show that the percentage of deaths in lobar pneumonia increases with the length of stay of the soldiers in France.

Previous History.—Three of the fatal cases were in-patients who had suffered
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from pneumonia before; three confessed that they had been alcoholics; three stated that they had often been troubled with bronchitis and asthma; and two had had malaria. One of these latter had been through the South African War, but did not know that he had contracted the disease there, although his history subsequent to that period warranted us in concluding that he had. Chills and "spikes of fever" made us suspicious during the course of his disease, and the organisms of tertian malaria were found in his blood. This war has abundantly proved that in persons who have suffered from malaria the disease may reappear during an acute illness, after a fracture of one of the bones, or even after slight wounds. Vandenbosche¹ has studied this question at Salonica.

Onset.—The mode of onset in these fatal cases did not differ in any striking way from that which one expects to find in lobar pneumonia. It is a disease which may attack one at any time or in any place, and it is not surprising that amongst our patients there was a soldier who was taken ill whilst on leave in England, and on the point of returning. He reported sick on his arrival in France. Another man had been for about two weeks in one of the medical wards suffering from sore throat, slight cough, headache, general aches and pains, and anorexia. His temperature had been normal or sub-normal when one day he suddenly had a severe chill, and his temperature rose to 103.7° F. He died of a very extensive bilateral lobar pneumonia.

Clinical Course.

Herpes.—There are some who consider that the presence of this lesion warrants a favourable prognosis. In our series such a conclusion cannot be drawn; of the 48 living cases herpes was noted in 8, and in the 17 fatal ones our records show that it occurred 5 times. In one instance herpes did not appear until the seventh, and the patient died on the eighth day of disease.

Temperature.—Ten of the seventeen fatal cases had high continued fever. The others showed marked remissions, and these generally coincident with the spread of the disease to another lobe. The chart of the case complicated by malaria was an interesting one. Chills began on the seventeenth (?) day of disease, and with the first one his temperature rose to 105° F. After quinine had been given for several days the chart was of the septic type. As dullness and blowing breathing persisted, and as the fluoroscope showed a dense shadow, which apparently lay between the middle and upper lobes, interlobar empyema was suspected. The needle and syringe, however, failed to find pus. No heart murmurs were made out. The autopsy showed a band of unresolved pneumonia in the right upper lobe. This area of consolidation occupied the position of the shadow seen in the fluoroscope, and had been interpreted as an interlobar empyema. However, no pus was found, nor was there any fissure at this site, as the middle lobe was absent. There was acute ulcerative endocarditis of the aortic valve. Other "atypical" charts were seen in the two cases operated upon for empyema. In the first, the temperature had gradually fallen from 103° F. to normal on the thirteenth day, but rose on the fourteenth to 103° F. again, and remained between this level and 100° F. until death on the twenty-ninth day. We failed to find pus with the needle on the seventeenth, nineteenth and twenty-

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first days; but succeeded in doing so on the twenty-third. A rib was resected on the following day, and the cavity well drained. The patient was transferred to a surgical ward. At the autopsy no "pocketing" of pus was found on the side (right) operated upon, but unresolved pneumonia of the whole of this lung. Whilst there was no pneumonia on the opposite side, we found a large clear pleural effusion which had caused great compression of the lower lobe. The second patient with empyema had had high continued fever with a maximum of 105°F. and a minimum of 100°F. The disease was extensive, there were no chills, and for a time empyema was not thought to be present. The chest was explored with a needle on the fourteenth day, and merely blood from the lung recovered; but on the eighteenth day, on tapping the thorax at a different site on the same side, fifteen ounces of turbid fluid were withdrawn. A smear of this showed pneumococci. A rib was resected on the same day, and a large cavity drained. The patient died on the nineteenth day, and the post-mortem examination showed delayed resolution and some organization of the lung on the same side which had been operated upon. There were 1½ pints of turbid fluid on the opposite side which contained very many pneumococci. Here the left lower lobe was represented by a tiny lappet, and practically the whole lung, except for a small part at the apex, was consolidated. The disease was even more extensive than was thought.

Extent of Disease.—A striking feature of our cases has been the number in which both lungs were affected. Thirteen out of seventeen showed this. It is a higher proportion than we have found in a large series of post-mortems in Canada, and is still being maintained, as the only three autopsies, done upon cases of lobar pneumonia since our present series was closed, have shown the same condition. In 100 post-mortems performed at the Montreal General Hospital, Osler reported only seventeen cases with disease of both lungs. In one of our cases the lesion on the opposite side was not diagnosed during life, and this was in a prolonged case of unresolved pneumonia complicated by malaria and endocarditis as we have referred to above. Here broncho-pneumonia of both lower lobes was found post mortem. In four cases the pneumonia was bilateral on admission to hospital. Extension of the disease to another lobe of the same lung, or to the other lung, was often accompanied by fresh pleuritic pain, the appearance of bright red blood in the sputum, and by signs of consolidation. When an exact date was noted in these cases this spreading of the disease took place generally about the sixth day. In four cases it was found at autopsy that the pneumonia, noted on the opposite side to that of the original lesion, was of confluent lobular, and not lobar, distribution. It is quite commonly observed clinically in cases of lobar pneumonia that the blowing breathing and other signs of consolidation appear in the course of the disease in the contiguous part of the neighbouring lobe. In our series of autopsies we saw five examples of this paradox of lobar pneumonia; that is, sharply defined and firm consolidation, lobar in nature, of only part of a lobe, whilst the remainder was quite free to the naked eye from any disease. A satisfactory explanation of this phenomenon has never yet been given as far as we know. It is possible that infection may take place where the endothelial cells covering contiguous surfaces of the pleura have been injured or destroyed by the pleurisy which is always present. Very often too, as may also be demonstrated during life in an ordinary case of lobar
pneumonia, we found that a narrow margin at the anterior border of the lobe showed no consolidation, so that the pneumonia was not "lobar" in the strict sense of the word.

Deliium.—This was not a troublesome factor with which to contend. It was noted in eight of the seventeen fatal cases, and in only one was it very marked. We have not yet drawn off cerebrospinal fluid to relieve this symptom, as has recently been recommended by Musser and Hafford. 1

Extra-systoles.—It has often been pointed out that extra-systoles may disappear during the course of an acute disease, accompanied by high fever. We had the opportunity of noting this phenomenon in the case of a man, aged 48, who, when admitted, had marked extra-systoles, but in the course of a few days the heart and pulse became quite regular. Unfortunately we were unable to see the extra-systoles return as the patient died.

Immediate Cause of Death.—Practically all the seventeen cases died with evidence of failure of the right side of the heart, and after death the chambers on this side of the organ were found to be dilated. Only one of the cases died of the toxic effects on the respiratory centre, and contrary to that which was noted at the time of death of all the others, the respirations ceased an appreciable interval of time before the beating of the heart. Before death there had been no cyanosis. The patient was 26 years of age, and died on the fifth day of disease. The post-mortem examination revealed early grey hepatization of all the lobes except the left upper one. There was no dilatation of the heart. By coincidence this picture stood out in sharp contrast with the usual findings, as at the same time we did an autopsy upon the body of a man, aged 48, who died of failure of the heart on the tenth day of disease, and who was markedly cyanotic before death. There was very extensive disease of both lungs in this case, and we estimated that the patient could not have used more than one-seventh or one-eighth of his lungs for breathing. The right side of his heart was greatly dilated, and filled with post-mortem clot.

Duration of Disease.—There is nothing very remarkable to note in the duration of the disease in these fatal cases. However, in 1916, we performed an autopsy on a British West Indian who had died ten hours after a typical onset of lobar pneumonia. He had been engaged in hard manual labour close to the hospital, and was brought in direct. His lungs were a beautiful example of red hepatization. In the series under consideration one died on the fifth day, and one on the sixth day of illness. Four died on the seventh, five on the eighth, and two on the tenth day. Two patients were operated upon for empyema, and these died on the nineteenth and twenty-ninth days respectively. One patient died about the twenty-second day (the date of onset was obscure).

At the autopsy there was found lobar pneumonia of the whole of the left lung with beginning resolution, and also a mass of broncho-pneumonia in the right lower lobe. This patient had had septicema, and a mural thrombus was found in the right ventricle, but no signs of infarct in the lung could be made out. And finally, one case died on the twenty-ninth (?) day. This patient had unresolved pneumonia, complicated by malaria and ulcerated endocarditis, as described above.

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Complications.

Diarrhoea.—Not infrequently the patients in the various wards of the hospital have been troubled with diarrhoea, the cause of which has evaded the keen search of the Sanitary Officer. Along with other patients those in the "Pneumonia Hut" were attacked, and the treatment of three of the fatal cases was made more difficult on account of this disorder.

Malaria.—One patient, to whom we have already referred, had malaria.

Empyema.—In the sixty-five cases of lobar pneumonia empyema was diagnosed three times. All these patients were operated upon; one recovered and the other two died. One of these latter had pus in both pleural cavities. These two cases have been dealt with already, when we were describing those fatal cases which had atypical temperature charts. It is satisfactory to note that no patients died with the complication of empyema undiagnosed.

Pericarditis.—This occurred three times, but was diagnosed in one case only, that of a soldier aged 27. On the seventh day of disease, a to-and-fro friction, synchronous with the movements of the heart, was made out. It was heard at the base of the heart, but best in the second intercostal space immediately to the right of the sternum. He died on the eighth day and the pericardial sac contained a recent fibrinous exudate, and a slight increase in the amount of fluid.

Endocarditis.—Acute endocarditis occurred twice in the seventeen fatal cases, but was not diagnosed clinically. One instance has been described already in the patient who had malaria. The lesion was of the ulcerative type, and situated upon the aortic valve. No murmurs had been heard during life, although these were faithfully sought after. The spleen showed two infarcts. The other case showing this complication was in a man, aged 40, who was large and plethoric-looking, and confessed to an alcoholic history. He was admitted on the eighth day of disease, and a loud to-and-fro murmur was heard at the base of the heart, at the root of the neck, and in the epigastrium, but best heard over the second and third right intercostal spaces. He did not have a "water-hammer" pulse. There was no mitral murmur. The murmurs were attributed to old lesions of the aortic valve (probably syphilitic), and although the heart was listened to carefully on several occasions no change in murmur was made out, and no pericardial friction detected. The man died of cardiac failure on the tenth day of disease. His fever had been continuous between 102° and 104°. At the autopsy we found acute fibrinous pericarditis, with a very small amount of exudate and effusion. The right side of the heart was dilated, and the left ventricle hypertrophied. There was extensive destruction of the aortic valve, especially at the base of the cusps, and the recent vegetations were large. The injury to the heart muscle varied in extent, but in the interventricular septum the ulcerative process had extended right through, and a small granular area of necrosis was seen on the inner wall of the right ventricle. Pneumococci were grown from the vegetation. There was the typical "wash-leather" appearance of syphilitic aortitis with aneurismal dilatations, and also sclerosis of the aortic cusps at their bases. Therefore, as is often the case, the acute had been grafted upon a healed endocarditis. Blood was recovered post mortem and the Wassermann test, carried out by our colleague, Captain R. H. Malone, proved positive. In speaking of endocarditis as a complication we must refer to the case with mural thrombus which
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has already been described. In the cases which recovered we have not sufficient evidence that any of them suffered from endocarditis.

Jaundice.—Marked generalized jaundice occurred only once, although "icteroid sclerotics" were noted several times. It is not without interest to record, in confirmation with the general finding that this complication is more frequent in the deeply pigmented races, that our case was in a Maori, aged 27. By the fifth day jaundice had become very deep. His temperature remained almost continuously at 104°, and he died on the eighth day of disease. At the post-mortem examination signs of a profound toxæmia were present as evidenced by punctate hemorrhages beneath the pericardium. The jaundice was quite general, and nothing was seen suggesting obstruction in the bile-ducts or duodenum. The spleen was not enlarged.

TREATMENT.

The patients were all given fresh air, light nourishing diet, and abundance of fluids. Magnesium sulphate was prescribed every morning unless contra-indicated. Otherwise, the treatment was mainly symptomatic. In the early stages of the disease we did not hesitate to give morphia ½ grain with atropine 1/10 grain hypodermically to allay pain and induce sleep. Tympanites, always such a troublesome and serious symptom, was treated with turpentine stupes and turpentine enemata, and on rare occasions with turpentine by mouth. As stimulants, strychnine, adrenalin, oil of camphor and digitalin were used, but generally with apparently little effect. When signs and symptoms suggested a possible empyema we always tapped the thoracic cavity, even several times. No apology is made for including this exploratory measure under the heading of Treatment.

NOTES ON A SERIES OF ONE HUNDRED AND SIXTY-ONE CASES OF GUNSHOT WOUNDS OF THE HEAD TREATED AT No. 7 GENERAL HOSPITAL, MAY TO AUGUST, 1916.

BY CAPTAINS W. W. WAGSTAFFE AND W. J. ADIE.

Royal Army Medical Corps.

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ADDITIONAL NOTE BY COLONEL C. WALLACE, C.M.G., A.M.S.

As the result of the D.G.M.S.'s permission to treat head wounds arising in the First Army area at No. 7 General Hospital, the D.M.S., First Army, issued instructions to commanding officers of the casualty clearing stations, permitting them to send on such cases by car to No. 7 General Hospital.

The type of case sent on has been that in which operation seemed likely to be of benefit, namely, those cases with slow pulses. They have been of all degrees of severity. Cases with rapid pulses have not, as a rule, been sent back, as such cases usually are not worth submitting to operation.