CLINICAL LECTURE ON CANCER OF THE LUNGS.

Delivered at the Liverpool Royal Infirmary.

By A. T. H. WATERS, M.D., F.R.C.P.,
Physician to the Infirmary.

GENTLEMEN,—I purpose occupying the time at our disposal to-day in considering, very briefly, the subject of primary malignant disease of the lungs. There is probably no affection of the chest in which more mistakes of diagnosis are made than in cancer of the lungs; and undoubtedly the affection is often very obscure in its origin, and very insidious in its course. In a large number of cases, accurate diagnosis in the early stages is almost impossible; but yet I think that, as a rule, by carefully considering the features of any given case, its mode of development, and the local and general symptoms which characterise it, we shall, even when the disease is not very far advanced, be able to arrive at a well founded conclusion as to its nature.

Cancer of the lungs usually comes on in a very insidious manner, and in its earlier stages may and does simulate, and indeed frequently is complicated with, pleurisy, pleuropneumonia, or bronchitis. One of the first symptoms which calls attention to the disease is often a slight pleuritic attack, or pain resembling that of pleurisy or pleurodynia. On making an examination of the chest, you may find a slight dulness at the base of one lung, and possibly a friction-sound. You think you have to deal with a simple case of pleuritic effusion, and you use the measures which you consider appropriate to such affection. But the symptoms do not yield; the dulness over the lung slowly extends, the patient begins to emaciate, he becomes weaker, his pulse rises, but the increase of temperature is slight, only to the extent of two or three degrees.

Again, instead of finding a friction-sound when you examine the chest, you may hear crepitation or bronchitic *râles*, and you think the case is one of subacute pneumonia or bronchitis. There may even be expectoration of rust-coloured sputa; but for the most part, in cancer, the sputa are whitish, tenacious, very difficult to expectorate, and occasionally bloody. There is often a cough of a very severe kind, and paroxysmal in character, which does not yield to ordinary remedies.

As the disease progresses, and you find that the constitutional measures to which you have resorted for the supposed pleuritic effusion or pneumonia do not have the desired effect, you begin to doubt the correctness of your diagnosis; and with the view of satisfying yourself on this point, or possibly thinking that some fluid, serous or purulent, exists in the pleural cavity, which should be removed, you make an exploratory puncture into the chest, either with an ordinary hypodermic syringe, or with a syringe such as I use in such cases; or you at once use the aspirator, and you find that no fluid is withdrawn, or, perhaps, only a few drops of blood. You have, in fact, punctured a solid lung, and, in a measure, you have cleared up the diagnosis.

Now, you must not imagine that, in making a puncture of this kind, although you have performed an useless operation, you have done anything which seriously injures the lung or jeopardises the patient. If only the hypodermic syringe, or a fine trocar and cannula be used, no harm is done. It is unfortunate not to find fluid, if you have expressed a strong opinion to the patient or the patient's friends that you expected to find it; but, if you have been guarded in the opinion you have expressed, and you certainly should be so, your mistake or failure will not seriously compromise you. Such mistakes, indeed, cannot be avoided. The differential diagnosis between a cancerous lung and a lung solid from some other cause, and pleuritic effusion, is at times so difficult that the most accomplished and most experienced physician may make a mistake with reference to it; and in all cases of doubt an exploratory puncture should be made.

There is, in addition to pleuritic effusion and consolidated lung, another condition which may simulate cancer of the lung. I mean diffused thoracic aneurysm. It is occasionally difficult in a case—when we have even eliminated the question of pleuritic effusion—to say whether a dulness which we find in the chest is due to an aneurysm which has become diffused, or to a cancerous lung. Some years ago, I attended a lady who developed symptoms of pleurisy in the left side; and soon after the onset of the symptoms there was distinct pulsation in the upper part of the chest, which I at first thought to be due to an aneurysm. As the case progressed, however, the sym-

ptoms became less equivocal, and the patient died with all the indications of malignant disease of the lungs.

Again, I was called, some years ago, to a gentleman in Cheshire, who, after having had a fall, developed symptoms of pleurisy—pain in the side, etc. When I saw him, there was dulness over the lower part of one lung behind, and I expressed the opinion that the case was one of malignant disease; but I did not feel quite sure of my diagnosis, for the conditions which I met with might have been due to an aneurysm produced by, or existing at the time of, the fall, and subsequently becoming diffused. The gentleman died not very long after I saw him; but no *post mortem* examination was allowed.

Cancer of the lungs often exists for a long time, and may go on to a fatal issue without causing much, or indeed any, pain. There may be no marked cancerous aspect, but the gradual emaciation and increasing debility show the serious character of the disease. Dyspnoea, sometimes only slight, but occasionally severe and paroxysmal, is usually complained of; but in many cases this difficulty of breathing does not trouble the patient much, and it may be difficult to persuade him that there is anything seriously wrong with his lungs, so slight are the subjective symptoms as regard these organs.

Let me refer now a little more in detail to the subject of diagnosis. The great difficulty, for the most part, is in distinguishing between malignant disease in the early stages, and pleurisy; and the points of difference are these. In cancer, the dulness, although it may be very decided, simulating that of fluid, does not vary in site with change of position of the patient; it does not, as a rule, even when the whole lung is involved, extend beyond the median line in front, as is the case in extensive pleuritic effusion. Sometimes, however, a cancerous development in the anterior mediastinum does produce a dulness which passes the median line, and even a solid lung may slightly encroach on the opposite side. The heart is not usually displaced to any material extent. There may, however, be but little displacement of it in pleuritic effusion in consequence of it having contracted adhesions. In extensive pleuritic effusion, when the chest is quite full, the dulness is complete in all positions of the patient, but in such cases there is usually cardiac displacement.

But in many cases of malignant disease of the lungs, there is some pleuritic effusion; and the fact that on tapping you draw off fluid may mislead you as to the real nature of the case with which you have to deal. There was a little girl in No. 15 ward some years ago, who was admitted with the following symptoms. There was well marked dulness over nearly the whole of the back of one lung, with some crepitation at the upper part. I thought there was fluid in the pleura, and I tapped the chest, and drew off about fourteen ounces of serum. But the symptoms did not yield; the girl grew gradually worse, and I tapped her a second time, but only a small quantity of bloody fluid was removed. She died, and we found the lung a mass of cancer.

In the progress of a case of cancer of the lungs, symptoms of pressure often show themselves. There may be some dysphagia from pressure on the œsophagus; and one or both arms, and the neck and face, may begin to swell from pressure on one or both of the innominate veins, or the superior vena cava. In one case which was under my care in the Northern Hospital, the œdema was most marked. The patient's arms, face, neck, and thoracic trunk became enormously swollen, whilst the lower limbs and the lower part of the trunk were free from swelling. The appearance of this man was very peculiar. Another symptom which occasionally shows itself, and which helps in the diagnosis, is an enlargement of the lymphatic glands about the root of the neck from cancerous infiltration.

It sometimes happens that cancerous affection of the lungs is confined to one side of the chest, one lung becoming quite a mass of cancerous disease, whilst the other remains free from it. In the case to which I shall shortly refer, one side only was affected.

In the development of the symptoms and signs of cancer, much depends on the site in which the disease originates. If it begin in connection with the pleura, the symptoms of pleurisy predominate; if, on the other hand, it originate in the interior of the lung, the disease may simulate bronchitis or pneumonia, or some other form of consolidation of the lung. There are cases which, in their physical signs, simulate very closely phthisis; but the temperature-ranges in them are not like those of phthisis. The temperature maintains a much more even level than in phthisis, and rarely rises to any great height. The character of the breath-sounds will not help you much in your diagnosis of an obscure case of cancer. They may be altogether absent, as in extensive pleuritic effusion, or in a lung intensely solidified from some non-malignant disease; or they may be feeble. For the most part, there is a certain amount of movement of the affected side; local vibration is usually present, but is not strongly marked.

In regard to treatment, I need not tell you that cases of cancer of the lung are hopelessly incurable. We know of nothing which will beneficially influence the course of the disease. You must treat symptoms as they arise. If the case be complicated with pleurisy, with or without effusion, you may often give relief by such measures as you would adopt in ordinary pleurisy—poultices, etc., or by tapping. For the most part, your attention must be directed to relieving pain and distress, often very prominent features, and to giving such food as the patient can take. The hypodermic injection of morphia, or the administration of opium in some form, is often of great service; it relieves pain, soothes the patient, and gives him sleep. Cancer of the lung is sometimes rather slow in its progress, and the aid that you can afford will tend to minimise the sufferings which are more or less incidental to the disease.

And now, having made these remarks, let me draw your attention to the following case.

James C., aged 44, was admitted into the infirmary under my care on January 13th last. He complained of tightness in the chest and slight dyspnoea, but no pain. His illness began, he said, about three months before his admission, and he had been gradually wasting since then. He had, however, followed his work in an iron-foundry up to six weeks before coming to us. On examination, we found the whole of the right side of the chest dull on percussion, with very impaired movement. The dullness was very marked, but it did not extend beyond the median line in front. Vocal fremitus was very slight. The breath-sounds were very faint all over the lung. On the left side, the resonance was good, and the breath-sounds loud, but healthy. The heart was not displaced, and the sounds were normal. The aspect of the patient, although somewhat pale and sallow, was not otherwise unhealthy. The pulse was 85. On the day after admission, the right pleura was tapped, and twenty ounces of a dark-coloured fluid were drawn off by the aspirator. The fluid was very fibrinous, and coagulated soon after it was drawn from the chest; indeed, it coagulated in the cannula during the operation. There was a slight improvement in the physical signs after the tapping: the breath-sounds were more audible, but the patient did not improve. On January 17th, tapping was again practised, but only two ounces of fluid were withdrawn. The man now became rapidly weaker, and took his food badly. He complained of restlessness and insomnia, but there was no pain. The physical signs in the lungs remained unchanged. There was some expectoration of frothy, tenacious, and rust-coloured sputa, for a few days rather abundant. The symptoms of exhaustion gradually increased. The chest was punctured again on the 25th, but only a very small quantity of blood-stained fluid was withdrawn. About February 1st, the abdomen began to swell, but there was little or no pain. During the whole time the patient was under observation, his motions were very pale, but there was no jaundice. He died on February 7th.

I expressed an opinion, when I first examined the man, that he was suffering from malignant disease of the lung, and the results of the tapping tended to confirm the opinion. At the same time, the case was just one of those in which the differential diagnosis between pleuritic effusion and cancer is very difficult, and the disease was complicated, as it occasionally is, with pleuritic effusion, thus making the diagnosis less easy. From the results of the *post mortem* appearances, I think there can be no doubt that the affection commenced in the pleura, which became infiltrated with malignant deposit, much thickened and inflamed, that extension to the lung took place subsequently, and that the further spread of the disease to the abdominal cavity occurred during the last few weeks of life.

I need say but little about the treatment. In addition to the tapping, which gave relief, I ordered carbonate of ammonia, and subsequently quinine; and sedatives were used to procure sleep.

The following are the notes of the necropsy, furnished by Dr. Barron. The left lung and pleura were healthy; the right pleura was occupied by a diffuse malignant growth. Two parts of the pleural cavity still existing contained yellowish glairy fluid. The right lung was infiltrated with malignant growth, running along the course of the fibrous septa from the pleura into the lung-substance. The infiltration of the lung was most marked along the diaphragmatic and lower costal aspect. The lung was somewhat softened and breaking down at the base. The right arch of the diaphragm was infiltrated with growth. There was some pericarditis, with malignant deposit on the parietal portion of the pericardium. The small and large omenta were infiltrated with the malignant growth; there was recent diffuse peritonitis, with fluid in the abdomen. The liver was healthy; its peritoneal ligaments were infiltrated by the growth. The cancer was of the carcinomatous kind.

ABSTRACTS OF ERASMUS WILSON LECTURES ON EVOLUTION IN PATHOLOGY.

Delivered at the Royal College of Surgeons.

By J. BLAND SUTTON, F.R.C.S.,

Assistant Surgeon to the Middlesex Hospital, and Lecturer on Comparative Anatomy.

LECTURE II.—THE INFLAMMATORY PROCESS.

INFLAMMATION, when viewed in the broadest possible light, may be defined as the method by which an organism attempts to render inert noxious elements introduced from without, or arising within it.

Noxious elements capable of bringing about the phenomena peculiar to inflammation may be denominated irritants. Some of them are very coarse; others are peculiarly subtle, often eluding detection. The objective signs of the inflammatory process are so well known, that it is needless to repeat them. The redness and swelling, as Galen knew, are the result of increased afflux of blood and exudation of serum, but the determining cause of the afflux has taxed the ingenuity of pathologists. It remained for the ingenuity of Cohnheim to devise experiments whereby the process could be objectively studied under the microscope.

From direct observation carried out on the tongue and web of the foot of a frog, the tail of a tadpole, fins of fish, and mesentery of a mammal, we have discovered the large part played in the inflammatory process by the white blood-corpuscles. These experiments teach that, in vertebrata, the most important feature in this process is the vascular disturbance, a result, it may for the present be said, of irritation. In the invertebrata, where many of the phenomena of cell-life may be studied with tolerable ease, the important functions played by active motile cells can be observed.

So far as inflammation is concerned, there are three points to which it is necessary to draw attention: firstly, the capacity exhibited by certain cells of effecting a change of place and form; secondly, their power of taking into their interior various substances with which they may come into contact; and, lastly, the property which they possess of decomposing organic material when in their interior or in contact with their protoplasm; this is termed intracellular digestion.

The inherent property possessed in many instances by protoplasm, of moving with a rapidity perceptible with the aid of a microscope, is an acknowledged fact in biology. These movements may be produced by stimuli. The discovery by Wharton Jones, in 1846, that the leucocytes of human blood possessed this property, was a most important step. The capacity of the leucocytes to change their position forms one of the commonest of demonstrations in the physiological laboratory.

In 1862, Haeckel showed that when a *Tethys*, a naked (shell-less) mollusk, was injected with indigo, the granules were taken up by the blood-corpuscles, and he further shewed the occurrence of similar phenomena in the blood of various invertebrata. It was then discovered that the cells of the blood of man possess similar properties; and this enabled Cohnheim to demonstrate, beyond question, that the migratory cells, seen in the cornea when inflamed, were directly derived from the blood.

It now becomes very essential in respect to inflammation to inquire concerning the fate of the material thus ingested by cells. When an amoeba takes into its interior a green coloured plant, the ingested material gradually breaks up, loses its green colour, and finally disappears. The amoeba is thus capable of taking food into its interior, and of making it part of itself, a process conveniently termed nutrition, and the outcome of the process of digestion. When the process is carried on in a cell of this kind, it is spoken of as intracellular digestion.

Metschnikoff, by using powdered carmine, was able to watch the ingestion of the granules by the endoderm cells. In one case, that of *Mesostomum Ehrenbergii*, that turbellarian refused to take the carmine, but Metschnikoff fed a *Nais* with the same pigment, and induced a *Mesostomum* to eat the *Nais*; the examination showed the presence of carmine in the digestive cells of the turbellarian. Mr. Jeffrey Parker, in a communication to the Royal Society, on the histology of *Hydra fusca* (1880), showed that the activity of the cells of the endoderm had not been sufficiently noted, for, in some cases, by means of their pseudopodia, the endodermic cells could actually obliterate the