A CASE
OF
PRIMARY CYLINDRICAL EPITHELIOMA
OF THE LUNG,

WITH SECONDARY DEPOSITS IN THE PLEURA,
BRONCHIAL GLANDS, AND LIVER.

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PRIMARY CANCER of the lung in any form is a comparatively rare disease, and instances in which this particular variety has been found are so rare as to induce us to bring the following case before this Society. We shall consider it first of all from its clinical and then from its pathological point of view.

H. P—, by trade a ship's carpenter, æt. 37, was admitted into the Royal Hospital for Diseases of the Chest, City Road, under the care of Dr. Finlay, on February 8th, 1877.

Previous history.—He stated that he had enjoyed good health until about six months ago, when, after getting wet through, he had suffered from cough and shortness of breath, with pain in the left infra-axillary region which

was aggravated by deep inspiration. For the last three weeks he had not been much troubled with the pain, but his difficulty of breathing had steadily increased, and he had rapidly lost flesh. There was no history of family constitutional taint.

State on admission.—The patient is in bed and lies by preference on his back or right side; he is unable to lie on his left side on account of pain. His expression is anxious; face dusky; lips livid; alæ nasi dilating with each inspiration; external jugular veins prominent and distended; fingers somewhat clubbed, especially those of the left hand. On removing his shirt for the purpose of physical examination, he is noticed to be a thin spare man, and greatly emaciated. The chest is somewhat barrel-shaped, its movements being impaired, mostly so on the left side. The percussion note is over-resonant over both fronts where are heard also loud sonorous and sibilant râles with prolonged expiration. Similar sounds are heard over the right back, and in the left infra-axillary region well-marked coarse friction. In the left back there is absolute dulness on percussion over the lower two thirds, above which the dulness gradually diminishes. Over the dull area the breathing is feeble and is accompanied by sonorous râles and prolonged expiration; vocal vibration is diminished, but not abolished. The præcordial dulness is much diminished and the heart's impulse marked in the epigastrium. The abdomen seems natural; there is no œdema of feet or legs. He has a troublesome cough, accompanied by the expectoration of tenacious pink-coloured sputa. Pulse 120, full and bounding; respirations 20, laboured; temperature 99.4° ; bowels regular; appetite bad; urine scanty, sp. gr. 1030, acid, depositing lithates on cooling, not albuminous.

There was but little change in his physical condition during the next nine days (February 17th), and with the view to determine or exclude the presence of fluid, two exploratory punctures were made through the chest wall on the left side near to the inferior angle of the scapula.

Nothing was obtained beyond a few drops of a thick blood-stained fluid, which was found on microscopical examination to contain several large compound granule-cells. It was noticed that the inguinal glands on both sides were slightly enlarged and hard. His breathing continued laboured, but became paroxysmally worse at times, particularly in the night.

On the 23rd, although by this time it had become sufficiently clear that he was suffering from intra-thoracic disease of a malignant nature, the puncture was repeated at a different spot, under the impression that there was also some fluid present. About a drachm of semi-transparent blood-stained fluid was withdrawn by the exploratory syringe, but on using the aspirator only about an ounce of thick blood-stained fluid was obtained.

Three days later (the 26th) the percussion note was very much impaired over the front as well as back of the left lung; and in two days more (the 28th) it was absolutely dull, the dulness not extending further to the right than the left border of the sternum: the breath sounds were more feeble, and at the apex tubular in character. It was also noticed that the supra-clavicular glands on the right side were now enlarged and very hard, which materially strengthened the diagnosis of intra-thoracic malignant disease. The heart's maximum impulse continued in the epigastrium and did not seem to be affected by the increasing dulness to which reference has just been made.

After this there was no material change in the physical signs. He emaciated rapidly, his breathing became more distressed, and he died on the 7th of March, one month from the time of his admission.

His urine was frequently examined, and beyond a deposit of lithates, presented nothing abnormal.

His bowels were regular throughout.

His temperature presented no remarkable features. Its highest point was 100.6° ; its lowest 97.6° ; and the daily average about 99° .

Autopsy twenty hours after death.—Rigor mortis moderate. Body much emaciated. Supra-clavicular glands on right side enlarged and hard. On section the outer portion was white and somewhat glistening, the centre softened down into a puriform material.

The anterior mediastinal glands, four or five in number, each about the size of a hazel nut, were also enlarged and hard, and resembled on section those above described. Neither pleural cavity contained fluid. On the surface of the right parietal pleura were several nodules of a soft spongy nature, the largest not exceeding an inch in length by half an inch in breadth. They did not involve the adjacent bony or muscular structures. Elsewhere the pleura appeared natural except at the base, where the surfaces were roughened in places, and presented some recent adhesions.

The right lung was large and heavy, weighing three pounds; its surface studded all over with numerous more or less projecting nodules, underlying the visceral pleura varying in size from a pin's head to a hazel nut. Similar nodules were found scattered throughout the entire lung. The superficial portions were emphysematous. The bronchi exuded on pressure a frothy curd-like material, and their mucous membrane was injected and thickened.

The left pleura presented some adhesions at its outer part, and was so firmly adherent posteriorly that it was impossible to remove the lung without tearing its substance.

On the parietal surface were several nodules of the same character as those on the right side.

The left lung was also large. It weighed 2 lbs. 10 oz.; and the pleura covering it was roughened in places by exudation. It presented patches of emphysema, and its surface was covered with nodules similar to those on the right lung. At the upper part of the lower lobe was a large mass of soft (cancerous) material, projecting slightly from the surface, measuring in length about five inches, and in breadth about two. On section it presented a yellowish-

white pulpy appearance, was soft and putty-like in consistence, and irregularly stained with extravasated blood. It yielded on pressure abundant thick puriform fluid, and the parts of lung tissue around were soft and friable. On cutting into the lung it was found to be œdematous, and nodules similar to those on its surface were seen disseminated throughout its substance. These growths, too, were composed of the same spongy material already described, and readily broke down on pressure. The bronchi contained thick curdy fluid, and the mucous membrane was injected and thickened.

The posterior mediastinal glands, about six in number, were enlarged, especially those on the left side. The largest was the size of a small walnut and pressed on the left bronchus, but not so as to narrow its calibre to any extent. They presented the same characters as those before described.

The liver appeared natural on its surface, but on cutting into it three masses of the same cancerous material were found, each about the size of a small hazel nut, two in the right and one in the left lobe. The organ weighed 3 lbs. 14½ oz.

The right kidney presented on its surface two yellowish spots about the size of pins' heads.

Heart.—The right ventricle contained a firm, decolorised, apparently ante-mortem clot; the left also contained a quantity of clot. The substance of the organ was natural, as were also the valves, excepting the tricuspid, the segments of which were somewhat opaque and thickened.

The spleen appeared natural.

The intestines were examined as far as the sigmoid flexure, and presented no abnormal appearance.

There were a few enlarged glands about the cardiac end of the stomach, and some of the retro-peritoneal glands along the spine were also enlarged, and presented the same characters as those before described.

Microscopic examination.—The portions of the organs intended for microscopic examination were hardened in

spirit, and the sections stained with logwood and mounted in dammar varnish.

Lungs.—For the most part there is a well-defined line of separation between the lung tissue and the substance of the new growth ; but in places this separation is less well marked. Fig. 1 (Plate XV) shows the cancerous deposit in the midst of the lung structure, in the interior of the alveoli themselves, the alveolar walls being quite distinct ; they are, however, considerably thickened by infiltration of cells probably of an inflammatory origin. Fig. 2 (Plate XV) shows another arrangement ; here there is a thick wall between the lung and the cancerous new growth. In both places, however, the structure of the growth is identical. When examined with a higher power this growth is found to consist of an alveolated stroma (fig. 3) ; the alveoli are filled with cells of a very typical, columnar form ; they are huddled irregularly together in some places, while in others they are arranged with great regularity around the walls of the alveoli, which then assume the appearance of the crypts found in an ordinary polypus of the rectum. The alveoli vary considerable in size, in places they are about as large as an ordinary pulmonary alveolus, in others they are much larger, as though from coalescence of several alveoli. This, indeed, seems to be the manner in which the cancer has spread ; the alveolar wall being pressed upon by the invading new growth has finally yielded to the pressure and broken down. The parenchyma surrounding the tumours is undergoing changes which belong to the category of catarrhal inflammation, and which have led to the distension of the alveoli with a highly corpusculated infiltration. In many alveoli this has become caseous. The epithelium is fairly regular in shape and of a typical columnar variety ; the cells are arranged in single layers for the most part, but occasionally they are two or even three deep. In no place do they seem to be ciliated. We could not trace any direct communication between the bronchial tubes and any of the cancerous nodules.

Pleura.—The parietal layer of the pleura was normal in the greater part of its extent, but here and there it was studded over with flat-topped nodules, which seemed to grow from its surface. On examining thin sections, however, the new growth was found to affect almost the entire thickness of the membrane. Fig. 5 (Pl. XVI) shows the appearance which it presented under a low power, and fig. 6 represents a portion of the same section more highly magnified. It will be seen that the cylindrical character of the epithelium is well developed, and that it accurately corresponds in structure with that found in the lungs. The pleura is much thickened and infiltrated with cylindrical epithelial cells, which in some places seem to lie without any definite arrangement, but which in others are placed around the walls of alveoli. In some of the alveoli the epithelial lining projects into their interior (as at Pl. XVI, fig. 6 A), resembling in some measure an intestinal villus. The alveoli vary from minute dots to the size of split peas; they are mostly circular, the larger ones being seemingly formed by coalescence of several smaller ones; they are all lined by columnar cells, which are sometimes one and sometimes two or three deep.

Bronchial glands.—The gland examined was about as large as a good-sized filbert. On cutting across it, it was found to consist of two parts; a caseous portion—probably the original gland—and a spongy part slightly pigmented. This latter portion is found to be composed of the same kind of epithelial growth as that already described in the lungs and pleura. Fig. 4 (Pl. XV) shows the appearances seen under the microscope.

Liver.—The growths in the liver, though presenting characters very similar to those already described, were less well characterised. Not only were the individual cells less typical in form, but they were also less definitely arranged in cylinders. The line of separation between the new growth and the liver-cells was less abrupt than in either lung or pleura. There was well-marked infiltration of

leucocytes along the immediate line of contact, and the liver-cells themselves were very obviously altered in consequence. At a short distance from the new growth the liver-cells and the parenchyma assumed their normal appearance.

Remarks.—Clinically, the interest in the case just narrated, lies in its diagnostic side; as in the present state of our knowledge, treatment, except such as is directed to the relief of distressing symptoms, is obviously hopeless. Several cases of primary cancer of the lung have been recorded, but most of these have been mistaken for chronic tubercular disease, and one was diagnosed as capillary bronchitis with pneumonia.

In the present case the physical signs pointed rather to a limited collection of fluid with thickened pleura. The absence of cachectic appearance (owing, no doubt, to the asphyxial tint of the skin), the well-marked pleuritic friction in the left lateral region which was noted on admission, and the fact of the heart's maximum impulse being seen and felt in the epigastrium, together with the history of the onset of the disease, all gave probability to this diagnosis.

But the rapid emaciation, the paroxysmal character of the dyspnoea, the nature of the sputa, the absence of œgophony, the fact that the bronchitic râles were well heard over the dull area, and that the vocal fremitus was not abolished, the enlarged and hard cervical glands, and last and chiefly the negative results of the exploratory punctures, pointed with overwhelming force to the true nature of the disease.

A case reported by Dr. (now Sir George) Burrows in the twenty-seventh volume of the 'Transactions of the Royal Medical and Chirurgical Society,' February 13th, 1844, the nature of which was diagnosed during life, presented many points of agreement with the present case; but no microscopical examination was recorded, and, indeed, this seems to have been generally, if not always, omitted.

Only two cases, so far as we can find, have been re-

corded hitherto, which the microscope has shown to be of a similar nature to the present case, and it may be of interest to quote them at some length.

In the '*Rivista Clinica di Bologna*' for May, 1874, Dr. Ettore Marchiafava of Rome records a case of primary cancer of the lung, of the cylindrical variety, with secondary deposits in the brain and frontal bone. The patient was a mason, *æt.* 40, who had been under his care in August, 1871. He had been subjected to great and rapid variations of temperature, in consequence of which (as he supposed) he was taken ill. Increasing malaise from day to day was followed by cough, of a convulsive nature, which became more and more frequent and hard. He lost flesh.

In January, 1873, he suffered from attacks of neuralgia in his loins and thighs, and he was then admitted into the San Spirito Hospital, where his disease was diagnosed as chronic tubercular pneumonia.

In February he commenced to complain of supra-orbital pain, which came on in fits and starts, and he occasionally wandered and was never entirely himself. He had an unquenchable thirst. These symptoms, added to those already described, led to the diagnosis of secondary tubercles in the meninges of the brain.

He died on March 19th.

At the autopsy, the meninges were found to be perfectly healthy, but on the base of the brain there were several nodules of new formation. On cutting into the brain similar nodules were seen scattered throughout the cerebral substance, varying in size from a millet seed to a nut. They had a rounded form, were composed of a greyish, soft, granular material, pigmented in places, and could be completely and easily enucleated from the nervous substance. A few similar growths were found in the cerebellum; the pons and medulla were not invaded.

The abdominal organs were all healthy.

In the thorax the pleura, pericardium, and heart were normal.

Scattered throughout the substance of the lungs were nodules similar to those found in the brain, some of them undergoing degeneration, and leading in this way to the formation of small cavities.

The microscopical examination showed an alveolar structure, which was filled with cellular elements having the characters of cylindrical epithelium. In the interior of the alveoli the peripheral cells were arranged along the walls, and presented the genuine form of cylindrical epithelium. In the areas of the alveoli bordering the cancerous nodules was a quantity of catarrhal exudation. The blood-vessels were distended with blood.

The tumours in the brain presented the same sort of fundamental structure. Besides the cylindrical cells the alveoli of the cerebral tumours contained granules of hæmatoidin, indications of old interstitial hæmorrhages. There were evidences of an abundant proliferation of nervous elements in the neighbourhood of the cancerous mass.

The tumours in the frontal bone springing from the periosteum had the same histological type as those in the lungs and brain.

There are no drawings of the microscopical appearances in this case.

The other case, by M. Lataste, Interne of the Paris hospitals, is recorded in the 'Bulletin' for 1875, of the Anatomical Society of Paris. The following is an abstract of the case.

M. F—, æt. 47, a milliner, was taken into the Hôpital Cochin on 11th October, 1875, under M. Bucquoy. The patient had always enjoyed good health, and had the appearance of having a strong constitution. A month before she was first seen she complained for the first time of giddiness and palpitations. Her condition shortly became worse, and she was seen again by her doctor who detected symptoms of left pleuritic effusion. Dyspnoea came on and got worse from day to day, while at the

same time sub-crepitant râles appeared on the other side. There was but slight expectoration, no traces of blood. A week later the dyspnœa became extreme and a condition of semi-coma supervened. There was a little dry cough, which came on in paroxysms, and which was accompanied by a very slight mucous expectoration. Examination of the left side showed absolute dulness reaching as high as the spine of the scapula. On the right side there was some dulness in front, with increased vocal fremitus. Tactile fremitus was completely absent on the left side, but was increased on the right. The heart was slightly displaced towards the right side, but there was nothing abnormal about its sounds. Temperature was 101.5° . The patient died, and at the autopsy the lungs were found studded over with tumours of sizes varying from a pea to a cherry. The interior of some of the larger tumours was yellowish and occasionally pigmented. The lymphatic glands and the pleuræ were also affected; the other organs all healthy.

The microscopic examination of this new growth is recorded and figured by M. Melassez in the 'Archives de Physiologie' for 1876, p. 353. We may briefly state that the histological characters and the description given correspond very nearly with our own.

M. Melassez states in his paper that he has seen one other similar case, for the notes of which he was indebted to Dr. Renaut, but the case is very briefly given and is not illustrated.

We have called this a case of primary cylindrical epithelioma of the lung, with secondary deposits in the pleura, bronchial glands, and liver. That the disease was primary in the lung there can be no reasonable doubt:—*First*, from the wide extent of the pulmonary growth, the whole of both lungs being studded throughout, while there were but three small nodules in the liver, which in this case was the only other organ where the disease could possibly have originated. *Second*, the histological

examination bears out this supposition, the large size and orderly arrangement of the constituent cells in the lung contrasting strikingly with the bastard arrangement in the liver. *Third*, that the lung is just as likely to be the starting-point of such a growth may be inferred from the history of the development of this organ, composed as it is of derivatives from hypoblastic as well as mesoblastic elements of the ovum. It will further be remembered that the bronchial tubes, almost to their terminations, are lined by columnar (ciliated) epithelium, and though this is replaced in the alveoli by an epithelium, the cells of which, owing probably to mechanical causes, have assumed a more flattened type, it is not difficult to imagine that they would serve as a very suitable nidus for the development of true cylindrical epithelioma.

We would take this opportunity of tendering our acknowledgments to Mr. Alfred G. Williams, the house-physician at the Royal Hospital for Diseases of the Chest, for many notes in connection with the case.

DESCRIPTION OF PLATES XV AND XVI.

Primary Cylindrical Epithelioma of the Lung.

(D. W. Finlay, M.D., and R. W. Parker.)

PLATE XV.

Fig. 1. Appearance of the cancer within the alveoli of the lung. The alveolar walls not invaded. As seen by a low power. $\times 125$.

Fig. 2. Appearance of the cancer within the alveoli, but separated from the rest of the lung-substance by a thick wall. The new growth has, in fact, taken the place of the lung-tissue. As seen by a low power. $\times 125$.

Fig. 3. Showing the new growth within the alveoli; the septa perfectly free. The cylindrical character of the epithelial cells is well seen, as also their mode of arrangement. $\times 350$.

Fig. 4. A bronchial gland, showing the cylindrical tubes lined with epithelium. There was some caseous matter in the immediate neighbourhood of this section. $\times 350$.

PLATE XVI.

Fig. 5. A nodule from the pleura. There is the same tendency of the epithelial cells to be aggregated in cylinders. Some are larger than others; the large ones consist of a coalescence of smaller ones. $\times 125$.

A refers to the same part as A in Fig. 6, where it is more highly magnified.

Fig. 6. A portion of Fig. 5 (A) more highly magnified, showing the cylindrical nature of the cells and mode of arrangement. $\times 350$.

Fig. 7. From the liver. The cylindrical arrangement of the cells is less typical, though their outline is still characteristic. $\times 350$.

FIG. 1.

X125.

FIG. 2.

X125.

FIG. 3.

X 350.

FIG. 4.

X 350.

FIG. 5.

x 725.

FIG. 6.

x 350.

FIG. 7.

x 350.