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[NEW SERIES.]

Diseases OF SPECIAL OCCUPATIONS.

No. I.

THE SHEFFIELD GRINDERS.

By JOHN CHARLES HALL, M.D., Fellow of the Royal College of Physicians, Edinburgh; Physician to the Sheffield Public Dispensary, etc.

[Concluded from page 295.]

C. THE SHEFFIELD GRINDERS' DISEASE.

It remains to consider, lastly, in this, my fifth communication, the *post mortem* appearances presented by the lungs of those who have died from the Sheffield grinders' disease: I purpose making, also, a few observations on its treatment.

(b) *The post mortem appearances found in the lungs of those who have died from the Sheffield grinders' disease.* CASE IX. George Capper, aged 45, a razor grinder, was admitted at the Sheffield Public Dispensary, October 19th, 1855. He complained of difficulty of breathing, tightness over his chest, and some pain on the left side. He said he had worked at his trade since he was twelve years old. His father, a table-blade striker, died at the advanced age of 82; his mother died at 62. He was one of a family of twelve. "He could not remember that any of his relations had died from consumption, but they might have done, for anything he knew." He had led a very irregular life, had never been married, and had always been very intemperate. He was a good deal emaciated. He measured only five feet; his chest was thirty inches in circumference; and there was much less mobility on the left than on the right side. The respiration on both sides was unequal, and the expiratory murmur was prolonged. There was considerable dulness under both clavicles; he was very sallow; the stools were white; and the urine was high coloured.

A small blister was applied under each clavicle; he was ordered, during the day, an expectorant mixture; and he took, for ten nights, two pills consisting of a grain of ipecacuanha, two grains of blue pill, and six grains of the extract of taraxacum. Under this treatment, he rapidly improved; and he was desired to go into the country, and to take a dessert-spoonful of cod-liver oil three times a day, and to apply the croton oil liniment to his chest until the usual eruption was produced; and, as this died away, the embrocation was to be repeated, so that the skin might be kept more or less sore for six weeks. He was also ordered eight grains of the compound ipecacuanha pill every night, a good diet, and a pint of beer daily. He recovered sufficiently to resume his calling of a razor grinder; and twelve months elapsed before I again saw him. When he was again admitted, the disease had made rapid progress. I saw him again three months before he died. There was then great dulness under each clavicle; the respiration over those portions of the chest where it could be heard was hard and unequal; and a diffused blowing sound could be detected on the right side, below the nipple. Once or twice, on urging him to take as deep an inspiration as he possibly could, an interstitial creaking sound was produced. During the very cold weather we had at the end of January in the present year, he was attacked with pain in the left side, and with very great difficulty of breathing: he did not apply to any medical man for assistance, and he died on the 28th of January, 1857.

POST MORTEM EXAMINATION, made twenty-four hours after death, with the assistance of my friend and colleague, Mr. George Atkin. The body was considerably emaciated, but not so much as might have been expected in one who had for so many years been ill. On opening the chest, the lungs did not collapse, and there were evidences on the left side of the

recent attack of acute pleuro-pneumonia which had proved fatal. Here the adhesions were easily broken down, and evidently but recent. The left cavity of the chest contained a few ounces of serum, and the pleura covering the lung in the same situation was coated with recently effused lymph. The middle lobe of the left lung was in a state of red hepatisation. On both sides there were extensive adhesions; these formed, at the apex of each lung, a cartilaginous cap, from which it was impossible to detach the lungs entire. The whole of the superior lobe of both lungs was extremely dense, and of a black grey colour. The external surface was sprinkled over with small black spots; some as small as a large shot-corn, others as large in circumference as a sixpence. On cutting into the solidified lung—a task of no little difficulty—we observed similar bodies: here and there these were aggregated into masses of a large size; one near the bifurcation of the trachea, on the left side, was the size of a large egg. The bronchial glands were enlarged and blackened; several of them contained a good deal of gritty matter.

In the following woodcut, made from a drawing by Mr. Tuffen West, Mr. Orrin Smith has enabled me to present the exact appearances exhibited by a section of the superior lobe of the right lung of this man.

Fig. 3. Section of the lung of a razor grinder.

The peculiar dark spots, to which reference has already been made, will be seen at *a*; the white appearance seen at *b* is also evidently a result of chronic inflammation; enlarged bronchial tubes will be noticed at *c*.

The *post mortem* appearances of the bronchial glands were exactly similar to those seen in Fig. 4. It was sketched by Dr. Branson, from one of the bronchial glands of a grinder who had died in the Sheffield General Infirmary; and I am indebted to my friend Henry Jackson, Esq., F.R.C.S., the senior surgeon of that institution, for the use of the drawing from which the annexed woodcut has been taken.

Fig. 4. Appearances frequently present in the bronchial glands of those who have died from the grinders' disease.

The heart was slightly enlarged; valves normal. The other organs of the body were not examined; permission having only been given to open the chest.

Microscopic Examination of the Lungs. I examined various portions of the lungs of this razor grinder, with very great care; and, although several gritty particles could be detected, I did not discover a trace of steel.

The general appearances of each section when examined, even with a very high power, were only such as might be expected in any ordinary case of chronic inflammation. In a case of such importance, however, I wished that, in addition to my own observations, my fellow Associates should have the benefit of the opinions of some of the first microscopists of the day. I accordingly sent a section to my friend Professor Bennett, of Edinburgh, and another section to my friend Dr. Lionel Beale. Dr. Bennett discovered for the most part "chronic exudation tinged with pigment", and fully agreed with me as to the nature of the lesion. Dr. Beale writes: "My impression is that the black granular matter is situated in the smaller bronchial tubes upon the mucous membrane. Much of it is certainly contained within cells; or, perhaps, more correctly speaking, is aggregated into masses having all the characters of cells. At the same time, I think it very likely that some of it is in the vessels, and consists, as you suggest, of altered blood."

I am again indebted to my friends, Dr. Branson and Mr. Henry Jackson, for the use of the beautiful drawings whence the next two woodcuts have been taken.

Fig. 5. Section of the lung of a fork grinder.

The above engraving very accurately represents the appearances frequently seen in the lungs of those who have died from the grinders' disease. We observe that portions of the lung are infiltrated with toughly solid exudation, in the state of induration matter. When cut, portions of it resemble new India-rubber in colour, and they are quite as tough and difficult to cut.

Fig. 6. Section of the lung of grinder.

Of the general appearances observed in the lungs of those who perish from this disease, Mr. Orrin Smith's skill has enabled me to present, in this series of engravings, a very correct representation. We observe:—

1. The little black spots on the surface and throughout the substance of the lungs,

2. Dilatation of the bronchial tubes.

3. Enlargement of the bronchial glands. On making a section, they are often seen, as in Fig. 4, of a greyish and blackish colour; for the most part of a very firm consistence. In other cases, they are soft. Calcareous matter is often present in them.

4. Large masses, varying in size and in colour, in different portions of the lungs.

5. Adhesion of the pleurae.

6. Inflammation of the lining membrane of the bronchi, trachea, and larynx.

7. Frequent enlargement of the heart, disease of the liver, and a granular condition of the kidneys.

These *post mortem* appearances naturally suggest a few observations, which, remembering, as I do, the great length to which these articles have already extended, shall be condensed as much as a possible.

1. *The black spots on the surface and throughout the substance of the lungs.* It may be well to remember, in considering the question of exudation in the lungs, that since the beautiful injections of Adriani and of Rossignol it has been known that the bronchial arteries and veins may be filled from the pulmonary veins, and the latter again from the bronchial arteries; the intercommunication of the two systems is thus demonstrated, and we have been thereby taught how disturbances of the circulation in one system, may account for those which are witnessed in the other.

Andral has remarked, "that black discoloration of the lung with augmentation of its consistence, is nothing more, in a great number of cases, than black pulmonary matter, with the superaddition of a morbid induration wholly independent of it. In other words, the lung affected with chronic induration blackens in the same way that an intestine does that is similarly affected, and passes by degrees from red to brown, and even to the black colour."

The same distinguished pathologist speaks also of four forms of melanosis; 1, Masses, incysted or not; 2, Infiltrated in different tissues; 3, Layers on the unattached surface of membranous organs; 4, Liquid. The fourth form was rejected by Laennec, who regarded melanosis as a tissue. These masses in the Sheffield grinders vary in size; some are about the bulk of a small bean; some are about the size of a large egg. I would remark, however, that much of the induration observed in the lungs of the grinders does not depend on the melanotic deposition, but simply on chronic inflammation. With regard to the colour of chronic induration it is sometimes red, yellow, iron grey, brownish, or black. The colour is in some degree of an accidental character, dependent as it is on the presence, in variable proportions, of blood, and of black or dark blue pulmonary matter. Dr. Gregory, of Edinburgh, found the black lungs of a collier to contain coal, which, on destructive analysis, yielded carburetted hydrogen and the other usual products.

In the section of lungs from which fig. 3 was taken, some of the vessels were pervious and the arrangement of the capillaries natural. The walls of the air-cells were thicker, and the elastic fibres more abundant than in a perfectly healthy condition of the lung. In many reptiles which have been kept without food, and with insufficiency of air, the vessels of the lungs and other organs are found to contain similar dark matter.

2. *The enlargement of the bronchial glands* is clearly the result of the chronic inflammation which has been set up in the pulmonary tissue by which they are surrounded. The black pigment which is so often found in them in considerable quantity (fig. 4) does not, so far as I am aware, differ from that generally found in the pulmonary parenchyma. That it bears (as Dr. Sieveking has shown) a close relation to the defective oxygenation of the blood, is manifest from the normal tendency to the deposit being greater in proportion to the advance of life; and, in the attacks of chronic inflammation to which the Sheffield grinders are so liable, it evidently accumulates in considerable quantities.

3. *The cartilaginous capsule* at the apex of the lungs on both sides is by no means an unusual occurrence. When placed under the microscope the deposit was found to be of a fibrous or, as Lebert has termed it, chondroid character. If the result of former inflammation of the pleura, it involves the free surfaces of the membrane with which it closely combines, which was the case here; if arising from subserous congestion, it is found in the subserous tissues and in the membrane itself.

The whole question of chronic pneumonia and its results,

including hypertrophy of the intervesicular tissue, owing, probably, to a deposit in them of an albuminous character, involves considerations of the highest importance, and demands a careful and patient investigation.

Dr. Williams mentions, in his *Principles of Medicine*, a chronic form of pneumonia in which the hepatised portion, owing to the thickening of individual vesicles, assumes an oolitic aspect. In this form of pneumonia he is of opinion that thoracic consumption may commence without the pre-existence of tuberculous disease.

(c.) *Treatment of the Sheffield Grinders' Disease.* This disease requires to be treated on general principles. All causes of irritation must be removed, attacks of inflammation must be subdued as they arise, and every care should at all times be taken to keep up the strength of the patient.

The Sheffield grinders' disease, in the first instance, is simply bronchitis, arising from the irritation produced by the presence of fine particles of stone and metal in the tubes. Removal for a time from the wheel, and a residence in the country, at least during the early stages of the disease, is an essential step to be taken; and the man should resolve for the future to work only in a hull where the revolving fan properly adjusted carries off the greater portion of the irritating particles.

In a grinder somewhat advanced in years, and in whom the disease has made considerable progress, when, in addition to dilatation of the bronchi, the surrounding portion of the lung is not only condensed by pressure, but very often also locally consolidated by chronic pneumonia, it often happens that an acute attack of bronchitis supervenes on the chronic disease. Such a case requires to be treated with the greatest possible caution. The patient, under such circumstances, broken down in constitution, does not die from the inflammation, but from the large accumulation of mucopurulent secretion thrown out by a congested surface. This copious secretion, which the patient has not sufficient strength to throw off, is the cause of death, the brain and tissues becoming poisoned by venous blood. Strong stimulating embrocations are here required to the chest, and doses of the sesquicarbonate of ammonia and of chloric ether should be given at short intervals.

With regard to the treatment of the chronic form of bronchitis, so common amongst the grinders of Sheffield, much will depend on the peculiar complications each case presents. The addition of a dilated state of the tubes to chronic inflammation of their mucous membrane, adds much to the difficulties of treating with success a patient so affected. In the great majority of such cases that I have seen, both in private and dispensary practice, the sputa have been very abundant, solid, opaque, and, for the most part, purulent. The face is bloated, the lips are blue, the countenance is generally livid; such symptoms arise from the altered state of the mucous membrane preventing the proper aëration of the blood. When the disease is of long standing, it is not uncommon to find enlargement and thickening of the right ventricle.

Blisters applied to different parts of the chest at intervals, and repeated dry cupping, are useful in many cases. In the chronic forms, counter-irritation, especially with the croton oil, or the turpentine and strong acetic acid liniments, should always be employed. The expectorant medicines to be selected must depend upon the condition of the discharge from the bronchial tubes. When the expectoration is excessive, balsam of copaiba and pyroxylic spirit are medicines of considerable value; and the inhalation of the vapour of tar, or of creasote, or of chlorine, much diluted, has unquestionably a tendency to reduce the irritability of the mucous membrane, and to lessen the quantity of its secretion.

Surrey House, Sheffield, April 13th, 1857.

ERRATUM.

[In Dr. J. C. Hall's paper on the Sheffield Grinders' Disease, in the JOURNAL of last week, by an error in revision, the woodcuts were unfortunately transposed; the description appended to Fig. 1 belonging to Fig. 2, and *vice versa*. To non-microscopists this error might prove embarrassing; and, therefore, to prevent any possibility of mistake, we again append the woodcuts illustrative of the sputa to this the conclusion of his elaborate articles on the Sheffield Grinders' Disease, with a correct description to each. EDITOR.]

Fig. 1 contains the sputa of a table blade and file grinder. (a) cells containing pigment; (b) sarcina ventriculi; (c) curled elastic fibre; (d, e, f) pus and mucus cells; some very transparent, shewing a distinct nucleus; others (f) with pigment.

Fig. 2. Sputa of a fork grinder (dry). (a) epithelium from the mouth; (b) epithelium from the fauces; (c) silicious particles; (d) metallic particles; (e) blood-corpuscles; (f) pus and mucus cells.

Illustrations

OF

HOSPITAL PRACTICE:

METROPOLITAN AND PROVINCIAL.

ST. MARY'S HOSPITAL, MANCHESTER.

BELLADONNA IN INCONTINENCE OF URINE.

Under the care of G. B. MASFEN, Esq.

M. B., aged 5, who had been under my care at various times since February 6th, 1856, suffering from incontinence of urine, under a variety of treatment, and with, at the best, very trifling amendment, was again admitted on the 28th of January 1857. He is a delicate looking boy, but apparently healthy in all other respects than the disease, for which he was under treatment. He had rarely passed a night, that his mother could recollect, without wetting his bed; and the treatment which had appeared to do him most good, was abstinence from drink in the after part of the day; but this could not be successfully carried out in warm weather.

I prescribed an anodyne alkaline mixture, with an occasional drastic aperient, till having seen Mr. Brooke's case in the JOURNAL of February 21st, I ordered, on February 28th, one-twelfth of a grain of extract of belladonna to be taken three times a day, when a marked improvement immediately commenced, which continued till after having the medicine for twelve days there was no more appearance of the symptoms. He continued under the same treatment till March 21st, when I discharged him apparently cured. I shall keep this case under notice, and, should any relapse occur, shall not fail to place it on record.

While on this subject, I may mention that I wrote to a sometime patient of mine, who had consulted several eminent practitioners in various parts of the kingdom, and who seldom passed a night without wetting his bed, from birth to the age