LECTURES

ON THE

PATHOLOGY, DIAGNOSIS, AND TREATMENT OF BRIGHT'S DISEASE.

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LECTURE IV.—CHRONIC BRIGHT'S DISEASE WITH A LARGE WHITE KIDNEY.

General History of the Disease: its Causes and Progress.—Condition of Urine in different Stages.—Various Forms of Tube-Casts, and their Significance.—Morbid Anatomy and Pathology of the Kidney in the three Stages of (1) Simple Enlargement, (2) Granular Fatty Degeneration, (3) Atrophy, with Coarse Granulations on the Surface.—Symptoms.—Dropsy.—Pulmonary Complications.—Inflammation of the Serous Membranes.—Endocarditis.—Dyspepsia.—Vomiting.—Diarrhœa.—Hypertrophy of the Heart.—Cerebral Symptoms.—Hæmorrhage, etc.—Defect of Vision.—Hæmorrhage from Mucous Membrane.—Diagnosis.—Prognosis.—SIMPLE FAT KIDNEY, OR GENERAL FATTY INFILTRATION OF THE KIDNEY.—History.—Microscopic Characters of the Kidney.—Pathology and Clinical History.—Points of Difference between it and the Granular Fat Kidney.

I NOW propose to give you the pathological and clinical history of those cases of chronic Bright's disease in which the kidneys are found, after death, always more or less anæmic and pale, usually enlarged, soft in consistence, and smooth on the surface, but sometimes contracted, indurated, and coarsely granular.

A large white smooth kidney is often a sequel of an acute inflammatory attack. Acute Bright's disease, the result, it may be, of scarlet fever or of exposure to cold, is imperfectly recovered from. The dropsy passes away; the patient regains his strength and his colour; the urine is normal in quantity, appearance, and specific gravity; but it continues to be more or less albuminous. The albuminuria which thus continues after acute Bright's disease many remain for many months, and even for a number of years, before the appearance of symptoms consequent on chronic and incurable degeneration of the kidney. At length there is, perhaps, a return of dropsy, or the patient is cut off by some of the results of uræmia, either of an inflammatory or neurotic character. After death, the kidneys may present one of three distinct appearances. 1. They may be large, almost uniformly white, and smooth on the surface. This appearance is admirably represented in Dr. Bright's fourth Plate, Figs. 1 and 2. I call this simply a "large white kidney". 2. The kidney may present the same general appearance, but with this addition, that the cortical surface and the surface of a section of the cortex are, to use the words of Dr. Bright, "interspersed with numerous small yellowish opaque specks". This appearance is represented in Fig. 3 of Dr. Bright's third Plate. I shall presently show you that these yellow opaque specks are spots of fatty degeneration; and I call this a "granular fat kidney", or a "large white kidney with fatty granulations". 3. The cortical portion of the kidney may be found more or less atrophied, with an uneven granular surface; the yellow specks of fatty degeneration being in some cases still visible on the surface and on section.

The various appearances which I have described are results of successive stages of the same pathological process; in the majority of cases, but not always, following upon an acute onset. A kidney which has contracted and become granular, after having been enlarged, differs from the contracted granular kidney which I described in my last lecture, in being of paler colour, of firmer texture, and more coarsely granular on the surface. The microscopic appearances of the kidney, the history, and the symptoms of the disease, also differ greatly, as we shall presently see.

There is a class of cases in which, with a clinical history different from that of the cases to which I have just now referred, the kidneys are found, after death, pale and wax-like in colour and consistency, usually enlarged and smooth, but sometimes contracted and granular. This is the "lardaceous degeneration" of the kidney. The subjects of this form of disease have usually been strumous or otherwise cachectic before the onset of the renal disease, which, in the great majority of cases, begins as an insidious chronic malady. A similar degeneration of the liver and spleen is often associated with that of the kidney. In my next lecture, I shall discuss the clinical and pathological history of lardaceous degeneration of the kidney.

I now proceed to give you a more detailed account of those cases which are associated with a large white kidney, with or without the fatty granulations, with or without subsequent contraction and coarse granulation on the surface.

In a large proportion of cases, the commencement of the disease dates from an attack of acute Bright's disease resulting from exposure to cold, scarlet fever, diphtheria, typhus, enteric fever, or other zymotic disease. In several instances, I have traced the disease back to an attack of tropical malarious fever; I have seen it as a sequela of ague in this country; and I have known it follow upon an attack of dysentery. The acute disease may or may not have been associated with dropsy. The dropsy, if present, usually passes away, and for a time the only evidence of incomplete recovery is to be found in the condition of the urine. In some few cases, the disease comes on as an insidious chronic malady, and it is impossible to determine either the date of its commencement or its probable cause. It is not unfrequently a result of, or, to say the least, it is often associated with, an excessive consumption of food and of alcoholic stimulants, with consequent dyspepsia. In cases thus originating, the approach of the disease is gradual, insidious, and often unsuspected until it has reached an advanced stage. The disease occurs at all ages from infancy to extreme old age. I have seen it fatal at the age of seventy-five. Beyond childhood, it is more common in males than in females—probably because males are more exposed to cold, and more intemperate, than the other sex. This form of disease has, as a rule, a more protracted course than any other form of Bright's disease; and for a period of years it may be unattended by any obvious symptoms apart from the indications afforded by the urine. A patient recovers from the dropsy and other symptoms of acute Bright's disease; he feels and declares himself to be quite well; but the urine shows that recovery has not been complete. The urine may for a long time be normal in quantity, colour, and specific gravity; but it contains albumen, varying in amount from a mere opalescence, with heat and acid, to a dense and copious precipitate; the albumen being usually more copious after food and exercise. The urine, placed in a conical glass, may remain quite clear, and show no appearance of tube-casts or renal epithelium; or it may either occasionally or constantly deposit a light cloud, in which are found small hyaline casts, in some of which a few oil-globules may perhaps be seen, while others contain an epithelial cell or two, or some fragments of cells. This condition of urine may continue with little or no change for many months, and even for several years, before there is any indication that the general health is suffering from the state of the kidneys. The scarlet fever-poison and its products, which originally excited the acute renal disease, have passed away, a certain amount of injury having been inflicted upon the kidney, from which it has not recovered; but there is, up to a certain period, no progressive disease of the gland. The convoluted tubes have been left enlarged; the cortex probably has a somewhat anæmic and mottled appearance, resulting from compression of the intertubular capillary network by swollen tubes. This compression of the intertubular capillaries to some extent impedes the circulation; there is consequent engorgement of the Malpighian capillaries, and hence a transudation of serum into the tubes, which, mingling with the urine, renders it albuminous. This explanation of the albuminuria will readily be understood by a reference to Fig. 1 in my first lecture. Its mode of production is analogous to that of the albuminuria and the hæmaturia which Dr. George Robinson first, and Frerichs and others since, have produced in rabbits by putting a ligature on the renal vein. In addition to this mechanical hindrance to the passage of blood, it is not improbable that, as a result of acute Bright's disease, the Malpighian capillaries may undergo some physical change, which for a time, or even permanently, favours the transudation of serum through their walls. After a variable period of months or even years, the albuminuria may at length cease, and the cure is complete; but persistent albuminuria, or the state of kidney which gives rise to it, involves, sooner or later, serious structural changes in the kidney, and, as a result of these changes, some of the secondary results of renal degeneration. The state of things which results from persistent albuminuria following the incomplete cure of acute Bright's disease, is analogous to that which occurs when acute endocarditis has passed away, but has left a thickened and defective valve. For a time, hypertrophy of the heart's walls compensates for the imperfect valve, and the circulation appears to be unimpeded; but there is a limit to this conservative process. At length, the muscular tissue of the heart ceases to respond to the increasing demands which are made upon it, and it undergoes degenerative changes, the circulation flags, and the serious trouble begins. In like manner, for an indefinite time, the urine, although more or less albuminous, is freely secreted, and contains its due proportion of solids to liquid, there being no indication or symptom of defective secretion.

Sooner or later, however, the urine loses its natural sherry-colour, and gradually becomes paler. The secretion is less copious. The specific gravity rises. With a scanty secretion, it may be as high as 1020, or even 1030; but, with a more copious secretion, it may be as low as 1010. By this time, probably, the sediment in the urine will have become more copious; and it may contain small hyaline and oily casts and cells in considerable numbers. These appearances indicate with absolute certainty that, in some of the uriniferous tubes, the gland-cells are undergoing fatty transformation; and the kidney will present, after death, those small yellow spots of fatty degeneration to which I just now referred.

The kidney has now passed from the first stage of a simple large white kidney to the second stage—namely, that of a granular fat kidney; and the disease is usually fatal in this stage; but it may pass on to the third stage of contraction and atrophy, with coarse granulations on the surface, the small yellow fat granulations being still visible. This stage is indicated by the appearance of large granular and large hyaline casts in the urine. The large size of these casts shows that they were moulded in tubes which have been deprived of their lining of gland-cells. The destruction of the gland-cells is followed by atrophy of the gland; and the amount of urinary sediment containing the large granular and large hyaline casts is an index of the rate at which the disease is making progress. The granular casts in part consist of disintegrated epithelium, while some result from disintegration of the fibrous material of which the hyaline casts are composed.

I have in many instances traced the transition from acute to chronic disease; and in chronic cases I have traced, by the microscopic appearances and other physical changes in the urine, the successive stages of a large white smooth kidney, a granular fat kidney, and, lastly, a contracted and coarsely granular kidney. This sequence of events occurred in a case the later stages of which are illustrated by Figs. 25, 26, and

27. The disease began in a man aged 23, as an acute attack, in October 1846. It passed into a chronic stage, with oily casts and cells, which continued for a period of nine years. Then the oily casts and cells were mixed with, and afterwards replaced by, large granular and large hyaline casts. Death occurred from uræmia in October 1856, ten years after the onset of the disease. The kidneys were pale, had many yellow fat granulations in the cortex, and were much atrophied, their combined weight being only $7\frac{1}{2}$ ounces. Their appearance is represented by a chromo-lithograph illustrating a paper of mine in the forty-second volume of the *Medico-Chirurgical Transactions*. The microscopic specimens from which Figs. 25, 26, and 27 are taken, retain their characteristic appearances after an interval of seventeen years; and they are placed for your inspection beneath the microscopes on the table.

Morbid Anatomy and Pathology of the Kidney.—When death has occurred before oily casts and cells have appeared in the urine, the kidneys will be found in the first stage of degeneration—that is, large, white, and smooth on the surface. The weight of each kidney may be from seven to ten ounces. The cortical portion is increased in thickness, and appears more or less anæmic; while the medullary cones are pink and vascular. The lobular markings on the surface, which are in fact the radicles of the renal vein, are more or less obliterated, so that perhaps there remain only a few isolated vascular patches, as represented in Dr. Bright's fourth plate. Rarely some hæmorrhagic spots are scattered over the surface or through the substance of the cortex. The capsule readily peels off, and leaves a smooth surface. On a microscopic examination, the greater number of the convoluted tubes present no other change than that of being larger and more opaque than usual. The epithelium is unusually granular and opaque, and apparently contains a more than ordinary amount of solid matter; while the central axis of the tube is lighter than the margins, and free

from deposit or accumulation. The appearance of the tubes is precisely the same as that which I described in cases of acute Bright's disease unassociated with epithelial desquamation (see *ante*, Lecture II, Fig. 12). In some tubes, the central canal contains the fibrinous material which appears in the urine in the form of small hyaline casts. The hæmorrhagic spots, when present, are seen to be convoluted tubes filled with blood from ruptured Malpighian capillaries (see *ante*, Fig. 11). The Malpighian capillaries usually have their walls more or less thickened and opaque, and they often have a wax-like appearance. The muscular walls of the minute arteries are sometimes hypertrophied; but hypertrophy is not constant in this stage of the disease. As a rule, the hypertrophy of the arterial walls bears an inverse relation to the general enlargement of the kidney. I shall presently suggest an explanation of this fact. The intertubular capillaries and veins present no structural change, but they are much compressed by the enlarged tubes; and this explains the disappearance of the lobular markings from the surface of the kidney. The enlargement of the cortical portion of the kidney is mainly a result of a kind of hypertrophy of the gland. Many of the tubes are certainly enlarged, and their epithelium is unusually opaque and bulky. The transverse sections of many tubes have twice the normal diameter, and these large tubes must contain an increased number of secreting cells. This increase in the diameter of the secreting tubes is analogous to the increased thickness of fibre in a growing and hypertrophied muscle. When one kidney has been destroyed by disease or accident, as by the impaction of a calculus in the ureter, the other does double work, and, in so doing, doubles its size, without undergoing structural change; the gland is simply hypertrophied. The pathological enlargement of the kidney is like this, but with a difference. When acute Bright's disease leaves such an amount of

Tube-casts at three successive periods of the same case.

Fig. 25.—Period of Fatty Enlargement of the Kidney.

Fig. 26.—Commencing Atrophy and Contraction.

Fig. 27.—Advanced Atrophy and Contraction. *a a a a*. Oily Casts and Cells. *b b b b*. Granular Casts. *c c c c*. Large Hyaline Casts.— $\times 200$.

swelling of tubes and consequent impediment of the circulation as interferes with the prompt and complete excretion of urine, there will continually be some excess of retained urinary products in the blood; and this accumulation of urinary excreta will act as a stimulus to increased growth and development of glandular tissue. For the tissues in question may be said to feed upon those materials for which they have a special affinity; and the growth of a gland is in proportion to the amount of the materials for its proper secretion with which it is supplied by the blood.

The hypertrophy goes on up to a certain point, and then a process of atrophy begins. The commencement of this is indicated during life by the appearance of oily casts and cells in the urine; and then, after death, the kidneys are found in the second stage—namely, that of fatty granulation, as before described, and as represented in Fig. 3 of Dr. Bright's third Plate.

These yellow specks are usually numerous in the cortex, but are never seen in the cones. Place a section of a yellow spot under the microscope, and you see that, as a hæmorrhagic spot is a convoluted tube filled with extravasated blood, this yellow speck is a tube filled with oil, mostly within cells, but partly loose. It is evident that, in this stage, the epithelium in certain sets of tubes has undergone fatty degeneration (See Fig. 28.) The fatty nature of the material is

Fig. 28.—A Yellow Speck or Granulation magnified 100 diameters, and thus shown to be a Convoluted Tube, with its contents in a state of Fatty Degeneration. — $\times 100$.

proved by its solubility in ether, and by the smaller particles fusing and forming larger globules when gently warmed. The probable explanation of these spots of degeneration is, that the swollen tubes so compress the intertubular capillaries, and thus impede the circulation, that the nutrition of the tubes is impaired, and their cells undergo the fatty degeneration. The phenomena are analogous to the softening, with fatty transformation of the brain-tissue, as a result of embolism in a cerebral artery. They also resemble the circumscribed patches of fatty degeneration of the muscular walls of the heart consequent on obstruction of branches of the coronary artery distributed to the diseased parts. (See, upon this point, Dr. Quain's classical paper on Fatty Degeneration of the Heart, *Med.-Chir. Trans.*, vol. xxxiii, p. 147.)

But the degenerative changes may proceed further, and lead to a rapid disintegration of the gland-cells, and their replacement by unorganised fibrine. This change is indicated during life by the appearance of large-sized granular and hyaline casts in the urine (see Fig. 27), and after death by some of the tubes being filled with the same materials. These destructive changes in the gland-cells explain the atrophy and the granular contraction of the kidney in the third stage of the disease. I may mention here that a large white kidney, the result of acute Bright's disease, sometimes passes on into the stage of atrophy with a coarsely granular surface, without going through the intermediate stage of fatty degeneration. This I know to be a fact, from close observation of the urine during life, and a comparison of its microscopic characters with the appearances in the kidney after death. In such cases, you may find here and there microscopic evidence of fatty degeneration within a tube; but the change is so slight as to be invisible by the unaided eye. No fatty granulations appear upon the surface or on a section of the gland. In the more advanced stages of this chronic disease, more especially in the stage of atrophy, the muscular walls of the arteries are almost always more or less hypertrophied. The explanation of the fact which I just now mentioned—that, as a rule, there is an inverse relation between enlargement of the kidney and hypertrophy of the arterial walls—is, that up to a certain point the increased growth of the glandular tissues obviates the necessity for that stop-cock action of the minute arteries which occurs when the glandular tissue is wasting, and which results in hypertrophy of the arterial walls, as I explained to you in my last lecture. The rule is, that the arterial hypertrophy commences when the glandular hypertrophy ceases, and is

succeeded by atrophic changes in the gland-cells and tubes. The Malpighian capillaries are usually more thickened, glistening, and wax-like, than in the earlier stages of the disease. This apparently is a result of the continued transudation of albuminous and fibrinous materials through their walls, and their consequent infiltration with these products.

We occasionally find that the walls of some of the renal arteries have undergone a peculiar change which gives them a homogeneous wax-like appearance. I shall hereafter describe and explain this form of degeneration in connexion with lardaceous disease of the kidney. In the stage of atrophy and contraction, some convoluted tubes may be seen denuded, some being contracted, and others dilated. These appearances are the same as are found in the small red kidney. In the advanced stages of the disease, too, the basement-membrane of some of the tubes and the capsules of the Malpighian bodies are somewhat thickened, but less decidedly and constantly than in the contracted granular kidney.

[To be continued.]

ABSTRACT OF THE GOULSTONIAN LECTURES ON ELEPHANTIASIS GRÆCORUM.

Delivered at the Royal College of Physicians, 1873.

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LECTURE I.

ELEPHANTIASIS GRÆCORUM, or true leprosy, is a disease that has existed from prehistoric times down to the present day, and has been aptly described by a traveller of the seventeenth century as a "distemper so noisome, that it might well pass for the utmost corruption of the human body on this side the grave."

Leprosy may be briefly defined as an incurable constitutional disease of young adult life, which is especially prevalent in tropical and sub-tropical countries. It is met with in three principal forms. First, macular leprosy, characterised by an eruption on the skin, accompanied by anæsthesia; secondly, anæsthetic leprosy, of which the chief features are, anæsthesia and discolorations of the skin, and atrophy of the muscles, with ulceration and mutilation of the hands and feet. The third form, or tuberculated leprosy, is constitutionally the most severe, and is characterised by a bronzing and tuberculated thickening of the skin, especially of the face, ears, hands and feet, followed by similar changes in the mucous membranes of the upper part of the alimentary and respiratory tracts, ending fatally in from two to fifteen years, by intercurrent disease in some vital organ.

It is to this disease that I have the honour to direct your attention in the present course of lectures. In dealing with this subject, which is very extensive, I find that it is impossible to do more than to give a slight sketch of the history, geographical distribution, etiology, and pathology of leprosy.

The present lecture will be chiefly devoted to an account of the history of the disease in Europe, during the Middle Ages, with a very brief notice of Jewish leprosy.

In the second lecture, I shall discuss the geographical distribution of the disease at the present day, in particular countries, with reference especially to the external circumstances of climate, soil, and the occupations of the inhabitants of those countries or districts, and other points connected with the etiology of the disease.

In the third lecture, I propose to give a sketch of the clinical features and morbid anatomy of the malady.

The nomenclature of leprosy or elephantiasis, and the confusion of names which arose from combining the Arabian and Greek literature, has often been explained; I shall, therefore, touch upon it but very slightly.

Hippocrates and the old Greek writers employed the name *lepra* (λεπρά) to designate patches on the skin covered with white rough scales, exactly corresponding to our psoriasis. True leprosy was at that time unknown in Greece, and therefore it did not attract much attention, it was to the early Greek writers only a matter of hearsay.

In the time of Aretæus, however, leprosy had appeared in South-Eastern Europe, and was accurately described by him as a disease with which he was personally well acquainted under the name of *leon-*