LECTURES

ON THE

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

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LECTURE II.—ON ACUTE BRIGHT'S DISEASE.

Synonyms.—*General Symptoms.*—*Microscopic Appearances in the Urine.*—*Morbid Anatomy of the Kidney.*—*Physiology of the Morbid Process.*

I HAVE told you that the first great division of cases of Bright's disease is into acute and chronic, and I now proceed to give you the pathological history of acute Bright's disease. The synonyms for acute Bright's disease, given in the *Nomenclature* of the Royal College of Physicians, are "acute albuminuria", "acute desquamative nephritis", and "acute renal dropsy". The renal disease associated with dropsy, which often occurs in connexion with scarlet fever, may be taken as a type of acute Bright's disease. I will first give you a sketch of the ordinary course of this form of disease, and I will then point out to you the chief varieties and modifications of the malady.

The attack is usually ushered in by a sense of chilliness, which may amount to actual rigors; a quick and throbbing pulse, a hot and dry skin, a dry and coated tongue, thirst, loss of appetite, pain in the back and limbs, headache, and restlessness. In some cases, frequent vomiting occurs at the commencement of the attack. In most instances, dropsy is a very early symptom; the patient's attention, or that of his friends, being arrested by an appearance of unusual pallor and puffiness of the face, and especially of the eyelids; the swelling soon becomes general, affecting the subcutaneous areolar tissue throughout the body, and often one or more of the serous cavities. The urine is at this stage more or less scanty, occasionally almost or even altogether suppressed; usually it is dark-coloured from admixture with blood, the colour varying from a slight smokiness to a deep blood tinge, and it contains so large an amount of albumen as to become nearly solid with heat and nitric acid. The specific gravity varies considerably, being as often above as below the normal point. There is usually more or less pain and tenderness in the loins; the pain is sometimes, though rarely, severe, and occasionally it extends to the inside of the thighs and to the testicles. There is frequent desire to pass urine, and sometimes a sense of pain or scalding in the urethra. There is often more or less of uneasiness in the epigastrium, with flatulent distension of the stomach, especially after food, and nausea and vomiting are of common occurrence. In some cases, inflammation of one or more serous membranes—the pleura, the pericardium, or the peritoneum—occurs, or respiration is impeded by an oedematous or an inflammatory effusion into the pulmonary air-cells and the smaller bronchi; or the head-ache, which is often present from the commencement, becomes more severe, and is followed by one or more attacks of convulsions, from which the patient may recover, or which may be followed by fatal coma.

When the progress of the disease is favourable, one of the earliest signs of amendment is an increased secretion of urine. It may be that for some days only a few ounces of urine have been passed in the twenty-four hours; it soon becomes more copious, of paler colour, of lower specific gravity and less albuminous, and the amount secreted may be as much as from four to six pints, the dropsy meanwhile diminishing daily. After an interval, varying from a few days to a month or more, the secretion of urine is reduced to the normal amount, the sediment diminishes and at length disappears, the urine gradually resumes its normal colour and ceases to be albuminous. At any time during the convalescence, there may be a temporary increase of blood and albumen, with a diminished secretion of urine and a return of dropsy, if the congestion of the kidneys be increased by exposure to cold or by errors of diet. In most cases, the dropsy disappears for days, and even for weeks or even months, before the urine has ceased to be albuminous; and in some cases, although the dropsy and the pallor of the skin pass away, the urine remains albuminous, and the renal disease passes into a chronic form.

Acute albuminuria is sometimes unassociated with dropsy from its commencement to its termination. The terms "acute albuminuria" and "acute renal dropsy" are, therefore, not strictly synonymous.

Microscopic Appearances in the Urine.—A portion of the urinary sediment in the early stage of acute Bright's disease, being placed under a quarter-inch object-glass, presents very characteristic appearances. The most striking objects are solid cylindrical moulds of the uriniferous tubes. The basis of all renal tube-casts is fibrine which has coagulated within the uriniferous tubes, but these casts assume various appearances according to the nature of the products which they contain and the condition of the tubes in which they have been moulded. The cases which are most characteristic of acute Bright's disease are "epithelial casts" (fig. 6). These casts contain gland-cells evidently derived from the

Fig. 6.—*a a* Epithelial Casts. Casts of the Uriniferous Tubes entangling Renal Epithelium and Blood-corpuscles. *b*. Scattered Renal Gland-cells and Blood-corpuscles. *c*. Pavement-epithelium from the Vagina. This is broader, flatter, and less granular than the renal epithelium.— $\times 200$.

convoluted tubes of the cortex; they also entangle blood-corpuscles, and some casts are entirely composed of coagulated blood; these are called "blood-casts" (fig. 7). Together with the tube-casts, many scattered

Fig. 7.—Blood-casts composed of Fibrine entangling Blood-discs.— $\times 200$.

renal gland-cells and blood-discs may usually be seen. In addition to the epithelial and blood-casts, we find in most cases of acute Bright's disease some small and large hyaline casts (fig. 8). The difference be-

Fig. 8.—Small and large Hyaline Casts composed of pure Fibrine.— $\times 200$.

tween a small and a large hyaline cast is readily explained by referring to fig. 2 in my previous lecture. The small casts, which are composed of pure fibrine, are moulded within the canal formed by the gland-cells, which retain their normal position within the uriniferous tubes; the

large casts, on the other hand, are formed within tubes whose gland-cells have been removed. The diameter of these casts, therefore, is about twice that of the small casts, and equals that of the tubes whose basement-membrane constitutes the mould in which they have been formed. The larger casts may be simply hyaline, or they may entangle here and there a cell-nucleus or the fragment of a cell.

In cases of acute Bright's disease, the small hyaline casts are often present in considerable numbers, while the large hyaline casts are usually less numerous, and may be entirely absent. On the other hand, there are unquestionably acute and curable cases in which the large hyaline casts are most numerous. When the disease has lasted beyond a month or six weeks, we find often in adults, more rarely in children, that more or less oil begins to appear in the tube-casts and in the desquamated renal epithelium. The appearance of oily cysts and cells (fig. 9) excites less alarm now than it formerly did.

Fig. 9.—Oily Casts and Cells.— $\times 200$.

It indicates that in certain parts of the kidney the secreting cells and the inflammatory exudations are undergoing fatty transformation; but I have seen many cases of complete recovery after oily cysts and cells in great numbers had appeared in the urine continuously for many weeks.

Morbid Anatomy of the Kidney.—When acute Bright's disease (acute desquamative nephritis) has proved fatal, both kidneys are found diseased; they are enlarged and their weight is increased, each kidney weighing from six to eight ounces, or even more. The increased weight of the kidney is partly due to infiltration with serous fluid; the tissues contain an excess of water in proportion to solids; the capsule readily peels off the surface, which is smooth and mottled, presenting an irregular combination of red vascular engorgement, with anæmia and pallor. The fine lobular divisions formed by the minute venous radicles on the surface are more or less obliterated. Some of the stellate veins are much enlarged and distended. Here and there appear spots of hæmorrhage—some of the size and shape of a pin's head, others irregular in form. On section, there appears a marked distinction between the cortical and the medullary portions: the former presents the same mixture of congestion and anæmia as appears on the capsular surface; the spots of ecchymosis, too, are here visible, but they sometimes take a linear course, especially near the base of a medullary cone. The cones are much darker than the cortex, as if from venous congestion. They appear to be compressed by the swollen portions of the cortex which pass between them, while the bases of the cones are expanded and spread out into the cortical portion, thus having, as Rayer suggested, the form of a wheatsheaf. The mucous membrane of the pelvis of the kidney, and occasionally that of the ureter, is more or less congested.

A microscopic examination of the kidneys shows that the morbid products are contained within the convolution-tubes of the cortex. Most of the tubes are abnormally opaque, in consequence of being filled with epithelial cells which have been formed within them and thrown into their cavity (fig. 10). The tubes are crowded with these cells in different degrees; some being stuffed full, while in others there is little or no evidence of desquamation having occurred, there being only a single layer of epithelium on their walls, and this being quite normal, or appearing more than usually opaque, granular, and swollen. This condition has been called the "cloudy swelling" of the epithelium. The most crowded tubes are usually found in those portions of the cortex

which to the naked eye appear pale and anæmic. In these parts the intertubular capillaries are compressed and emptied by the distended and swollen tubes. Occasionally, in examining a section of the tubes,

Fig. 10.—Sections and Knuckles of Tubes rendered opaque by their accumulated contents. A Malpighian body near the centre more transparent than the surrounding tubes.— $\times 200$.

portions of their contents, being squeezed out, present exactly the appearance of the "epithelial casts" which have been before described as existing in the urine.

The hæmorrhagic spots before spoken of, as appearing here and there on the cortical surface and on the face of a section, are seen to be tubes injected with blood which has flowed into them from ruptured Malpighian capillaries (fig. 11). In some tubes, the epithelium is found

Fig. 11.—Malpighian Capsule and Convoluted Tube—the former partially, the latter completely filled with blood from ruptured Malpighian capillaries—thus forming a hæmorrhagic spot in the cortex of the kidney.— $\times 45$.

to contain more or less oil. Most of the straight tubes of the cones appear to be quite normal, while others are opaque and filled with cells more or less disintegrated, which seem to have been washed into them from the convoluted tubes. There is no evidence that the epithelium of the straight tubes has been morbidly changed.

Some Malpighian bodies are of a deep red colour, with fully injected capillaries; more frequently, however, the Malpighian capillaries appear of a lighter colour than the surrounding opaque tubes; their walls are more opaque than in the normal state, and their surface often appears rough and finely granular, as if from the coagulation upon them of some of the fibrinous materials which have transuded through them during life. The nuclei in the walls of the capillaries are abnormally conspicuous. Occasionally, as I have before mentioned, there is evidence of rupture of the capillaries, in the fact that the capsule and the adjoining tube are filled with extravasated blood. (See *antea*, fig. 11.)

Physiology of the Morbid Process.—The morbid anatomy of this form of Bright's disease being such as I have described it to be, it remains that we attempt a physiological explanation of the phenomena. I say a physiological explanation, because I wish to impress upon you that these morbid phenomena are modifications of normal physiological processes which admit of explanation only by reference to physiological principles. The structural changes in a kidney affected with Bright's disease are the result of a modified process of secretion. The cortical or secreting portion of the kidney is obviously the part which is chiefly affected, and a microscopical examination shows that the gland-cells which line the convoluted tubes are the structures primarily and essentially affected. The secreting cells of the kidney, like those

of other glands, have the power of separating from the blood and discharging from the body not only the constituents of their own proper secretion, but also other materials foreign to that secretion. Many salts and many odorous and colouring matters, when introduced into the circulation through the stomach, are speedily and completely eliminated through the kidneys, apparently without causing structural change or inconvenience. We do not hesitate to give for weeks or even months consecutively large doses of such medicines as iodide of potassium, a salt which is known to be largely eliminated by the kidneys. It is, however, important to observe that certain materials, which when secreted by the kidneys in moderate quantities for a short time are quite harmless, may cause decided structural change by their long continued secretion in larger quantities. We have an instance of this in the case of diabetes. Diabetes is not primarily a disease of the kidney, but kidney-disease is a frequent result of diabetes—indeed, healthy kidneys are rarely if ever found in subjects who have died of diabetes; and the probable reason is, that the long-continued secretion of large quantities of sugar so alters the secreting cells of the kidney, rendering them granular, swollen, opaque, and oily, that at length they lose the power of secreting urine; the urine becomes albuminous, and complete suppression of the secretion is often the immediate cause of death. Again, when in consequence of obstruction of the gall-duct, or other disease or accident, causing an accumulation of bile in the blood, bile-products in large quantities are secreted by the kidneys, desquamated renal epithelium, tube-casts, and sometimes albumen, are found in the urine. The excretion of these new products sometimes causes a mild form of desquamative nephritis. I refer to these facts to illustrate a physiological principle. It is certain that neither renal gland-cells nor tube-casts are ever found in normal urine, and it is highly probable that the desquamative process never occurs in the kidney except as a result of the excretion of some abnormal materials by the gland. It will scarcely be denied that scarlet fever is associated with a blood-poison. This poison does not always and of necessity implicate the kidneys, as in the vast majority of cases it affects and inflames the skin; but we know from abundant experience that the risk of renal complication is greatly increased by exposure of a patient to cold while the rash of scarlet fever is out, or even while the skin is desquamating after the disappearance of the rash. It would seem that by exposure to cold the cutaneous inflammation and desquamation are suppressed or checked, and an analogous morbid process is set up in the uriniferous tubes of the kidney. That a poison is thrown off from the skin of a scarlet fever patient, and that the poison is contained in the epidermic scales, we have very good reason to believe; and analogy renders it in the highest degree probable that the implication of the kidneys is associated with the excretion of a morbid poison by their gland-cells. The morbid phenomena result from a modified physiological function. This explanation can scarcely be considered hypothetical; it appears to be the obvious interpretation of unquestionable facts. Meanwhile, the modified cell-growth within the kidney chokes and distends the tubes with desquamated epithelium, the circulation through the gland is impeded, the secretion of urine is checked, and urinary constituents, both liquid and solid, accumulate in the blood. The circulation of urinous blood causes general febrile excitement, with a quick and throbbing pulse, usually a more or less extensive dropsical effusion, and in some cases inflammation of the serous membranes or of other tissues, or serious disorder of the cerebro-spinal functions.

When under favourable circumstances the morbid poison which excited the renal disease has been eliminated, or in part, perhaps, decomposed, the desquamation of epithelium ceases, the secretory process again becomes normal, the urine is copiously secreted, the blood and the tissues are then freed from retained impurities, and from excess of water.

The copious flow of urine which occurs during convalescence from acute Bright's disease is thus explained: during the acute stage of the disease, the constituents of the urine, both solid and liquid, have accumulated in the blood, and have thence been effused into the areolar tissues and into the serous cavities. Now, urea is a most powerful diuretic: when injected into the veins of a dog, it quickly excites an abundant flow of urine; and as soon as the circulation through the kidney again becomes free, the retained urea exerts its natural diuretic influence upon the gland. The accumulated water serves as a vehicle for washing out the urea, and the copious flow of urine thus induced speedily removes the retained urinary solids and water from the blood, the areolar tissue, and the serous cavities into which they had been effused, and thus the dropsy is removed.

This abundant flow of urine, in favourable circumstances, takes place without aid from diuretics or drugs of any kind. I have seen it occur while only a bread-pill or coloured water was given as a placebo.

[To be continued.]

NOTES AND OBSERVATIONS ON DISEASES OF THE HEART AND LUNGS.

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THE more manifest examples of a deficient systolic impulse of the heart in connection with physical disease have been reviewed. These being eliminated from the inquiry, it remains to consider when the existence of a deficient impulse is dependent solely on functional disorder, and whether as such it have hostile tendencies, or may be considered as entirely free from them, affording assurance of danger neither to life, nor threatening future injury to the heart itself; and, finally, it remains to consider when such deficient impulse is proper to the individual, and consistent with a sound and healthy condition, present and prospective.

Those in whom a feeble impulse occurs as a functional disorder are, irrespectively of sex, usually of the leucophlegmatic temperament. This feeble impulse is met with, in both sexes, chiefly amongst those whose distinctive mental quality is that of being unimpassioned, and who are constitutionally prone to that form of indigestion characterised by cold and clammy extremities. The physical signs, on examination of the heart, are very negative. The impulse, though weak, may be excited by exertion to a more powerful action, and even to throbbing, without any sensation of distress, and although it be, as is most probable, accompanied by an acceleration of the breathing. When the heart is thus excited to unusual action, it will be found that the sounds are more audible and somewhat altered in quality—the first sound suggesting, rather than being of, a sharp ringing tone, while the second is prolonged, and perhaps reduplicated; still, they are less sonorous and distinct than in weak impulse from dilatation. The general symptoms marking this disordered condition are flatulent dyspepsia, anorexia, perhaps a depraved appetite, a foul breath, with tendency to constipation; indifference to exertion, both mental and bodily; a general languor, with lowness of spirits, passing at times into a distressing despondency; shortness of breath upon exertion; and, in extreme cases, a marked liability to oedematous swellings, not only of the feet and ankles, but of the face and the person generally. Where this state occurs in females of the hysterical constitution, there may be super-added a tendency to faint—a casualty which is somewhat unusual in these cases. This disordered condition is not in itself dangerous, and is certainly very amenable to general and medical treatment; nevertheless, the neglect of its indications may lead to grave physical complications. In its simple form it is to be regarded as a blood-disease, rather than an affection of the heart.

Exercise, both of the mind and body, though at the time it may seem to increase some of the symptoms, by inducing exhaustion, is for the most part beneficial, and should always be enjoined. The dyspeptic tendencies must be sedulously counteracted by a well regulated diet, with the occasional administration of such ferruginous tonics and aloetic and other deobstruents as the system will bear.

In the instances in which a feeble impulse appears to be the normal condition of the individual, it will generally be met with—perhaps more frequently in females than in males—in those of slight make, disposed to be of or above the average height, having good but moderate appetites, and enjoying an even good health. They do not appear generally capable of great mental or physical efforts, and they rarely or never engage in violent or prolonged exertion—the quiet regular walk being esteemed to be exercise sufficient. If by any unaccustomed effort the heart's action be accelerated, it is unaccompanied by any very continued, exhausting, or painful disturbance of the breathing, and there is certainly no undue tendency to fainting. They usually present fair mental qualities, with remarkably easy even tempers, not easily roused to excitement; of good but quiet tastes, being aesthetically rather than animally disposed, finding their pleasures in the enjoyment of scenery and the cultivation of the fine arts—in books, music, or painting. They are often good instrumental musicians: they pass through life amiably and agreeably, without ambition, and neither achieve nor even plan any great designs.

In reconsidering the preceding illustrations of a diminished and feeble impulse, can we feel, without being too didactic, that approach has been made, by aid of the physical indications, to the accurately and surely distinguishing that which depends on diseased and urgent conditions from that which has its origin in natural and harmless causes? In the former, it has been shown, there are not only the signs of the diseased conditions themselves, but, for the most part, the more the heart is thus impaired, whether this be from dilatation, from