A Course of Lectures ON URINE, URINARY DEPOSITS, AND CALCULI.

DELIVERED AT THE PATHOLOGICAL LABORATORY,
DURING THE SESSION 1857-58.

BY

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LECTURE IX.

[Concluded from page 871.]

CASTS OF THE URINIFEROUS TUBES.

Casts of the Renal Tubes are seldom found unmixed with other deposits. Frequently they are accompanied with much epithelium, and in many cases blood-globules are present in considerable number. Occasionally, however, we meet with a transparent and scarcely visible deposit, consisting entirely of casts. The connexion between different renal diseases and the presence of casts in the urine has been demonstrated most conclusively by Dr. Johnson; and for extended information on this subject, I must refer you to his well known work *On Diseases of the Kidney*. I shall here only attempt to draw your attention to the microscopical characters of those forms of casts which you are most likely to meet with in examining urine.

Of casts there are several different forms, which are to some extent characteristic of the morbid changes taking place in the structure of the kidney. At the same time, we must not express ourselves confidently, if only one or two casts of a particular kind are found. Thus we may meet with in the deposit of the urine from acute cases, which completely and perhaps rapidly recover, one or two cells containing oil, and one or two casts containing a few oil-globules; but we must not, from the presence of these, be led into the error of concluding that the case is necessarily one of fatty degeneration of the kidney. If, however, there were numerous cells and casts containing oil, such an inference would undoubtedly be correct. We must not expect to find in one case *epithelial casts* alone, in another *granular casts* alone, in a third *fatty casts* alone, in a fourth none but *large waxy casts*, and so on; but we must be prepared to meet with several varieties in one case, and must ground our opinion in great measure upon the relative number of any particular kind of cast, and upon the circumstance of other deposits being associated with the casts. For instance, the presence of uric acid crystals and blood-corpuscles would render it very probable that the case was acute, and of short duration. The absence of these deposits, and the presence of a number of granular or perfectly transparent casts, which can only be seen when the greater part of the light is cut off from the field of the microscope, or the existence of a number of *oil-casts*, render it certain that the case is chronic. The former would indicate that the kidney was becoming small and contracted, while the latter variety of casts occur when it is often of large size and fatty. Such examples might be multiplied. When we consider how very numerous the secreting tubes of the kidney are, we cannot feel surprised that a different condition should exist in certain cases, in different tubes, at the same time; and, from careful *post mortem* examinations, we know that very different morbid appearances are often seen in different parts of the cortical portion of one kidney. It is not difficult, therefore, to account for the fact of the presence of

casts differing much in their diameter and characters in the same specimen of urine.

As has been shown, the cast varies in diameter with that of the canal of the uriniferous tube; but probably, after its formation, it contracts slightly, and in consequence it readily passes from the tube, and escapes into the urine. If the epithelial layer on the basement membrane of the tube be of its ordinary thickness, we shall have a cast of medium size. If the cells be enlarged, and adhere firmly to the basement membrane, the cast will be fine and narrow; while, on the other hand, if the tubes be entirely stripped of epithelium, the basement membrane alone remaining, the diameter of the cast will be considerable. In describing the different varieties of casts, it will be convenient to divide them into three classes, according to their diameter.

You will find numerous figures of the various forms of casts in the *Illustrations of the Urine, Urinary Deposits, and Calculi*, Plates xiv, xv, xvi, xvii, and xviii. These figures have been traced, from the objects under examination, upon the stone from which the plates have been printed.

The first class of casts, which is by far the largest, will include casts of medium size; the second, those of considerable diameter; and the third will comprehend the smallest casts that are met with.

A. Casts of medium diameter, about the 1-700th of an inch.

1. Epithelial casts.
2. Pale and slightly granular casts, with or without a little epithelium, or epithelial debris.
3. Granular casts, consisting entirely of disintegrated epithelium.
4. Casts containing pus or blood.
5. Casts containing oil.

B. Casts the diameter of which is about the 1-500th of an inch.

1. Large transparent "waxy casts".
2. Large and darkly granular casts.

C. Casts the diameter of which is about 1-1000th of an inch. Small waxy casts.

A. Casts of Medium Diameter.

Epithelial Casts are met with in great number in cases of *acute nephritis*; and their presence is generally accompanied with a considerable deposit of uric acid, and also with much free epithelium and epithelial debris. These casts often contain many perfect cells of renal epithelium, and not unfrequently blood-globules are entangled in them. (*Illustrations*, Pl. xiv, Fig. 1; Pl. xv, Fig. 1 a.)

Besides these casts, however, some of the larger casts, comprehended in the second class, may often be observed; and these have, as Dr. Johnson states, "a wax-like appearance"; or they may be dark and granular, or part of the cast may be so highly granular as to be quite opaque, while in another portion it may be perfectly clear and transparent. Sometimes also a few of the small "waxy casts" may be observed, and rarely a few of the cells may be found to contain well defined oil-globules.

Casts containing Dumb-Bells. In the urine of a patient suffering from cholera, after eighteen hours suppression of urine, I found a trace of albumen, with some very transparent casts entangling dumb-bell crystals of oxalate of lime. (*Illustrations*, Pl. xii, Fig. 1.) Octohedral crystals of oxalate were also present in the urine; but none were to be seen in the casts.

Crystals of triple phosphate and octohedra of oxalate of lime are sometimes met with in casts. Not unfrequently perfectly dark casts are observed. The opaque appearance is due to the presence of urate of soda, which is proved by the fact of the casts becoming perfectly transparent upon applying a gentle heat to the slide upon which the specimen is placed. (*Illustrations*, Pl. xiv, Fig. 4.) These casts appear white by reflected light.

In *chronic nephritis*, a considerable number of "granular

epithelial casts", of medium diameter, will be present in the early stage of the disease. In the second stage, the granular casts become more abundant, and often form a white deposit at the bottom of the vessel.

Dr. Johnson says that, in the third stage, there may be an abundant deposit composed of granular casts and disintegrated epithelium; or secondly, the granular casts may be mixed with large waxy casts, with a sharp and well defined outline; or thirdly, the waxy casts may be in small number, and mixed with a few granular casts and disintegrated epithelium. Casts from a case of chronic nephritis are represented in the *Illustrations*, Pl. xv, Fig. 2; Pl. xvii.

Casts containing Oil. In that condition of the kidney termed "fatty degeneration", the pale albuminous urine frequently contains a number of casts which appear to be made up of oil-globules, or composed of cells containing oil. In adults recovering from acute nephritis, it is not uncommon to find a few oil-particles in the casts, and cells crammed with small oil-globules floating in the surrounding fluid; but at the same time, if there be a greater number of granular or epithelial casts, the presence of the oil need not excite any apprehension for the patient's safety. If, however, on the other hand, the oil casts increase while the other casts diminish in number, we should probably find that the case would become one of confirmed fatty degeneration. The composition of the oil in these cases has been alluded to. (See *Illustrations*, Pl. xviii, Figs. 1 and 2.)

Fat-Cells. Besides the occurrence of fatty matter in casts, and in cells entangled in casts, it is very commonly met with in cells, in the urine; and occasionally these cells are present without any casts. They consist usually of epithelial cells of the kidney, enlarged and gorged with oil. Sometimes they contain a few oil-globules, which are well defined, and are seen to be distinct from each other; while, in other instances, the globules are very minute, and so crowded together that the cell appears perfectly opaque and dark, resembling the so-called inflammatory globules. Although I use the term *cell*, it is not possible in many cases to demonstrate the existence of a *cell-wall*. Occasionally, cells containing oil-globules may be derived from some other part of the mucous surface of the urinary passages. I have seen epithelial cells, and collections of oil-globules which have been removed from the membranous portion of the urethra. It is therefore important to bear in mind that cells containing oil-globules are occasionally met with in cases where the kidneys are not diseased.

Casts containing Blood-Globules are not unfrequently met with in the deposit of the urine in acute nephritis. They are usually of medium size, and often contain a certain quantity of epithelium. (*Illustrations*, Pl. xv, Fig. 1 b.)

Pus is very rarely found in casts, although some cells agreeing in character with the pus-globule, in the development of two or three little circular bodies in the centre when acted on by acetic acid, are not unfrequently observed. Cases in which the urine exhibits these characters are generally acute, and terminate fatally in a short time. A beautiful specimen of the urinary deposit in one of these rapidly fatal cases is represented in Plate xvi of the *Illustrations*. At the same time, I have seen two or three instances occurring in children where these casts and cells were most abundant, which have completely recovered.

B. Casts of considerable Diameter.

The *large waxy casts*, of about the one five-hundredth of an inch in diameter, are obviously derived from tubes which have been entirely stripped of epithelium; for under no other circumstances could casts of this diameter be formed. They are often met with in small quantity in the urine of acute desquamative nephritis; but when present in very large quantity, a condition of kidney to which Dr. Johnson has given the name of "waxy degeneration", from the peculiar glistening appearance of the substance with which the tubes are filled, is present. Large waxy casts are represented in the *Illustrations*, Pl. xvi, a and b.

In some cases, at least, it is certain that these casts of large diameter are formed in the lower part of the straight portions of the uriniferous tubes where these are very wide. Often it is evident that the material is deposited in successive layers. In Fig. 20, at a, such a cast is represented. Although in some cases the convoluted portion of the uriniferous tube is wide enough to admit of the formation of one of these large waxy casts, I have never seen an instance where the tubes between the cortical and medullary portion of the kidney were wide enough to permit them to pass through. There is evidence

that much of the material is in some cases deposited in the lower straight portion of the uriniferous tubes. (*Illustrations*, p. 39; *Archives of Medicine*, vol. i, p. 303.)

Fig. 20.—a. Large transparent waxy cast. The other two figures represent casts which have received a deposit upon their outer surface during their descent from the kidney, probably in the straight portion of the uriniferous tubes. X 215.

C. Casts of small Diameter.

The small waxy casts, on the other hand, are derived from tubes in which the epithelial lining is entire, and in which there appears no tendency for desquamation to take place—a condition to which the name of "*non-desquamative nephritis*" has been applied. The urine is either found to contain no deposit whatever, although albuminous, or only some of the small waxy casts, not more than one-thousandth of an inch in diameter, can be found. In some of these cases, symptoms of blood-poisoning come on, and a rapidly fatal result occurs. The casts have a perfectly smooth and glistening surface, and present in the microscope the same general appearance as a piece of the elastic lamina of the cornea. (*Illustrations*, Pl. xiv, Fig. 6.) It is probable that some of these very fine casts come from contracted tubes, and perhaps from tubes which have not attained their full development.

Of Casts in a clinical point of view. It is not too much to say that the treatment of renal disease has advanced within the last few years more than that of any other class of diseases. Frequently we are able to say most decidedly what course should be followed in a given case; and we are able to indicate exactly the conditions which will retard the progress of the malady, and to warn the patient of those which would certainly hasten the extension of disease. I do not think I have at all exaggerated the improvement which has taken place in this department of medicine; and when we reflect that we possess more positive knowledge of the anatomy and physiology of the kidney, and that its morbid changes have been more successfully investigated than those of other important organs, we can scarcely help attributing the improved treatment to our increased knowledge, and we have every encouragement to hope that ere long a similar result will be seen as distinctly in other branches of medicine. I am quite sure that many patients with chronic renal disease are now kept alive, and even enjoy life, for many years longer than was possible at a time when the exact nature of their malady was not understood, and when the treatment considered right was of a kind which no one, knowing anything of the nature of the changes taking place, would now think of adopting.

I do not propose to discuss the treatment of these diseases in the present course of lectures; but let me say that, as a general rule, it is very simple; and, if you feel satisfied of the nature of the disease, you will in many cases at once determine

the right course of treatment to be pursued, especially if you consider carefully the physiology and pathology of the organ. But let me warn you of the danger of making a diagnosis too hastily. If you do not feel quite sure you are right in the opinion you have formed of the case, do not act as if the diagnosis was decided; for, although the treatment is simple, the harm resulting from acting upon a wrong view may be irreparable. The application of cold where warmth is required, the administration of stimulating diuretics where the kidneys require rest, the abstraction of blood where the patient has but too little for the requirements of his system, may be carried out to the detriment of the patient, upon a false view of the nature of the disease. Your observation of these cases cannot be too extended, and you should especially study the history of the disease as recorded in many published cases. I hope, from these observations, you will not think I undervalue the study of the treatment of disease, and infer that I only attach importance to the diagnosis of the case; but will only conclude what I believe cannot be impressed upon you too strongly—that important as a knowledge of various plans of treatment, and of the action of various drugs, undoubtedly is, it is of no real use—it is even worse than useless—unless the practitioner possess that fundamental knowledge of the actual changes taking place in the various organs of the body in health which will alone enable him to arrive at a correct conclusion as to the nature of a case of disease.

In the next lecture, we shall consider the characters of the second class of deposits, which are characterised by the formation of a bulky, dense, opaque, and often abundant precipitate, which sinks to the bottom of the vessel, leaving a clear or more or less opaque supernatant fluid. The most important substances occurring in this second class are deposits of *pus*, *phosphates*, and *urates of soda and ammonia*; and in certain cases, by examination with the unaided eye, it is quite impossible to decide which of these deposits is present. By the application, however, of a few simple tests, or by submitting a specimen to microscopical examination, we are enabled to ascertain with certainty which of the three deposits is present.

Addresses and Papers

READ AT THE

TWENTY-SEVENTH ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

[Held in LIVERPOOL, JULY 27th, 28th, and 29th, 1859.]

RETROVERSION OF THE GRAVID UTERUS.

By THOMAS SKINNER, M.D., Physician to the Northern Dispensary, Liverpool; Fellow of the Obstetrical Society of London, etc.

[Read in abstract, 29th July, 1859.]

II.—RETROVERSIO UTERI POST CONCEPTIONEM.

[Continued from page 873.]

(i) *Diagnosis.* It is not my intention to treat this part of the subject in detail; yet I think there is room and necessity for the following practical remarks. The diagnostic signs of retroversion of the gravid uterus are:—

1. *Dynamic Symptoms.* If the displacement has taken place suddenly, most generally there will be complained of enuresis, tenesmus, and a sensation of bearing down in the pelvis, which symptoms are reflex in their nature, and almost wholly beyond the control of the patient. Pain of a sympathetic kind will also be complained of over the sacrum, round the haunches, and sometimes proceeding down the thighs, this latter being likened to a sensation of dragging. Sooner or later the most prominent and pressing symptom, and one for which our services are almost always required, is retention of urine. I cannot speak for town practice, but in country districts, this symptom is always greatly aggravated by domestic and neighbourly officiousness—the patient, in the absence of the “doctor”, being pressed to take saltpetre and sweet nitre in linseed tea, or such like household remedies. The bowels, if not previously confined, are almost sure to become so; and in the majority of cases they rapidly become filled with flatus, particularly in hysterical women. As the bladder distends, and if no relief is

obtained by catheterism or otherwise, all the symptoms, constitutional and local, common to overdistension of the bladder are added. If the retroversion is slow in its development, as in cases of *retroversio uteri ante conceptionem*, the symptoms vary both in intensity or urgency, and in the rapidity of their accession. They are already detailed at the beginning of page 492. I think it is of importance to add, that one or more, or even all, of these signs may be absent at any period of retroversion of the gravid uterus.

II. *Physical Signs.* 1. *Abdomen.* The external appearance of this region will depend upon the fullness of the bladder, which may be altogether empty, or so distended as to occupy the entire of the abdominal cavity, simulating pregnancy in its last stage, as in Mr. Wall's case. Percussion affords dulness over a circumscribed tumour, which is painful on pressure, and which can be moved laterally in most cases, but neither upwards nor downwards. Succussion, or the *tactus eruditus*, as a rule, can at first detect no fluctuation, which arises from the tenseness of the muscular fibres of the bladder and abdomen, and from the incompressible nature of the contained fluid; but subsequently, fluctuation is more distinct, because the muscular tissue becomes paralysed and relaxes from the continuance of the over-distension. Auscultation over the abdomen cannot detect any sounds, except those arising from muscular action, flatus in the intestines, or from the beating of one or more of the larger arteries. As regards the form of the tumour, the late Dr. Ramsbotham in his admirable *Practical Observations*, states: “Let it be kept in mind, that the fundus of the bladder is excluded from the cavity of the pelvis, in consequence of that cavity being already occupied by the enlarged uterus, and that the vesical tumour will be readily traced, extending itself from ilium to ilium in a greater degree than upward.” In a foot note, he adds: “This fact is apparent, upon the comparison of the shape of an inflated female bladder with that of a male one.” (*Op. cit.*, part II, p. 431.) The above statement may be correct, but I am inclined to take another view. In the only two cases of retroversion of the gravid uterus which I have seen, attended with retention of urine, the form of the abdomen exactly resembled that of pregnancy. Hunter and others have made the same observation; and if further proof is wanted, I have only to refer to the copper-plate representation of the form of the bladder as it appeared when the abdomen was opened at the *post mortem* examination of Mr. Wall's case. (Hunter *On the Gravid Uterus*, Sydenham Society's edition.) Dr. Ramsbotham's idea is a very natural one; but when we consider that the posterior portion of the *fundus vesicæ* is drawn backwards and downwards, on account of its attachment to the uterus by the utero-vesical fold of peritoneum, we need not wonder that, when the female bladder is over-distended and the uterus retroverted, the bladder should be found to be really narrower below than above.

2. *Pelvis, Mamma, etc.* On instituting a vaginal or rectal examination, the finger or fingers at once impinge upon a globose surface, which, on being traced, is found to block up the cavity of the pelvis more or less completely, according to the stage of gestation at which the ovum has arrived. Up to three months and a half, while the uterus is pyramidal in form, the blocking up is not so perfect as it is from the fourth to the fifth month, when it is spherical in form, and about six inches in diameter every way. In most cases, it is more or less difficult to reach the os uteri with the finger or with a sound, whilst in others it is quite impossible to do so. If the patient is lying upon her back, and it is possible to explore the vagina, its axis will be found to be directed upwards towards the pubes, and its posterior wall will feel tight, as if put upon the stretch. The sensation communicated to the finger on pressing the tumour varies, as it is sometimes hard and resisting, while at other times it is soft and yielding, and not infrequently it communicates to the touch a sense of fluctuation. Most generally, the sensation is that afforded by a round body, which is soft, smooth, yielding, inelastic, and possessing an indistinct feeling of fluctuation. Auscultation *per vaginam* affords us, even at an early stage, the uterine souffle, and if the patient is four and a half or five months pregnant or more, we ought to hear the foetal heart, if the fetus is alive. If the patient is a primipara, the peculiar change in the mammary areola and other signs of pregnancy will most likely be present; in particular, kystein will almost always be found in the urine.

(k) *Differential Diagnosis.* To describe the various pathological conditions which might be mistaken for, or which might give rise to phenomena simulating retroversion of the gravid uterus, would involve an amount of research and space uncalled for by the nature of this paper. I shall therefore content