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## PUS IN THE URINE.

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THE presence of pus in the urine is of not unfrequent occurrence, and must generally be considered as a symptom of grave importance. The difficulties which so often attend the establishing of a correct diagnosis of its source, are too well known to the practitioner. And yet, without this, we can neither expect to render our patient any real service, nor ourselves any satisfaction.

I propose to offer a few practical suggestions, first, upon the general appearances which pus in the urine presents, and upon the means of detecting it; secondly, upon the means we possess of arriving at a knowledge of its source.

Urine which contains pus to any considerable amount, sufficient, for example, to form even a slight deposit, exhibits a certain degree of cloudiness, from the moment when it is passed. This fact will serve to distinguish it from urine containing urate of ammonia, a deposit of which resembles very much a deposit of pus. Urine containing urate of ammonia is generally bright and clear at the moment of micturition, and only becomes turbid on cooling. Purulent urine, after standing some time, throws down a deposit, the supernatant fluid being more or less clear according to circumstances, depending upon the length of time during which it has been left in repose, and upon the amount of pus present.

This deposit varies in its aspect. It may be uniform, of a pale yellowish-white color, of creamy consistence, a little shaggy on the surface, varying in thickness according to the amount, and easily diffused through the urine by slight agitation. This is the most common form of the purulent deposit, and if we submit it to a microscopic examination, we shall find an abundance of pus-corpuscles, with few or no other ingredients. The urine will be found to have an acid re-action.

Or, the deposit being of the same yellowish-white color, and the urine *acid*, we shall find it mixed with more or less mucus, rendering it slightly tenacious and somewhat slimy, and under the microscope we shall discover the pus-corpuscles adhering together.

Again, the deposit may be of a thick, viscid,ropy consistence,

resembling what is termed glairy mucus—the urine being *alkaline*. This peculiar appearance is brought about by the decomposition of the pus, which acts upon the urine, rendering it alkaline, and this alkaline condition of the urine in turn re-acts upon the deposit, giving it the character just described. The same effect may be artificially produced by the addition of an alkali, liquor potassæ, for example, to a purulent deposit. This decomposition of a purulent deposit takes place after it has been suffered to stand for some time. Recent observations have shown, that what has been considered as a deposit of glairy mucus, is but this decomposed pus, “and that mucus never assumes this particular form of a ropy sediment, which sinks to the bottom of the vessel; nor does it ever exist in the urine in such quantity as we frequently find this altered pus.”—(Todd.)

I have remarked that purulent urine exhibited a certain degree of cloudiness from the moment of micturition, but this peculiarity, it must be remembered, may be also exhibited under other circumstances. Urine containing an excess of phosphates is not unfrequently cloudy when first passed, and even when clear at the time of micturition, after standing throws down a deposit much resembling one of pus. Yet, on closer examination, it will be found more flocculent and much lighter than pus, and of a whiter color. Phosphatic urine is almost always alkaline. The addition of an acid to phosphatic urine, instead of coagulating it, as is the case with that containing pus, renders it clear. These are expeditious and reliable means of distinguishing the two.

A few words upon the coagulation which takes place in purulent urine on the application of heat and nitric acid. This coagulation is due to the albumen contained in the fluid, the *liquor puris*, in which the pus-corpuscles float, and the amount of coagulation is in direct proportion to the amount of pus present. This fact, viz., that purulent urine is always albuminous, should be borne in mind, since, no doubt, the coagulation produced by the re-agents just mentioned, when applied to urine containing pus, has too often led the inexperienced to suppose that the patient was necessarily suffering from Bright's disease.

Deposits of pus may be confounded with those of mucus—and yet, with moderate care, they may be easily distinguished. In the first place, mucus rarely forms a layer or stratum at the bottom of the vessel, as does pus, neither is it easily diffusible through the fluid by agitation. Secondly, the urine containing mucus is alkaline, whereas purulent urine is almost always acid—or when it is alkaline, owing to decomposition, the purulent deposit exhibits the glairy appearance of mucus, and is under those circumstances most liable to be mistaken for it. In such a case, we must have recourse to acetic acid, in which mucus is soluble, and to the microscope, under which we shall not fail to find more or less epithelium, “and the so-called mucous particles, in small number, which doubtless are included in the deposit.”—(Todd.)

albumen in a state to be coagulated by heat or nitric acid. If these simple facts are kept in mind, there need be scarcely any difficulty in distinguishing these deposits.

Pus being present in the urine, we are anxious to discover its source, a point in almost all cases attended with more or less difficulty, and in some perfectly impracticable. Pus may come from any portion of the mucous membrane of the genito-urinary organs—or it may come from some adjoining abscess which has opened into the urinary passages.

Pus from the kidneys may be the result of inflammation of the tubuli and pelvis of the kidney (pyelitis), of suppurative nephritis, and of other renal affections. Without going into detail upon the diagnostic symptoms of these affections, we can only remark that in a majority of cases the local symptoms are sufficiently well-marked, and point to the kidneys as the parts implicated—in many cases, moreover, our diagnosis being confirmed by the discovery under the microscope of "tubular casts" mixed with the purulent deposit. One very essential point must be remembered, viz., that the urine flows from the kidneys into the bladder *acid*, therefore if the urine which contains pus is found to have an acid re-action, particularly after long standing, we may be quite sure that the morbid admixture comes from the kidneys, particularly if we have the symptoms of renal disease present, or else from some abscess external to the urinary apparatus.

Pus from the bladder is almost always the result of inflammation of its lining membrane, which, however, under such conditions, pours out a vitiated mucous secretion, which seems to bring about a speedy decomposition of the urine—and certain changes in the purulent deposit, such as I have already described. The urine enters the bladder from the kidney *acid*, and becomes mixed with the secretions of the inflamed membrane; if these are not very abundant, the acid re-action continues even after micturition, but on standing a short time decomposition takes place, and the re-action is alkaline. This change may take place within the bladder, as is well known in cases of paraplegia from injured spine, or where there is any mechanical obstruction to the free discharge of the urine.

Hence we may establish, as a general rule, that, when we find urine containing pus to be alkaline and to deposit ropy mucus, the bladder is the source; whereas pus in urine which has continued acid for many hours after standing, has come either from the kidneys or ureters, or from an abscess external to the urinary organs—a purulent discharge from the urethral canal being in most cases easily recognized.

The bursting of an abscess through the walls of the bladder, or into any other portion of the genito-urinary system, may be recognized by the sudden appearance of the matter in the urine, and by the history of the case.

**Pus may also be the result of acute and chronic inflammation of**

the prostate gland. When the pus flows back into the bladder, becoming mixed with the urine, it renders the diagnosis of its source in many cases very difficult. Still, we have the history, local symptoms, and the information gained by explorations of the urethra and rectum, to guide us. In addition, it will be found that when the prostate alone is the seat of disease, the urine will be *acid*, and will continue acid after standing many hours—the deposit of pus will take place also immediately after micturition, and will present all the physical appearances of this substance.

Pus from the urethra is generally easily recognized. In examining the urine of females, it must not be forgotten, that a purulent deposit may proceed from some uterine or vaginal difficulty. A neglect to bear this in mind has not unfrequently led to embarrassing mistakes.

In conclusion, a word upon the administration of alkalies in diseases of the bladder. Many authorities lay down as a rule—“If the urine is acid, give alkalies; if alkaline, give acids.” Now, in cases where the urine is passed alkaline, and where the bladder is inflamed, the urine undoubtedly entered the bladder acid, and therefore irritating to the inflamed membrane; hence we may explain the good effects derived from the administration of liquor potassæ, carbonate of soda, lime-water, &c., in changing the re-action of the secretion. Therefore we are not to be deterred from using alkaline remedies because the urine is alkaline, this condition depending upon decomposition, the result of the vitiated secretion thrown off by the mucous membrane of the bladder. On the contrary, the use of alkalies seems to have the power to lessen the morbid secretion and to aid most essentially in the restoration of the diseased organ.

Although cases will arise, where a correct diagnosis is impracticable, yet the few practical points which I have laid down will often aid us in obtaining that knowledge which is always essential.

*Boston, June, 1855.*

D. D. SLADE.

## MEDICAL AND SURGICAL EXPERIENCES AT THE HOUSE OF INDUSTRY.—NO II.

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### *Pleuro-pneumonia.*

CATHARINE MOORE was admitted to the House of Industry Hospital on the 11th of February, 1850. She was found wandering upon Long wharf, late in the evening, in apparent distress, and unable to give any account of herself. She was carried to the Centre Watch-house, and thence to the House of Industry. No information but her name could be obtained from her. When admitted, by action of Dr. Slade, who first saw her, she was cold