

## ACUTE URETHRITIS.

THE term "urethritis" includes all forms of urethral inflammation. By far the most common of these inflammations is gonorrhœa. Cases of urethritis originating without the influence, direct or indirect, of gonorrhœal infection are rare. Other forms of urethritis, arising from constitutional defects or from mechanical or chemical injury to the urethral membrane, occur, but they are chiefly interesting from the standpoint of etiology, since in symptoms and treatment they correspond with some of the stages of the more common disorder. In the following pages, except where mention is made of other forms of urethritis or of the disease as it occurs in women, the subject under consideration is gonorrhœa in the male.

**Etiology.**—From an etiological standpoint, the best classification is that of Lustgarten, who recognizes two classes—infectious urethritis (including gonorrhœa, pseudo-gonorrhœa, syphilitic urethritis, and urethritis tuberculosa) and non-infectious urethritis.

I. INFECTIOUS URETHRITIS. — I. *Gonorrhœa* (γονή, semen, and ῥεῖν, to flow).—Synonyms: Urethritis; Clap; Blennorrhagia; Blennorrhœa; Gleet; *Germ.* Tripper; Schleimfluss; Unreiner Fluss; Gonorrhœ; *Fr.* Blennorrhagie; Gonorrhée; Chaudépisse; *Span.* and *Ital.* Gonorrea.

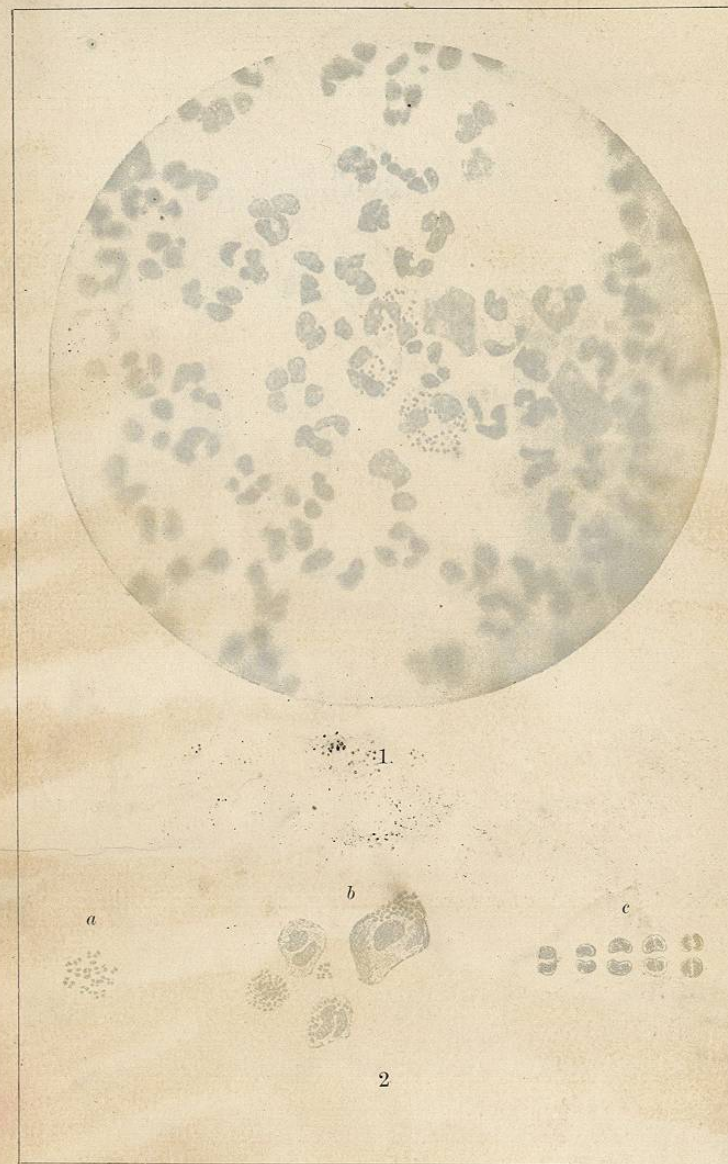
The term "gonorrhœa" is a misnomer, but it has

been so long employed in a specific sense that it must be retained for the present rather than be supplanted by one more scientific. In these pages its use is restricted to indicate that acute, infectious form of urethritis which follows a period of incubation, pursues a more or less definite course, and produces a discharge which contains gonococci and is capable of causing a like form of inflammation in the mucous membrane of the healthy urethra of another individual. Of all diseases, gonorrhœa is the most correctly termed *venereal*, for it most frequently results from sexual intercourse, and is rarely acquired in any other way. Simple contact of a gonorrhœal discharge with the mucous membrane is sufficient in the large majority of cases to communicate the disease, though the vagina is less easily infected than the urethra, and some persons, particularly under special circumstances, are less susceptible than others. The general condition of the individual, the state of the mucous membrane exposed to infection, and the circumstances of the exposure, other than the presence of a gonorrhœal discharge, play a much less important part than in the other venereal disorders. A man who exposes his urethra to a gonorrhœal discharge has few chances of escaping infection. On the other hand, since the source of contagion lies solely in the discharge from the diseased membrane, and does not exist in the blood and in special secretions of the body, as in syphilis, the opportunities for acquiring gonorrhœa outside the sexual act are rare. It must not be forgotten, however, that gonorrhœa may be innocently acquired, and that it is possible for the contagion to be conveyed by means of a towel, the seat of a public water-closet, and other media.



*The Gonococcus.*—It is now generally conceded that the active factor in the production of gonorrhœa is the gonococcus of Neisser. This micro-organism is found in the purulent discharge of acute urethritis, known as gonorrhœa; in the muco-purulent discharge and threads (*tripper faden*) of certain chronic and sub-acute forms of urethritis; in the gonorrhœal discharges from the vagina, uterus, conjunctiva, and rectum; and a few cases have been recorded in which gonococci were found in the secretion of the mucous membrane of the mouth and the nose. This micro-organism has also been found in joints affected with gonorrhœal rheumatism, in periurethral folliculitis and abscesses, and in suppurating vulvo-vaginal glands. Bumm, Wertheim, and others have repeatedly succeeded in cultivating the gonococcus, and by inoculating the healthy urethra with these cultures have produced an acute urethritis having an incubation period of from two to five days and a duration of five or six weeks, the discharge containing gonococci. In one instance the twentieth generation of a pure culture was thus successfully employed. These experiments seem to demonstrate fully the pathogenic character of this micro-organism. It should be remembered, however, that even the normal urethra may be inhabited by one or more species of diplococci, which so closely resemble the gonococcus in all particulars, including staining properties, that the most expert cannot always differentiate them with certainty.

(a) *Preparation and Examination of the Specimen.*—In selecting gonorrhœal pus for examination it is well to avoid that found at the meatus, as this pus is more liable to contain other organisms that might render the examination complicated and confusing. It is better to



1. Gonococci in gonorrhœal pus;  $\times 500$  (from a photomicrograph by Dr. John A. Fordyce).  
2. Gonococcus (after Bumm): *a*, from a pure culture; *b*, secretion from a gonorrhœal conjunctivitis, showing an epithelial cell partially covered with gonococci; three pus-cells, two of which contain gonococci; and a group of three gonococci; *c*, division and multiplication of gonococci (schematic).



obtain pus that may be squeezed out of a deeper portion of the urethra. A small drop of this pus is thinly spread on a slide or a cover-glass, by means of a platinum wire or by pressing the drop between two cover-glasses and then slipping them apart. The thin film is allowed to dry in the air, and is then fastened to the glass by slowly passing it three times through the tip of the flame of an alcohol lamp or a Bunsen burner, the pus-covered side being upward. The film is then covered with a few drops of the staining fluid, or the cover-glass is floated, film side down, on the liquid. The preparation should remain in the stain from one to five minutes, depending upon the strength of the solution, after which the surplus stain is gently washed off with a jet of cold water. The specimen can now be examined in water or in glycerin, or, what is better, it can be dried carefully with soft blotting-paper and mounted in Canada balsam.

The stain employed may be almost any of the basic aniline dyes, as methyl-blue, Victoria blue, methyl-violet, gentian-violet, or fuchsin. These dyes may be used in aqueous solutions of varying strength, but they do not keep well, and it is best to prepare the fluid each time it is wanted. This may easily be done by keeping on hand a saturated alcoholic solution of the stain, a very small quantity of which can be added, drop by drop, to a watch-glassful of distilled water until the latter is of the required strength and color. The following is a rapid and satisfactory method: A solution of methyl-blue is prepared by dropping a saturated alcoholic solution of the stain into a watch-glassful of distilled water or into a solution of potassium hydrate (1 : 10,000) until the liquid has a dark-blue color. The cover-glass, prepared

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in accordance with the above directions, is floated on this liquid, pus side down, for from one to two minutes; it is then taken out and the surplus stain is washed off. It may now be placed at once, without drying, upon a slide and examined, or it may be carefully dried and mounted on a slide with Canada balsam. In a specimen thus prepared the gonococci appear dark blue, while the cells show a very pale blue protoplasm and grayish-blue nuclei.

The gonococci are readily decolorized by acids or by alcohol as in Gram's method. In doubtful cases the last-named method is claimed to be capable of making the diagnosis a certainty, but it has been pretty well demonstrated that a few other diplococci lose their stain in exactly the same manner as do the gonococci, and that even this test cannot always be relied upon. The method is as follows:

1. Prepare cover-glass as above described.
2. Stain for from two to five minutes in a saturated solution of gentian-violet in aniline-water. (Aniline-water is prepared by adding 5 parts of aniline oil to 100 parts of water and shaking thoroughly. The milky fluid thus produced is filtered until it comes through clear and transparent. To this fluid a saturated alcoholic solution of the stain is added, drop by drop, until the liquid loses its transparency and a distinct opalescence results.)
3. Place the preparation for from one to one and a half minutes in iodine solution (iodine 1 part, potassium iodide 2 parts, water 300 parts). In this solution the preparation becomes quite black.
4. Place in alcohol, and allow to remain until no more color is extracted.

5. Wash in distilled water.
6. Stain for half a minute in a weak solution of Bismarck brown.
7. Wash in distilled water.
8. Dry and mount in Canada balsam.

The gonococci and a few other diplococci lose their blue stain by this method and take a brown stain. Such diplococci as retain the blue stain are not gonococci.

For a satisfactory examination of the preparation, good lenses, with a magnifying power of at least 500 diameters, and a substage condenser should be employed, an immersion lens being always desirable, and in doubtful cases usually necessary.

(b) *Characters*.—Each single gonococcus has a shape much like that of a kidney or a coffee-bean; but, like other diplococci, these organisms appear in pairs. Each pair is thus made up of two individuals so placed that the flattened surfaces face each other, but are separated by a narrow space, which in the stained specimen appears as a clear (unstained) line (Pl. 8). In the process of reproduction each individual divides into two, the dividing-line being at right angles to the flattened surface. The result is two pairs instead of one, and the usual grouping of the gonococcus is explained, for it is found rarely in chains, but usually in clumps of four or multiples of four. The micro-organism is seen not only between and upon the epithelial cells and pus-cells, but also within the latter. This position in the pus-cell is characteristic of the gonococcus, and possibly of a few other rarer forms of diplococci, and is determined by observing that the micro-organisms are in focus at the same time with the nucleus and outlines of the cell, and



by noting that, though a pus-cell may be filled with gonococci even to its border, they rarely, if ever, project beyond it, as would frequently be the case if they were simply lying on the surface. A cell may contain a single group, or so many as to conceal the nucleus or finally to burst the cell-wall, allowing the groups of gonococci to escape.

Until recently, culture of the gonococcus has been unsuccessful except on human blood-serum. Wertheim used culture-plates according to Koch's method, made with 1 part of human blood-serum and 1 or 2 parts of peptone, agar, or gelatin solution. His cultures were easily made and grew rapidly. Finger recommends a culture-medium composed of urine and agar, 1 part of the former to 2 of the latter. He finds that the gonococci do not grow well in a strongly alkaline medium, and that a temperature of 40° C. (104° F.) will destroy them if continued a number of hours.

(c) *Value in Diagnosis.*—The characteristics of the gonococci that distinguish them from other diplococci are their shape, their grouping in fours or multiples of four, their position in, as well as on and outside of, the cell, and their staining properties, including especially the readiness with which they lose their stain when treated with alcohol. When diplococci possessing these characteristics are present in large numbers, there is no doubt that they are gonococci; but there have been found in urethral discharges diplococci which possess all these characteristics, but which yet are not capable of producing a gonorrhœa. They are, however, not common, are never present in large numbers, as is the rule with gonococci, and are usually associated with a larger number of other micro-organisms common to the urethra. They are

probably present, and liable to be a source of error in diagnosis, in about 5 per cent. of all cases. Some believe this percentage should be much larger. The question is plainly a most difficult one to decide, since the only method yet found of making the differential diagnosis with absolute certainty lies in culture- and inoculation-experiments. These methods must have a narrow range of application, since the cultivation of the gonococcus is too laborious and difficult to be carried out in every case or by anyone but an expert; while inoculation is practically out of the question, since man is the only animal yet clearly proven to be susceptible to the disease.

The three following facts have been demonstrated clearly: 1. Gonorrhœal pus, or a pure culture of gonococci from such pus, produces gonorrhœa. 2. Pus free from gonococci, or a pure culture of micro-organisms found in such pus, does not produce gonorrhœa. 3. A slight subacute or chronic discharge containing a small number of gonococci may produce a true gonorrhœa; but a discharge of apparently the same nature, and containing diplococci that cannot be differentiated from gonococci, often fails to produce an infection of any kind.

In all cases of acute urethritis it is evident that the microscope is of great value in making a diagnosis, for the discovery of gonococci in the discharge at once decides it to be a gonorrhœa and infectious in nature (its immediate origin is not necessarily infectious; see *Bastard Gonorrhœa*), while an acute discharge that after repeated and thorough examinations on several successive days fails to show gonococci may safely be pronounced non-gonorrhœal. In a large class of subacute



and chronic forms of urethritis the microscope renders valuable service, but often by its use alone the diagnosis cannot exactly be determined, and one must then rely largely on clinical conditions and experience to decide upon the infectious or non-infectious nature of the case in hand.

2. *Pseudo-gonorrhœa*.—A few cases are reported in which micro-organisms other than gonococci were apparently responsible for urethritis closely resembling a gonorrhœa, and in which culture- and inoculation-experiments were made by competent observers. These cases are rare, and not yet sufficiently understood to call for special consideration by the general practitioner.

3. *Syphilitic Urethritis*.—During the early stages of syphilis mucous patches may form in the urethra and be the source of a scarcely noticeable discharge. In a patient under treatment for recognized syphilis such a discharge is of little importance and calls for no special treatment or precautions, as it is assumed that no physician will allow a patient whom he is treating for syphilis to indulge in sexual intercourse. In unrecognized cases such a discharge might prove a source of infection. Further, a urethral chancre may furnish a discharge closely resembling that of gonorrhœa, and this mistake in diagnosis is frequently made as the result of careless examination. Manipulation of the parts should reveal the presence of the sclerosis.

4. *Urethritis Tuberculosa*.—Primary tuberculosis of the urethra has been reported in rare instances. It occasionally occurs in the form of ulceration in generalized tuberculosis of the genito-urinary tract. The discharge from the urethra should show tubercle bacilli. The examination must be conducted with great care,

and special methods must be employed, otherwise the smegma bacilli and other micro-organisms found in the urethra and in the urine will lead to confusion and error.

II. NON-INFECTIOUS URETHRITIS.—A mild or even a violent urethritis may follow mechanical or chemical violence to the urethra. It is difficult to decide how often the cause of these apparently frequent cases lies solely in the urethral injury, since other causes, on careful investigation, are often disclosed. The commonest source of error lies in the fact that a urethra damaged by a previous gonorrhœa may show no evidence of its diseased condition until it becomes the seat of urethritis as the result of an irritation that would have no effect upon a perfectly sound urethra. Some individuals of a strumous or gouty diathesis seem prone to urethritis on comparatively slight provocation, such as the passage of highly acrid urine, indulgence in beer or alcohol in any form, or ungratified sexual excitement. In the majority of these cases, however, there is a history of true gonorrhœa at some time in the past. Somewhere in such a urethra there probably has existed an area of congestion or thickening or a forming stricture. Those forms of urethritis due to syphilis and to tuberculosis have already been mentioned. But while a diathesis is frequently responsible for the readiness with which some men acquire the disease, and while the systemic condition often exerts a most important influence upon the course and duration of the local process, in the vast majority of cases the production of urethral inflammation requires the presence of an irritant acting locally.

*Mechanical violence* may produce an inflammation of a urethra that has previously been sound. This form of urethritis follows the improper use of sounds and



other instruments by unskilled or careless operators, the introduction by the patient of foreign bodies into the urethra or the bladder, and occasionally the passage of fragments of calculi from the bladder. This form of urethritis usually develops within a few hours after the violence is done; its intensity is in direct proportion to the amount of mechanical damage inflicted upon the mucous membrane, and it generally disappears promptly on removing the cause, without further treatment than is necessary to keep the urine bland and unirritating to the injured surface.

*Chemical violence*, resulting from the use of too strong injections, from irritating vaginal secretions, from the internal use of cantharides, and possibly from too great concentration of the urine, may produce urethritis in varying degrees of severity. Here, again, the symptoms come on promptly without any period of incubation, and, as a rule, the cause having been removed, disappear rapidly under very simple treatment.

With these forms of urethral inflammation should be considered the cases of urethritis caused by irritating vaginal secretions and discharges in women in whom no trace of gonorrhœa can be recognized on examination. That some men under favorable circumstances do thus acquire a urethritis is unquestionably true. On the other hand, a married man who has had no previous disease of the urethra, who is otherwise well, and who is indulging in no sexual excesses, rarely acquires a urethritis from his wife, even though she have a leucorrhœal or menstrual flux. Even the discharges from a carcinoma of the uterine neck or from a tuberculous ulcer usually fail to injure the urethra of the husband. It would seem that these discharges are

capable of causing urethritis only when there is a previously diseased urethra, a strumous diathesis, a debilitated condition of the body, prolonged sexual excitement, excesses in coitus, or, as most frequently happens, a combination of several of the conditions named.

Clinical experience shows that a woman, wife or mistress, may be incapable of giving urethritis to husband or lover, while a stranger may promptly acquire the disease in a single coitus with her. This is cited as proof of the so-called "acclimatization" of which Ricord and other writers speak. Not infrequently a newly-married man consults his physician for a mild or even violent urethritis, in great alarm lest his really innocent wife be not pure. If his urethra was previously sound (in the majority of such cases the man has had a gonorrhœa at some previous time), it is probable that his wife has leucorrhœa, or both have disregarded the beginning or the end of the menstrual flux, besides indulging to excess, possibly after partaking of alcoholic or other stimulating articles of food and drink. Such a urethritis subsides in a few days under simple treatment, and if in the future their sexual relations are properly regulated, the husband will in all probability remain free from any future attack.

It is in this class of cases that the tact as well as the skill of the physician is severely tested. He will be asked innumerable questions, and upon his answers may depend the integrity and future domestic relations of an entire household. It is far better to let the guilty escape, or to permit a patient to think that a successful imposition has been practised upon his physician, than falsely to accuse the innocent. With this end in view he will bear in mind the following facts:



1. A healthy man with a sound urethra in all probability cannot acquire a urethritis from a healthy woman, even if he indulge to excess.

2. A healthy man with a sound urethra does not, as a rule, acquire a urethritis from a woman with vaginal secretions or discharges which are not gonorrhœal. To this rule, however, clinical experience furnishes some undoubted, and many apparent, exceptions.

3. There are instances in which a man of strumous, gouty, or tubercular diathesis, or with a debilitated general system, may acquire a mild form of urethritis from a healthy woman, particularly if sexual excesses with her be accompanied by other excesses, as at table. If the woman, instead of being healthy, has a leucorrhœa, urethritis follows more frequently and may be severe in type.

4. There are many men with a slightly damaged urethra, the only evidence of which may be a drop or two of muco-purulent discharge at the meatus in the morning, or the presence of small threads of pus in the urine, or, indeed, with no apparent symptoms; who are ready to light up anew a urethritis as a result of any of the causes above named. Slight disturbances of the general economy (such as bronchitis, constipation, or diarrhœa), the excessive use of tobacco, beer, or alcohol, violent exercise, and great fatigue sometimes suffice without sexual excitement for such relapses; while sexual indulgences of any nature are almost certain to be followed by a reappearance of the old trouble. These are cases of so-called *bastard gonorrhœa*. They are generally subacute in type from beginning to end, and may present no other symptoms than a slight discharge, with possibly moderate itching at the meatus. They

usually run a short course, but they may be protracted, and if the irritation be sufficiently violent they may present any degree of inflammation up to that found in gonorrhœa. These cases are non-infectious in their immediate origin; but if, as is often true, gonococci were still present in such a damaged urethra, they may multiply under the added inflammation, and a true gonorrhœa, generally subacute, may result.

5. A woman may have a true gonorrhœa which the examining physician is unable to detect. This is especially true if the disease be limited to the urethra, and the acute stage, with swelling and redness of the parts, has passed; or, again, if there be left only a chronic and subacute inflammation of the vulvo-vaginal glands. Noeggerath and others have proved beyond dispute that the Fallopian tubes, the uterus, and the cervix uteri may be the seat of a true gonorrhœal inflammation and yet present no evidence that can be detected in a most careful examination of the external genitals and vagina. In the face of such evidence it is surprising that some physicians are willing, after examining public women, to give them a certificate to the effect that they have no venereal disease. Ninety per cent. of all pelvic diseases in women have their origin, it is claimed, in gonorrhœa. From coitus with a woman having one of these unrecognized forms of gonorrhœa some men will escape, while others will acquire the disease.

6. The non-infectious forms of urethritis have no period of incubation, as in gonorrhœa, but promptly follow the operation of the exciting cause. They tend to a rapid recovery upon the removal of that cause, and are usually mild in type as compared with gonorrhœa, though they may exhibit a severe grade of inflamma-