

stone expelled by the gush of urine. The urethral lithotrite is a dangerous instrument and of doubtful utility. The scoops and forceps of Collin and Leroy d'Etiolle, though ingenious, are never at hand at the right moment. I have extracted a stone with Thompson's divulsor. When all these methods fail external urethrotomy succeeds.

Chronic cases of urethral calculus call for external urethrotomy to remove the stone, to excise the pocket in which it lies, and to divide or excise the stricture which is usually present.

Infiltration, abscess, and fistula are considered in another section.

CHAPTER V

URETHRAL CHILL

THE term *urinary fever* is commonly bestowed upon any continuous febrile condition occurring in the course of an inflammation in the urinary organs or resulting from an operation upon them, while the term *urethral chill* or *fever* is restricted to the more acute cases usually attributable to urethral instrumentation. Both terms are misleading from a scientific point of view, since they give no clew to the real nature of the disturbance, and, indeed, group under one title several conditions of widely different natures; and yet, clinically speaking, they represent a set of well-defined phenomena, and they will doubtless always find a place in the clinician's vocabulary. Urinary fever will interest us later; our present concern is urethral chill. This term includes three conditions, any one of which may prove fatal. They are:

1. Shock to the whole nervous system;
2. Shock to the kidneys, inducing uremia; and
3. Toxemia, septicemia, or pyemia.

The first two conditions deserve the title *urethral shock* or chill, while the last is urinary fever or chill, properly speaking, since the toxic elements are derived from the urine.

Etiology.—That urethral chill does not occur more constantly under similar conditions is the mystery. The majority of patients escape, whether the urine is infected or not, whether the wound or the trauma be great or small. The same patient may have a chill one day, and escape it after an exactly similar operation on the next. The simple gentle passage of a small, soft bougie may give rise to it, while violent divulsion or urethrotomy, performed a day or two afterward, may evoke no reaction; and again, after divulsion, which has been negative, the passage of a steel sound may produce a chill. Nor is it instrumentation only which is the exciting cause, since patients suffering from stricture, upon whom no instruments have ever been used, have well-marked exacerbations of chill and fever in connection with renal and bladder disease, and

these patients cease to have chills (which they usually call dumb-ague) after the use of instruments in their urethrae has dilated the strictures. Other patients have no chill until dilatation has reached a certain limit, after which every effort to pass an instrument of a larger size is liable to be followed by urethral fever. The extent of injury bears no relation to the amount of fever that will follow. The gentle passage of a smooth sound may cause speedy death, while extensive wounds and lacerations of the canal are often absolutely innocuous, and that, too, when the urine is manifestly purulent, even ammoniacal. I have had a number of cases where the passage of any instrument effecting even very moderate dilatation, without bringing blood, would be followed by chill, and yet divulsion, tearing the urethra, and opening the tissues freely, did not occasion the customary chill and fever. Moreover, the position of the injury inflicted by the instrument is of importance. At and near the meatus the most serious injuries do not give rise to chill, though decomposed urine pass freely over the raw surface. The danger increases in proportion to the depth at which the injury is inflicted. Nor does a wound seem at all necessary, since cases are on record where death, following rapidly upon the introduction of a smooth instrument, has failed to reveal on autopsy any lesion of the canal. Here shock and reflex action (Banks) arresting kidney secretion would seem to be the immediate cause of death. The chill may come on before the instrument has been withdrawn from the urethra, but usually it does not follow for some hours, and generally not until after urine has flowed through the canal. In rapidly fatal cases, old and often advanced kidney disease, or at least intense kidney hyperemia, is found on autopsy; but in some cases the kidneys have been pronounced normal.¹ Even in these latter there has usually been suppression of urine; but simple suppression of urine does not often kill in one or two days, and, to solve the problem in these cases, we are forced to fall back upon the effects of shock. The French school, championed by Guyon,² stoutly maintains that the entire range of cases is septic; but the experience of many observers confirms the belief that, although most are of a mixed type, in which the element of sepsis predominates, there are also purely nervous and purely renal cases. How sharply the posterior urethra resents the first introduction of an instrument—the sudden faintness, even complete syncope—attests its sensitiveness and its power of reacting upon the whole economy; while the wholesome apprehension of sup-

¹ Cf. Velpeau, *Leçons orales de clin. chir.*, etc., 1841, p. 326.

² *Cong. franç. de chir.*, 1892, vi, 77; *Leçons clin.*, 1896, ii, 135 *et seq.*

pression of urine felt by every genito-urinary surgeon after an operation upon the deep urethra and bladder speaks for the close reflex connection between the extremes of the internal urinary tract.

The predisposing causes of urethral chill are therefore: 1, urinary infection; 2, disease of the kidneys; and 3, a susceptibility to shock impossible always to foresee or to prevent. The efficient cause is shock to the deep urethra, or abrasion, laceration, or inflammation, permitting the absorption of bacteria or their toxic products from the urine, the urethra, or both.

Symptoms.—No two cases present exactly the same picture, the symptoms of shock, uremia, and sepsis intermingling variously, sometimes one predominating, sometimes another; but they can usually be classed in one of the following types:

1. *Urethral Shock.*—Mild urethral shock is often seen typically upon the first passage of an instrument. The patient, usually of a nervous type, fearful of all manipulation, complains of great pain from the unobstructed and gentle introduction of a sound into his bladder. Immediately he feels faint and nauseated; he may vomit or faint away; his skin is cold, pale, and dry, his pulse weak, rapid, or irregular. He may have a slight chill, and as the attack passes the skin becomes flushed and moist. Such a paroxysm lasts but a few moments. Exceptionally, the collapse and chill are unduly severe and prolonged, anuria is complete, and the patient dies of shock in a few hours; or the fatal issue may be delayed some days, the suppression of urine continuing and the patient dying of uremia with acute congestion of the kidneys. In this last class of cases it is probable that the acute renal congestion is grafted upon a chronic nephritis which, up to that time, may have passed unnoticed. That this prolonged suppression may occur from the effect of urethral shock on normal kidneys has not been disproved.

2. *Acute Urethral Fever.*—Sir Henry Thompson's¹ classical description I here transcribe:

The patient has undergone his first urethral instrumentation—the gentle and bloodless dilatation of a urethral stricture: then, “some three or four hours afterward, the patient wants to pass water, and feels, in doing so, a smarting sensation which, after all, is the natural consequence of passing any instrument through the urethra whether healthy or diseased. Soon after, it may be a few minutes, or an hour, or even more, the patient suddenly feels a cold chill through his back, thence invading the whole system, so

¹ *Dis. of Urin. Org.*, 8th Edit., 1888, p. 180.

that his teeth chatter involuntarily, and all his limbs tremble so much that it is obvious to a bystander that he is the subject of a convulsive shudder which he cannot control, affecting the voluntary muscles. The patient's look is haggard, he becomes grayish in tint, dark beneath the eyes, the expression of his face is altered, his breathing is hurried, and the voice changed. The attack varies greatly in intensity in different cases and circumstances. Such a patient is, of course, sent to bed at once, if not already occupying one, that hot bottles and warm coverings may be applied; and the bed itself shakes with the rigor, if the fit is severe. He now begins to complain of severe pains in his head, back, and limbs; there may be an attack of vomiting or of purging, although these are not so common. The temperature if taken now is high, and rising rapidly reaches nearly 104 degrees or passes it, sometimes to 105 degrees. In half an hour, perhaps, more commonly an hour or more, the pale and contracted features become red, then flushed, the mouth is dry, he asks for a drink, and with an oppressive sense of heat he is eager to throw off the coverings which have been heaped upon him. His pains are now severe and his temperature at its maximum; the pulse is rapid, hard, and vibrating. There gradually appears a little glistening in the dry, cutaneous surface, the commencing dew of gentle perspiration which quickly becomes profuse from the now soft, relaxed, and reddened skin, with sensible relief to pain and feverish heat. The respiration becomes slower and fuller, and the patient is tranquil, passive, exhausted in appearance as he lies on his back sweating at every pore. Then the pulse slowly grows less rapid, is soft and full, temperature diminishes, thirst continues, and he passes a little urine dark in tint. After six, twelve, or eighteen hours, the signs of fever disappear, leaving him more or less weak, and he is convalescent the next day or the following one."

Such is the typical attack—sharp, intense, transient. It doubtless indicates the sudden spread of some toxin through the system; but—more than that—it represents the equation between the trauma and the urethral susceptibility. For this chill is too severe to be comparable to any other septic phenomenon of so ephemeral a nature, and, moreover, it seems to depend rather upon the location of the lesion than upon the septic materials present (see above). Yet what we do know quite definitely is the proper preventive treatment for this condition, and this is a knowledge not to be exchanged for many theoretical data.

Treatment.—The best treatment for urethral chill is prophylaxis. The five essentials of prophylaxis are:

1. Gentleness in manipulation;

2. Nitrate-of-silver irrigation of the urethra and bladder at the end of every operation;
3. Efficient drainage—according to the nature of the case;
4. Urinary antisepsis and dilution; and
5. Stimulation of the kidneys and other emunctories.

The first two points have already been noticed (p. 28). The third and fourth (and second) sound the surgeon's warning, "For pus—antisepsis, drainage, and irrigation." Antisepsis and irrigation are achieved by local washings and, at the same time, by rendering the natural irrigating fluid—the urine—as unirritating, as plentiful, and as antiseptic as possible. Copious draughts of diuretic mineral waters, and the administration of urotropin (0.5 to 1.5 grammes *t. i. d.*), or salol (2 to 3 grammes a day in divided doses), fulfil this latter indication, while drainage is established according to the requirements of the case. The final requisite is fulfilled by the diuretic mineral waters and urotropin (a valuable renal stimulant), together with a warm bath and a cathartic before any operation upon the urinary tract.

Practically speaking, therefore, the patient must be prepared for every formal operation upon his urinary organs by a course of two days' administration of urotropin (0.5 gramme *t. i. d.*) and a diuretic water (Suwannee, Stafford, Poland, Bethesda), a warm bath and a cathartic, and some attempt must be made by daily irrigations of the bladder to render his urine as sweet as possible (see Cystitis); while, if the patient suffers from cystitis or pyelitis, or threatens to become septic or uremic, the same course of treatment is to be instituted, and drainage established, if necessary, through the loin, the perineum, or the retained catheter. (See Cystitis, Pyelitis.) Quiet and rest in bed are beneficial. Anesthesia exerts no effect on urethral chill, except in so far as ether is a tax on damaged kidneys, and cocain more toxic in the deep urethra than elsewhere.

For urethral shock or chill, when it has once set in, rest in bed, a hot foot-bath, fluid diet, and urinary dilution and antisepsis usually suffice; but if the attack is a rapidly pernicious one, morphin, hot-air baths, the hot pack, stimulants, and cups to the loins constitute the treatment. The suggestions of Gouley and Long as to the prophylactic value of the tincture of the chlorid of iron and of 2-minim doses of Fleming's tincture of aconite I cannot indorse by any personally favourable experience, while quinin has given no satisfaction at my hands. The sodio-salicylate of theobromin seems to be of service only in chronic cases, and the benefit of venesection and infusion in uremia must not be lost sight of.