

so that they are perceptible in the urine and cause the cloudiness and sediment which has been already described, it can be readily understood that these crystals may be deposited in the shape of fine sand or grit in any part of the urinary tract. Consequently in some cases such a deposit takes place in the pelvis of the Kidney; and the minute crystals adhering to one another, and being perhaps welded together by means of mucus, form small concretions or *Calculi*. By the further deposition, upon these, of more grit, their size gradually increases. Then they may slip down into the ureter, and be washed away by the flow from the Kidney into the Bladder, and if of sufficiently small size may be safely thrown off from the body. But if the process of formation continues until a comparatively large stone is formed—and in a considerable proportion of cases this takes place—some sudden jolt or movement, on the part of the patient, may cause it to slip out of the pelvis into the upper part of the ureter, down which, however, it may be unable easily to pass. Then certain characteristic symptoms occur. The pressure of the hard-edged stone upon the ureter will set up extreme and often agonising pain, referred to the exact position of the obstruction. Then it becomes a question whether the violent spasmodic straining which is set up in the tissues around the calculus will be sufficient either to force it down the narrow canal into the bladder, or up again into the kidney. Until one or other of these occurrences takes place, the patient's sufferings will continue, and it is therefore the object of treatment to bring about one or other result; if possible, of course, the former; because if the stone can be passed into the bladder it can be, with comparative ease, removed; whereas if it slips back into the kidney it is almost certain that the patient will sooner or later suffer from a recurrence of the attack, due to the stone becoming again impacted in the ureter; or that he must undergo the serious operation involved in removing the stone from the kidney.

We have then to remember that the narrow canal of the ureter is being forcibly contracted, by the irritation set up by the foreign body, upon the stone, and that events tend therefore to move in a vicious circle. The worse the pain becomes, the more exhausted will the patient be. The more closely the ureter constricts the calculus, the worse will the pain and the subsequent

exhaustion become. There are therefore two principles which the doctor clearly keeps in view in these cases; first, to relieve pain, and secondly to relax the ureter as much as possible. He therefore gives, as a rule, opiates in order to give the body generally, and the local parts in particular, perfect rest; and by giving aperients he will prevent, as far as possible, any pressure from the intestines upon the distended ureter.

But beyond this it is necessary to relax the parts as much as possible, so as to allow the ureter to distend to its full capacity, and thus to permit the stone to pass down it, and escape into the bladder. Nothing gives so much and such speedy relief as hot external applications—spongio-piline being in many ways most useful because of its power of retaining heat for a lengthy period. The object to be attained, of course, being the relaxation of the deeper tissues, whatever application is used will require to be maintained at an even temperature for some time; and great harm can therefore be done by permitting, for example, a "hot fomentation" to remain on, after it has become cold. The vessels which the warmth had caused to dilate, if the surface becomes chilled, will contract; and therefore the good results of the warmth will be lost, and perhaps more injury caused than if no application had been used at all. This is a fact which cannot be too clearly understood and remembered, because upon the Nurse's attention to it may depend, not only the patient's comfort, but even his safety. If spongio-piline cannot be obtained, flannels wrung out of quite hot water, placed not only on the side of the abdomen to which the pain is referred, but also round the side, covered with oiled-silk and then with several turns of flannel bandage, will be equally efficacious. The oiled-silk will prevent evaporation, and the wet flannel will be converted by the heat of the body into a permanent warm fomentation.

Sometimes in these cases, especially when the pain is on the left side, a large enema of hot barley water, with or without laudanum, affords the greatest relief; probably by relaxing the internal tissues around the descending colon, and thus directly relieving the distended ureter. Or again, the doctor may direct the patient to drink considerable quantities of hot barley water, in order to produce the same effect.

(To be continued.)

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