Reynolds (E.)

The Results Obtained by Examination of the Air-Distended Bladder in Females,

WITH REMARKS UPON THE TECHNIQUE AND A SUMMARIZED REPORT OF CASES.

BY

EDWARD REYNOLDS, M. D.

Reprinted from the Boston Medical and Surgical Journal of January 30, 1896.

BOSTON:
DAMRELL & UPHAM, PUBLISHERS,
283 Washington Street.
1896.

THE RESULTS OBTAINED BY EXAMINATION OF THE AIR-DISTENDED BLADDER IN FEMALES, WITH SOME REMARKS UPON THE TECHNIQUE AND A SUMMARIZED REPORT OF CASES.[1]

BY EDWARD REYNOLDS, M.D.

Cystoscopy of the bladder is no new procedure either in men or women. But the long-established method of examination of the bladder, when distended with fluid, through a fenestrated cystoscope carrying an obliquely placed mirror within its calibre, is so unsatisfactory in its results as never to have attained popularity, nor to have established any very familiar knowledge of the viscus. This method further labors under the disadvantage that local treatment is of course impossible through such an instrument.

The direct exploration of the female bladder was placed upon a wholly different plane, however, when, but little more than two years ago, it occurred to Dr. Howard A. Kelly, that if a woman were placed in an appropriate position and air allowed to enter the bladder, it could be made to dilate under the influence of negative abdominal pressure, just as the vagina is dilated in the familiar use of the Sims speculum; and it is to-day a matter of familiar knowledge that direct inspection of the mucous lining of the bladder is by this method a procedure sufficiently easy, rapid, and painless to be used in the office, and to be applicable to ordinary clinical work. Its value and results are,

[1] Read before the Obstetrical Society of Boston, November 9, 1895.

however, still sufficiently *sub judice* to render it desirable that we should accumulate as large an amount of testimony as possible upon this point.

Our knowledge of the pathology of the bladder is still small, and workers in this field still labor under great difficulties, many if not most of which are owing to the absence of a satisfactory literature, and indeed, of the knowledge which produces such a literature. This scarcity of literature is to be deplored, but is perhaps natural when we remember how very recent the introduction of the method is. Not quite two years ago, when I personally first began to study the subject, there was not even a satisfactory account of its technique to be procured, and I was obliged to start by a visit to Baltimore, where Dr. Kelly very kindly demonstrated his method to me. Even then I was obliged to expend the labor of a number of months before I was able to make a satisfactory examination of the bladder; for at that time even Kelly, whose mind was principally occupied with the affections of the ureters, had paid but little attention to the bladder itself; and I believe that most workers are to-day in the same position in which he then was, that is, occupied chiefly with the ureters and content to ignore the bladder, unless incidentally; and, although there is now a considerable volume of periodical literature descriptive of the technique of Kelly's method, yet the scantiness of the literature which relates to its results is shown by the fact that when I attempted to read up whatever had been written, in preparation for this paper, an exhaustive search of the "Index Medicus" up to the date when its publication ceased, and a letter to the office of the Surgeon-General at Washington, asking for a list of articles published since that date, furnished me, indeed, with a few papers in which single cases were detailed, but with no single effort at

any general statement of what should be looked for, or of the results of treatment in any series of cases, however small. The individual cases reported were, moreover, almost without exception, affections of the ureters, and there was no single reference to any condition of the bladder except tuberculosis. I am, therefore, led to hope, that though many others are now working in this field, a brief statement of my own experience may help other beginners in avoiding the great waste of time which attended my own blind efforts to obtain a knowledge of the normal bladder, and of the more familiar of the pathological appearances which may be expected; or that it may, at least, produce criticisms and differences of opinion from others who are now familiar with the method. My object to-night is to present to you a preliminary numerical statement of the lesions which I have so far observed, of the number of cases in which each has appeared and of the results of treatment in these cases; and, afterwards, to speak briefly of certain rules of procedure which I have picked up slowly by the disagreeable process of studying out the causes of my failures, and which my experience now leads me to believe to be essential to success in the diagnosis and treatment of affections of the female bladder.

In reporting my cases I feel obliged to limit myself to those which I have seen since December 1, 1894, the date on which my last year's service at the City Hospital began, as my records of those which I had seen before that time are rendered valueless by many omissions and errors of observation, which were due, I hope, to my lack of experience. Those of these cases which are of interest I hope to write up in detail at some future time, and shall therefore content myself to-night with a simple summary of the lesions which I saw during a five months' service at the hospital last

winter and spring, together with a few which have occurred in my private practice during the year 1895.

My hospital work during this period was based upon the plan of examining the urethra and bladder in every case in which frequent, or frequent and painful micturition was constantly present in sufficient degree to make the patient ready to submit to treatment, and in which there was no contraindication in her general condition. As a result of this policy, I cystoscoped at the hospital twelve patients, to which I may add four cases taken from my private practice, with the following results:

Negative Results. — Three cases. Nothing was found in the bladder in three cases. In one of these the examination was satisfactory, and the patient reported at her next visit, a few days later, that she was entirely well. I take it that there was some irritable condition of the urethra which was relieved by the dilatation. In the second case the examination was unsatisfactory, but was followed by chilly sensations alternating with hot flashes in the next twenty-four hours; and as the urinary symptoms were not important, the patient was not re-examined and was encouraged to endure her discomforts. In the third case, one seen in private practice, a fairly satisfactory examination failed to show anything except that the posterior wall of the bladder was pressed inward by the fundus of what was known to be a sharply anteflexed uterus. The mucous membrane covering this mound — so to speak — in the bladder was redder than the remainder of the vesical surface; but this, as I hope will appear later in my paper, was probably not pathological, but due to the existence of imperfect dilatation, that is, of less tension over this portion of the bladder wall. The results of the treatment were, I regret to say, extremely unsatisfactory and the patient

is at present unrelieved of her urinary difficulties. [Since this paper was written the patient has been re-examined, after an interval of many months, and a ureteritis with vesical erosions found. She is now improving with fair rapidity.]

Tuberculosis. — Four cases. There were four cases which I have classed together under this heading. One patient was examined for trifling urinary symptoms in what proved to be the initial stage of a localized tuberculosis, the diagnosis being sustained by the presence of tubercle bacilli in the urine. After some weeks of treatment, the bladder was restored to a wholly normal condition and the symptoms disappeared. I have seen this patient recently and she is still wholly well, after an interval of eight months. [Has since returned with a recurrence, but is again well.] A second case was examined first in a reasonably early stage of the disease. She was treated for some weeks, and was so greatly relieved that she unfortunately ceased coming to the hospital and took a place as a domestic. She returned about a year later in an advanced stage of the disease and with well-marked renal tuberculosis. She was again somewhat relieved by treatment; but there was, of course, no prospect of a cure, and she eventually gravitated to Tewksbury. In a third case the clinical appearances were precisely those which were seen in the first, but two attempts to detect the presence of bacilli in the urine yielded negative results, and as the bladder was shortly brought under treatment into a normal condition, the diagnosis is likely to remain open to doubt. In the fourth case the patient was seen but once, and the diagnosis was made from the clinical appearance only.

Ureteritis. — Eight cases. In eight cases, or fifty per cent. of the cases examined, it was possible to establish an undoubted diagnosis of ureteritis. In

one case there was an acute cystitis, complicated by an involvement of the ureters. The patient was discharged well. In one, ureteritis was complicated by a small ulcer near the internal orifice of the urethra. This patient was discharged well. In two cases the ureteritis was accompanied by granular inflammatory patches separated from the mouth of the ureter by a small space of normal mucous membrane. One of these cases was discharged well. The other was treated but twice, and although she was improving when last seen, I feel bound to enter the result as not treated rather than relieved. In one case there was ureteritis and a probable inflammatory patch of roughened mucous membrane; but the examination was somewhat unsatisfactory and the patient never returned. Discharged, not treated. One case was uncomplicated ureteritis, discharged well. To these six should be added two cases of acute ureteritis seen in private practice, but not cystoscoped; in one case because the diagnosis was clear without cystoscopy and the patient was extremely sensitive to pain; in the other, on account of the youth and virginity of the patient. Two other cases, seen in private practice, are not included in this list because the cystoscope was not used and the diagnosis, though probable, could not be regarded as established.

Ulceration and Sacculation of the Bladder. — One case. There was one case, seen in private practice, in which the cystoscope demonstrated the presence of several deep ulcerations and a large number of cicatricial bands in the bladder of a woman who had been the subject of considerable, but not extreme, urinary discomfort for many years. In two places the cicatrices were annular and the portions of the bladder beyond them communicated with the rest of the viscus only by narrow openings. This patient could be ex-

amined only under anesthesia, and the treatment was necessarily limited to a single sitting. As a result, however, of a single local treatment her urinary trouble is — six months after operation — limited to very slight frequency of micturition when she is over-fatigued. I prefer to report this case as relieved rather than well, because I believe the condition likely to recur.

There were in all sixteen cases, of whom three were discharged not treated; nine, well; two relieved (one of them the case last reported); and two, unrelieved.

The list includes every case in which the examination was made during the period named, and seems to me to warrant a belief in the frequency of localized lesions in a very large proportion of cases in which there is frequent, or frequent and painful, micturition.

These are, then, my cases of the last eleven months and are the only ones which I think worth reporting statistically, but in respect to what they have taught me, the comparatively ill-observed cases of my first year were perhaps more valuable.

In summing up my whole experience, the first point that I notice is that although some of my early cases showed what was then, to me, an unexpectedly close localization of the lesions; yet in the great majority of them I was able to make no very sure diagnosis, and in few or none did I obtain any very marked benefit from treatment; but that as I grew more experienced, the proportion of cases in which the diagnosis was clear grew greatly larger; until in the last year, as instanced by the list just read, there were but few cases in which I failed to find a definite lesion, and in by far the greater proportion the results of treatment were exceedingly gratifying. My resulting position is, that though I certainly believe that there will always

be cases in which the urinary difficulty is distinctly a reflex from pelvic or general non-urinary disease, I have been brought to what was, to me, the very unexpected conclusion, that in the majority of cases in which I have been in the habit of believing that urinary symptoms were the results of a reflex influence from other pelvic diseases, there is, in fact, some localized vesical lesion which is susceptible of independent treatment, with the result of a relief or cure of the urinary troubles, independently of the condition of the other pelvic organs; and, believing as I do, that our knowledge of the bladder is as yet by no means perfect, and that our knowledge of treatment is very elementary, I am led to hope that the proportion of cases which we must, as yet, still class as reflex, will be in the future somewhat further diminished.

In searching for the causes of my failures in my early work, I notice first an imperfect appreciation of the importance of obtaining complete dilatation of the bladder. It would seem at first sight as if a moderately complete dilatation would, in the end, yield as good results as a wholly complete expansion, even though the resulting examination were less comfortable and more tedious; and such was at first my own belief. In point of fact, it has been demonstrated to me in case after case that no diagnosis can be considered satisfactory unless it is made by the inspection of a fully dilated bladder.

It is more especially, and most emphatically true that a *negative* result derived from anything but complete dilatation is absolutely worthless.

Three factors enter into the difference of results. First, and least important, in the partially dilated bladder the speculum is necessarily so near to the wall which is under examination that but a small field can be seen at any one time, and a systematic inspection

of every part of the bladder is almost impossible from the loss of time involved; whereas, when the bladder is dilated to its full capacity, by holding the inner end of the speculum but little inside the internal orifice of the urethra, the bladder wall is at a considerable distance from the end of the speculum, and a large field can be covered by very slight motions of the speculum and in a short space of time.

Secondly, and more important, in the partially dilated bladder there are necessarily numerous folds in which small lesions may be concealed; and, moreover, our inspection of the all-important trigonal region is always rendered difficult, and sometimes impossible, by the presence of even a small quantity of urine; and it must be remembered that even if the bladder be wholly emptied at the start, the urine rapidly re-accumulates during the examination.

Thirdly, and most essential, the appearance of the mucous membrane during partial dilatation is utterly and wholly different from its appearance when the bladder is in complete expansion. While the bladder wall is lax, as must always be the case with partial dilatation, the mucous membrane has a soft, velvety-looking surface, which is rendered rough by the presence of innumerable minute, one might almost say microscopic, wrinkles; that is, the surface looks granular; it is uniformly pink in color, granular inflammatory patches are almost indistinguishable from the surrounding healthy mucous membrane, and even shallow ulcerations are distinguished with the greatest difficulty. In contrast to this, in the presence of full dilatation, that is, when the bladder walls are rendered tense by their intrinsic resistance to the expansile force of a fully developed negative intra-abdominal pressure, the normal mucous membrane shows a white and glistening field, over which branching blood-vessels

throw a coarse network of brilliant red, and against which the smallest ulcer or inflammatory spot exhibits itself with almost startling distinctness. The appearance of the vesical mucous membrane in this condition may be not inaptly compared with the base of the eye as seen with the ophthalmoscope. All folds are obliterated, the all-important trigonal region is easily found, and it can be readily appreciated that only in this condition can a sure diagnosis be reached; or, at least, that it is only when the bladder has been inspected in this condition that we can be safe in assuming the absence of abnormalities. In the presence of full dilatation we can inspect with ease every part of the bladder wall except the anterior portion, and this is, so far as we now know, unlikely to be the seat of disease. The attainment of complete dilatation is then the first point which I now insist upon.

The second source of error which I note is that I was at first unacquainted with the comparative importance of the different regions of the bladder; and that when, as is often unfortunately the case, the complete dilatation is inconstant, and the diagnosis must be made by quick glances during the short periods when it is present, a hap-hazard search may fail to reveal lesions which would be promptly discovered by a more systematic inspection. As a matter of fact, it seems to be a rule that if the region of the trigonum and its neighborhoods on the posterior and lateral walls, are free from disease, there is every probability that the bladder as a whole is normal. In every viscus with which we are familiar it is known that disease is apt to localize itself at a certain point or points; and when we consider the physiology of the bladder, and that any irritating substance, whether introduced from above or below, will first come in contact with the trigonum; also that the contained

fluids will constantly gravitate to this point in all the ordinary positions of the patient, it is easy to understand why this should be the most frequent seat of disease. In the event, moreover, of our being obliged to suspend the inspection after having seen these regions only, we may feel fairly confident that the appearance of the remainder of the bladder will be but slightly modified from those seen here. The importance of this region is further emphasized by a fact in treatment, of which I feel reasonably confident, that if the region of the trigonum has once been rendered normal, there is, in the majority of cases, a tendency to the resolution of the usually less marked lesions in other portions of the bladder; but upon this point I must be content with a passing reference, since to enter upon a discussion of treatment would be to extend an already long paper to an unconscionable length. I may, however, be pardoned if, after emphasizing the absolute importance of complete dilatation, I permit myself to add a few words upon the comparative value of the different postures and methods of obtaining dilatation and a consequent easy opportunity of examining the all-important region of the trigonum.

Dilatation of the bladder depends upon relaxation of the abdominal muscles, and as every gynecologist knows, this can be attained only by obtaining the full confidence of the patient, by persuading her that she is not liable to unexpected pain, and in many cases only by the training which comes from several examinations; some points in the avoidance of pain are, however, peculiar to this special examination, and must be referred to here. The meatus urinarius is the only organically narrow portion of the urethra, and is usually lacerated by the passage of a No. 12 Kelly dilator. I believe it to be well worth while to make it a rule to devote the first sitting to this process of

dilating the meatus, and to make no attempt to pass the cystoscope at this visit.

I am in the habit of beginning each sitting by the insertion of a small pledget of absorbent cotton, wrapped upon an applicator, and saturated with a 20-per-cent. solution of cocaine. At the first visit the introduction of the cotton usually causes considerable pain, but when it is once in position, one is justified in assuring the patient that she has passed through the only very painful stage of the ordeal. After allowing the cocaine five minutes in which to attain its effect, I dilate the meatus, as a rule, to the size of a No. 13 or 14 cystoscope. This dilatation is always attended by bleeding, but the bleeding has never been known to be of moment. The patient is then assured that the subsequent sittings will be far less painful, and dismissed for the day. At her next appearance the cocaine is again inserted, this time with little or no pain, and the meatus is then dilated to about No. 13. The dilatation is much less painful than on the preceding occasion. She is assured that the rest of the operation will be practically painless, and after resting for a few moments is turned over into position for the use of the cystoscope. The passage of the No. 12 cystoscope is then almost painless, and at this or the next sitting most patients are able to relax completely. I believe that a gradual training of this kind is in most cases far preferable to making the first examination under general anesthesia.

For obtaining dilatation of the bladder, we have the choice of three positions: first, the Kelly position, that is, with the patient upon her back, her hips elevated by a pillow, the thighs flexed to the sides of the abdomen, and the knees extended across the chest; second, the knee-chest position; and, third, the familiar Sims. Each position has its advantages and its dis-

advantages. Kelly's position is rather uncomfortable for the patient, but is far more comfortable than the knee-chest. It renders the region of the trigonum more easily accessible than any other. It is consequently more convenient for both diagnosis and treatment, and more especially for the use of the ureteral catheter. Its disadvantages are that complete dilatation is less easily attained in this position than in either of the others, that the urine is less completely out of the way, and that a small amount makes more trouble. Kelly himself says that it is better to use the knee-chest position until the patient has become well trained, and always in unfavorable cases. In my experience Kelly's position has been unsuccessful in stout patients, in patients with rigid abdominal walls, and in the great majority of all patients in their early sittings.

The knee-chest position is perhaps the most generally useful. Its great advantage is its creation of a more powerful negative abdominal pressure than can be obtained in any other, and therefore in the attainment, as a rule, of better dilatation than by any other position. The urine gravitates to the fundus and is wholly out of the way, so that a comparatively large amount makes no trouble. Its disadvantages are that any long maintenance of it is uncomfortable to the patient, and that the trigonal region is rather difficult of access for the surgeon, more especially so when we come to consider the question of treatment or of ureteral catheterization. It is, nevertheless, the position which must be used in a large majority of cases. The Sims position is only occasionally useful. It is the most comfortable for the patient. Distention is more easily obtained than in the Kelly position, but less easily than by the knee-chest. So, too, in the amount of trouble caused by the urine, it occupies an intermediate position. It produces, however, a lateral dis-

location of the bladder which is confusing to the surgeon and makes the lower side of the trigonum and the lower lateral wall somewhat inaccessible; but this can, of course, be obviated by placing the patient upon one or the other side in accordance with the region which we wish to inspect, and the position is therefore occasionally useful for the treatment of cases in which the location of the lesion is already known.

In conclusion, I may say of the value of Kelly's method of examination of the air-distended bladder that it has already changed our ideas of vesical disease, and has certainly transferred the affections of the lower urinary tract of women from the region of diagnosis from obscure symptomatology, to that of a clear and definite physical examination, that is, from medicine to surgery. As our knowledge of the subject increases, this change is likely to become even more pronounced. The method has already established itself as not only the best, but as, so far, the only satisfactory method for diagnosing and treating the more serious affections of the bladder. Its practice is likely to lead us to pay an increasing attention to the lesser degrees of vesical disease, both because it has already been established that a very slight degree of irritability may be due to the initial stages of important disease, and because it offers a prospect of cure in many cases in which we have been in the habit of encouraging patients to endure slight urinary distress, simply because we knew of no way of relieving it, or because we believed it to be of reflex origin, and therefore not susceptible of improvement by direct local treatment. Many such cases can, moreover, be shown to be susceptible of cure by but a few local applications, and it is to be hoped that this number will in the future prove to be greater than we can believe it to be to-day. I am unwilling to trench upon the domain of

treatment in this paper, but must here permit myself the reminder that when we use the word cure in this connection we must add the corollary that in many of these cases, the local lesions will be sure to recur unless the brief local treatment is backed up by the appropriate and often long-continued course of general medicinal and hygienic care, which is alone able to control the underlying vicious diathesis.

It is, moreover, important to remember that the process of direct treatment of the bladder is yet in its infancy, that its development requires much patience and prolonged work, and that it is yet too soon to speak with confidence even of its immediate, and far less of its ultimate results. It may yet be found that the examination is not *per se* the harmless thing which we now believe it, though so far no evil results have been reported. Moreover, to avoid an over-enthusiasm, it is important for us to remember that the female bladder is comparatively seldom the seat of even slight affections, and still less frequently of serious disease, so that even the most ideal methods of exploration are never likely to develop a field for extensive work, but I think that we are justified in saying that in so far as the comparative unimportance of the field permits, the method of examination which we have been discussing has inaugurated a great advance in our knowledge.

It may be noted that I have said little or nothing of the exploration of the ureters, but this omission is compelled by lack of space. I felt it impossible to discuss both questions, even cursorily, within the limits of a single article, and chose the bladder, because, fascinating as the ureteral work is, I believe that it offers far less promise of valuable results than are to be attained in the treatment of the bladder.

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