

OPERATIVE TREATMENT OF URINARY INCONTINENCE

BY MARION DOUGLASS, M.D., F.A.C.S., CLEVELAND, OHIO

(From the Department of Obstetrics and Gynecology, Western Reserve University School of Medicine, and the Lakeside Hospital)

SINCE 1928 we have been interested in the problem of urinary incontinence and its methods of treatment, and during that time have treated and followed carefully a series of cases of its various types. A number of surgical methods, most of them standard operations, have been employed, and a few modifications, devised for individual cases, have been given a trial. The subject is rather specialized and might seem to be of limited interest, but many patients with urinary incontinence are so hopeless often and so eager for surgical relief that a consideration of operative methods seems worthwhile. Urinary leakage is one of the most troublesome ailments with which patients are ever afflicted. The mechanism of urinary control, which under normal circumstances functions so perfectly, is rarely appreciated until, due to relaxation, accidents or disease, it becomes functionally incompetent or organically damaged.

Since the time of Rounhuise in the latter part of the 17th century there have been consistent attempts to improve upon the operative methods which may be employed in dealing with urinary leakage. The history of vesicovaginal fistula, primarily due to the work of its pioneer surgeon, Marion Sims, is best known in the surgery of urinary leakage, but the advances made and cures obtained through the efforts of Kelly, Ward, Rawls and others have so improved surgical attack that almost any case may be promised great improvement or even a clinical cure although several surgical procedures may be necessary. Crossen has presented detailed descriptions of technic in his volume "Technique of Gynecological Surgery." Many isolated cases of all types have been reported which have been benefited or cured by many different methods (Young).

Relief of incontinence depends to the greatest extent for its success upon the proper choice of methods in the various types of incontinence. It is the purpose of this paper to give a brief consideration to those types and the methods best adapted to their treatment with the report of some typical cases.

Although vesicovaginal fistulae have been described in mummies as early as the second Egyptian dynasty, apparently no suggestions for its treatment were considered until the time of Ambroise Paré in 1570.

Marion Sims in 1850 was the first to employ the three essentials of exposure, closure by suture, and catheter drainage.

Urinary incontinence usually may be considered under the following headings: those due to—

1. Congenital or neurogenic causes; spina bifida, exstrophy of the bladder, lues, cord lesions, congenital defects of the vesical sphincter, ectopic ureters, et cetera.

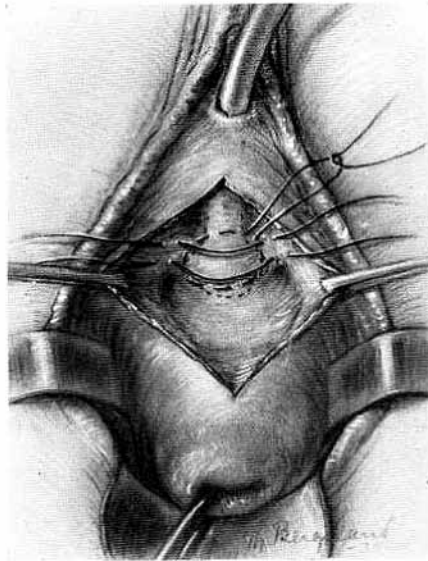


Fig. 1. Repair of vesical neck where bladder is thin and redundant by means of superimposed purse strings combined with a mattress suture (Kelly).

2. Acquired defects of the vesical-control mechanism, usually
 - (a) trauma or relaxation of the vesical neck, due most often to dystocia, defective tissues, senility, et cetera.
 - (b) relaxation of vesical neck associated with marked cystocele or prolapse.
3. Vesical fistula with urethra and vesical sphincter intact.
4. Loss of urethra and vesical sphincter.

Several considerations are important in the treatment of these cases. Certain patients can not be classified as absolutely cured. Especially is this true in cases where there is a lesion or functional incompetence of the vesical neck. The simple vesicovaginal fistula either leaks or does not, whereas the patient who has a synthetic vesical sphincter constructed or who has a normal vesical neck artificially made tighter, but

under poor nervous control, can scarcely be expected to have a perfect functional result. Repeated operations through scar tissue and the necessity of employing the thinned out atrophic structures add to the operative difficulties. The anatomy of the vesical neck is insufficiently understood. The vesical neck is produced by thickening of musculature and submucosa which forms a ring about the orifice that functions as a sphincter, i.e., the sphincter vesici internus. In addition, but

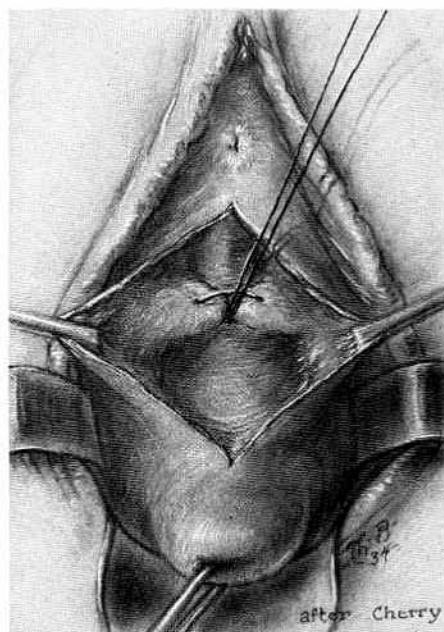


Fig. 2. Kelly operation. Plication of vesical neck.

in the female essentially continuous with the structure of the vesical neck, there is an external sphincter which is voluntary in function. The hypogastric nerves and pelvic sympathetics carry the impulses and there is a balanced antagonism of reflex sphincter and bladder muscle stimulation and inhibition. Incontinence as well as acute retention occurs in cerebrospinal lues, in cases of congenital defects of the bladder and tumors of the cord.

1. *Congenital Defects.*—Occasionally we see cases of a congenital type of incontinence characterized by incontinence without recogniz-

able anatomic defects. Case 1 shows such a condition. These patients have apparently an uncertain nervous control over the vesical sphincter.

CASE I.—The patient, thirteen years of age, came to the hospital for incontinence of urine. She had been incontinent since birth. There was no history of any urologic disease and neurologic findings and cystoscopic examination were completely negative. She voided regularly, and had no difficulty in emptying the bladder. There was slight constant dribbling of urine. Ectopic

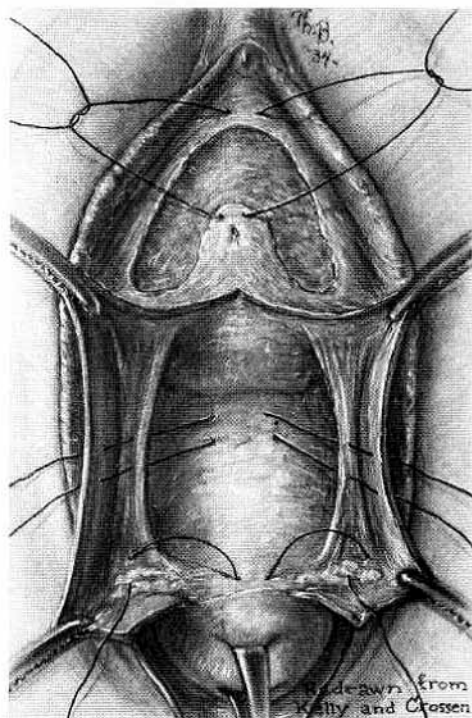


Fig. 3. Procedure best employed in certain cases of incontinence with cystocele and first degree prolapsus. Advancement of the urethra (Pawlik) plus advancement of the bladder and the Kelly operation may be combined with this.

ureteral orifices were ruled out as nearly as possible. Upon withdrawal of urethroscope it was found that the internal sphincter remained open even after the instrument had been withdrawn down the urethra 1 cm. from the internal sphincter. The anterior half of the neck was seen to close, but the posterior half remained definitely open. The situation thus being one of mechanical insufficiency, it seemed advisable to attempt to improve the competency of the sphincter by simple plication. This was performed by the Kelly technic consisting of a longitudinal denudation, mattress sutures being placed in the vesi-

cal neck; the neck being marked out by the means of a Pezzer catheter. This patient is markedly improved, especially in her diurnal control. (Fig. 2.)

The treatment of extravesimal ureters is relatively easily carried out once the diagnosis is made. In general it may be said that the incontinence due to cord lesions in congenital defects can not be well treated by plastic surgery. Implantation of the ureters into the rectum is advisable, being about the only surgical possibility. This also holds for

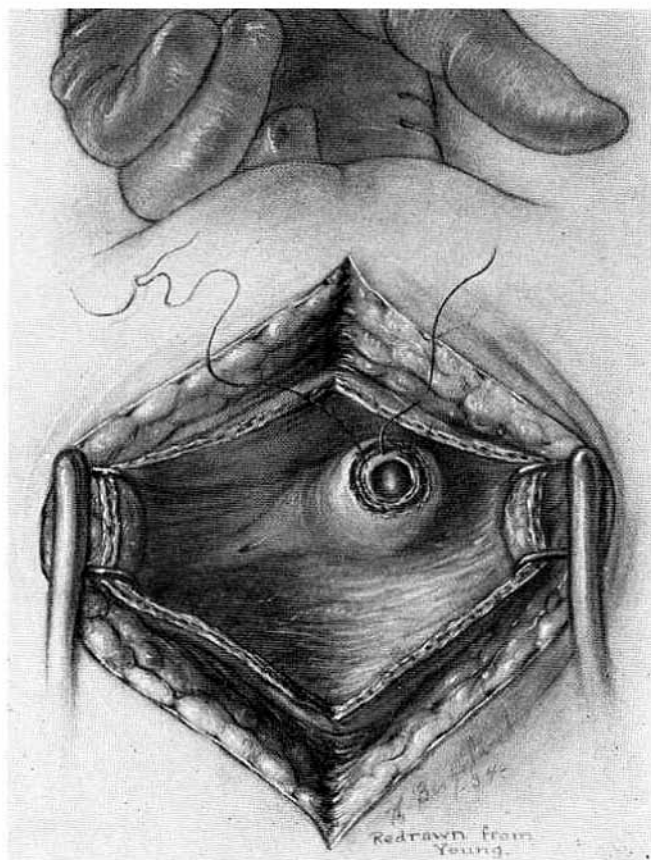


Fig. 4. Transvesical approach (Young) showing invaginated bladder and purse-string suture easily placed.

extrophy of the bladder. I am performing a series of operations in a case of extrophy at present by the transvesical approach.

2 (a) *Acquired Defects: Relaxation of the Vesical Neck Due to Dystocia or Defective Tissue.*—By all odds the most common type of relative or intermittent incontinence is relaxation of the vesical neck

due to dystocia or defective tissue. This occurs most frequently after extreme dystocia, breech or difficult forceps delivery. Certain patients seem predisposed to development of urinary incontinence of a minor or intermittent type, i.e., tendency to lose urine when coughing or straining or where the bladder is abnormally full, apparently due to defective tissue.

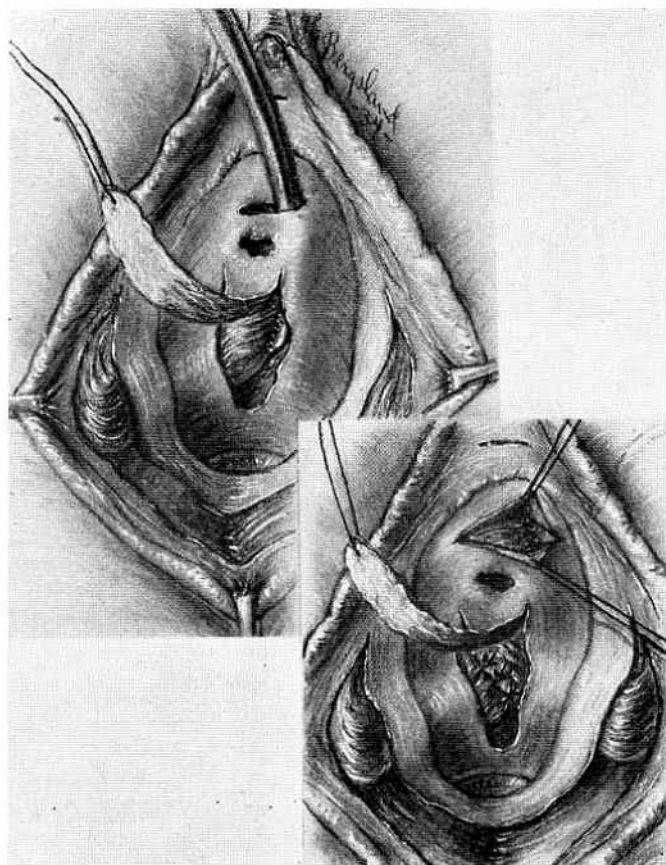


Fig. 5. Levator flap transplantation (Taussig), as modified (McGaw-Douglass), applicable to certain cases with destruction of the urethra and vesical sphincter may be combined with operation for reconstruction of the urethra.

These cases are seen principally in women who have had numerous rapid pregnancies and in women of advanced years. The Kelly method is usually sufficient. Other methods which may be used are the advancement of the urethra as advocated by Pawlik or twisting of the urethra with advancement (Fig. 3). For example, a typical patient

is a young women, twenty years of age, who entered the hospital complaining of incontinence of urine since delivery of her first child with a difficult forceps procedure. Pelvic examination revealed no abnormality except moderate relaxation with a very rigid perineum, and a wire-edge scar completely encircling the lower half of the vagina. The typical Kelly procedure resulted in complete cure.

2 (b). *Acquired Defects: Relaxation of the Vesical Neck Asso-*

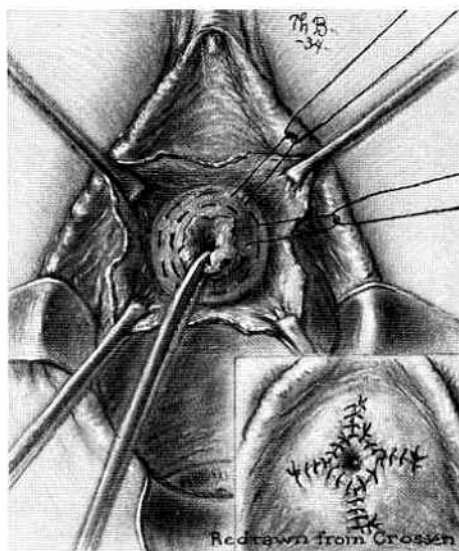


Fig. 6. Procedure applicable to destruction of urethra and vesical sphincter consisting of invagination of vesical wall inside of successively tied and invaginated purse-string sutures.

ciated with Marked Cystocele or Prolapse.—There is a distinct group of cases which have marked relaxation of the pelvic floor associated with relaxation of the vesical neck, i.e., a marked cystocele and rectocele with some degree of prolapsus uteri. The problem here is more complicated. Here we have residual urine as well as incontinence often producing vesical irritability, causing loss of urine due to contractions of the bladder which are more or less involuntary. In these cases the relaxed pelvic floor must be repaired as well, to support the base of the bladder and urethra. This is necessary to give a lasting result. The type of operation advisable for this procedure may well be the cystocele operation with advancement of the bladder as recommended by Ward (Fig. 3). This is carried out by means of advance-

ment of the bladder with the usual T incision, the fascia is mobilized laterally and the vesical sphincter shortened by the Kelly procedure and the fascia is then sutured under the bladder after it has been advanced, after which the mucosa is repaired along the usual lines of incision. Certain patients with marked relaxation resist ordinary tightening of the sphincter vesici by the commonly used Kelly method. In these there is usually marked thinning of the bladder wall at the vesi-

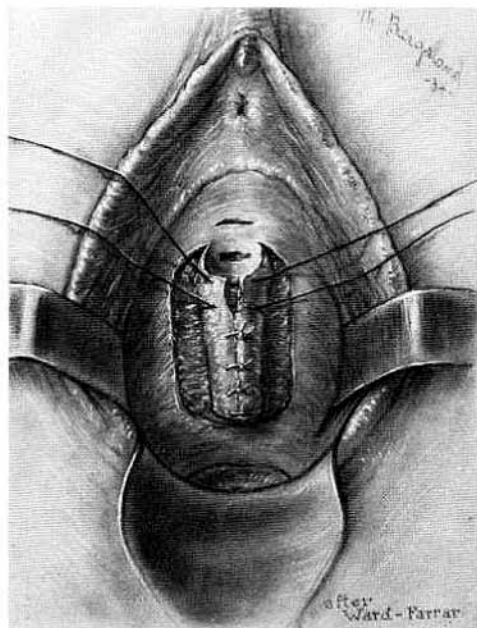


Fig. 7. The Ward-Farrar operation showing construction of mucosal tube to be placed as new urethra.

cal neck, i.e., the site of the vesical sphincter, which is usually readily distinguished at operation. Where it is very difficult to imbricate the relaxed tissue of the vesical neck about a Pezzer catheter the trouble lies in the fact that only very small superficial sutures may be taken in placing the mattress sutures employed by the Kelly technic. Unless extreme care is employed there is danger of penetrating the vesical mucosa, with subsequent development of a fistula, a most troublesome and embarrassing accident. This situation may be met by several methods, among which are advancement of the urethra or the placing of superimposed small purse-string sutures, invaginating the redundant tissue into the bladder by the method of Gersuny and Saenger. This pro-

duces a plug mechanism which aids in restoring the competency of these thinned out tissues. This has proved effective in our hands in one patient, whom we had treated first by the Kelly method alone, and then by a modified Kelly technic with advancement of the urethra (Fig. 1). Of this variety of cases we have had, with and without marked cystocele and prolapse, eight cases with a satisfactory result.

3. *Vesicovaginal Fistula*.—As it has been previously pointed out in the early history of the surgery of urinary incontinence, vesicovaginal fistula has dominated the picture. The early work of Sims and Emmet marks the beginning of modern operative treatment. The classical method of Sims, using silver wire, consisted in the essentials of trimming the edges and closure by suture. Rawls, Watkins, and others have advocated flap splitting and mobilization of the bladder in the operative attack. This is much the same as the dissection of the anterior vesical wall and free mobilization of the bladder, which is used by many operators for cystocele repair. It is not in the scope of this paper to mention all the procedures which have been suggested to deal with certain types of fistulæ. Kelly, Farrar, Noble and Ward have all devised modifications for various types of fistulæ. The trans-vesical route has been of interest to us and we are including in this series several successful cases so treated.

In 1927 Young reported a cure of a patient who had had eleven unsuccessful operations during a period of three years. His method is extremely good. Suprapubic incision is made following complete urologic investigation, the bladder incised, the fistula elevated by a hook, circumcised and closed by purse-string sutures about the finger in the vagina (Fig. 4).

We have three successful cases where fistulæ developed following panhysterectomy. These patients had had repeated operations by the classical method, which we repaired at one procedure by the trans-vesical route. Suprapubic transperitoneal operations have been advised (Legueu, 1914). The extra-vesical route is used, the mobilization of the bladder being carried out as in doing a hysterectomy. We have had no experience with this method. In our hands the classical method with marked mobilization of the bladder and fistula in large fistulæ and the Young operation in certain cases are the advisable procedure.

4. *Loss of Urethra and Vesical Sphincter*.—Destruction of the urethra and vesical sphincter are extremely difficult cases with which to deal. Flap operations and many tunnelling methods have been used by Baker Brown, Noble, Sellheim and many others. Artificial

sphincters have been constructed by various methods (Deming, Taussig, Martius, and others). We reported in detail in 1931 before the American Gynecological Association three cases of complete loss of urethral and vesical sphincter treated by a modification of Taussig's method with almost complete cure within limits of emptying the bladder about every hour. Two of these patients are still under observation and in good condition. Since then we have operated upon three

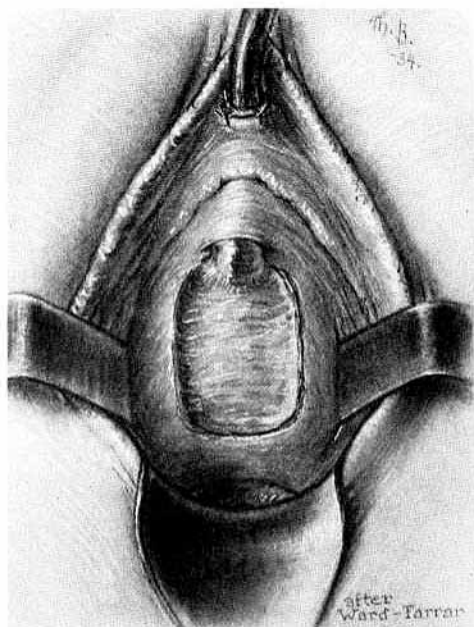


Fig. 8. Tube used as synthetic urethra in tunnel. This was employed successfully in one case in this series.

more patients. In one the operation is a complete failure, one is much improved, and one is cured following four operative procedures. I briefly summarize the methods used in the last case.

The patient is twenty-six years old, incontinent of urine after forceps delivery. She had two unsuccessful attempts at repair at other hospitals. There was complete destruction of the urethral sphincter, it being possible to put the tip of the forefinger into the urinary bladder. Transplantation of the levator flaps was performed and the patient was discharged completely continent within the limits of emptying the bladder every hour and a half when on her feet (Fig. 5). The patient remained continent for three months, when approximately at the time of renewal of her coitus her incontinence returned making it necessary for the patient to wear pads constantly. In the next operative procedure it was

attempted to narrow the urethra by a horseshoe denudation above the urethra after the method of Pawlik, with narrowing of the urethra. This operation was a complete failure. At the third operation the posterior wall of the urethra could be demonstrated as being approximately 2 cm. in length. An attempt was made to imbricate the presumable site of the bladder neck by a Kelly mattress suture and the use of multiple purse strings after the method described by Crossen to support the para-urethral structures (Fig. 6). Suprapubic drainage was performed. In this case, two and one-half months following discharge from the hospital the patient stated that she was continent, and had good voluntary control. Within six months the patient was again incontinent. This was due again presumably to the pull on the perineum following resumption of coitus. A fourth operation was performed later and consisted of the Ward-Farrar operation (Figs. 7 and 8). The new urethra was a complete take and the patient is now continent after one and one-half years.

This case demonstrates the difficulty encountered in dealing with cases of absent sphincter and urethra and illustrates to some extent how the attack must be modified according to the tissues which are available to the operator at successive operative procedures.

In summary I wish to emphasize that treatment of urinary incontinence demands patience, care in details of technic, and proper choice of methods.

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DISCUSSION

DR. LOUIS E. PHANEUF, BOSTON, MASS.—Dr. Douglass, in his paper, has well covered the subject of urinary incontinence in all its details. Per-

sonally, I have been interested in this condition for over twenty years, during which time I have used several of the methods in vogue. The essayist's classification of urinary incontinence under four large groups is a clear and satisfactory one. He has further mentioned practically all the operations in common use to overcome this distressing disorder. My paper on vesico-vaginal fistula, presented at this meeting, covers what I want to bring out in connection with this lesion. I would like to mention, however, that in difficult cases, where other methods have failed, the extraperitoneal approach through a Pfannenstiel incision may be successful. This particular method, which is not mentioned in Dr. Douglass' paper, has served me well in one case, where I successfully closed a bladder fistula after having failed at five previous operations performed through the vagina and through the bladder.

My experience differs from that of the essayist in the use of the transvesical route in the closure of a vesico-vaginal fistula. He reports three cured cases; I have used the method four times and failed each time.

Urinary incontinence from a relaxed vesical sphincter is a fairly common condition. This is encountered not only in dystocia but also in repeated, frequent normal deliveries. The vesical sphincter is a poor sphincter at best and the results obtained by surgical procedures on the neck of the bladder depend, to a great extent, upon the condition of the tissues at the time that operation is performed. I have found the Kelly technic satisfactory in a number of these patients, the best results being obtained in those women who were operated upon early after the appearance of incontinence, before the tissues had undergone marked atrophy. My poorer results were obtained in the group of older patients where there was so much loss of sphincter tissue that shortening of this structure gave but little control.

At the 1924 meeting of this Association, held in Cleveland, H. Dawson Furniss presented an ingenious method of suprapubic sphincter tightening through a median, extraperitoneal suprapubic incision over a Pezzer catheter. He claimed to have obtained the idea from F. C. Holden, who had so operated successfully. Holden in turn had gotten his idea from Todd of Texas. This method is useful where the vagina is very contracted, where the vaginal mucosa is thinned out, where a previous Kelly operation has failed and where the Watkins interposition operation and other operations for cystocele and vesico-vaginal fistula have been previously performed. This operation is well illustrated in our Transactions for 1924.

Repair of the pelvic floor, as advocated by Dr. Douglass, is important where there is marked relaxation of the vagina, the repaired pelvic floor obviously giving support to the base of the bladder and urethra.

I am in complete agreement that the best treatment of extra-vesical ureters and exstrophy of the bladder is implantation of the ureters in the rectum.

Reconstruction of the urethra has been resorted to three times with success in the series of cases which I reported in my paper.

Like Dr. Douglass, I feel that the results of the treatment of urinary incontinence depend on the choice of the proper procedure, a meticulous technic and painstaking after-care.

DR. WILLIAM H. WEIR, CLEVELAND, OHIO.—This paper has been of particular interest to me because I was able to see a number of these patients who were operated upon by Dr. Douglass. The method of approach in repair of

successfully. On looking in the vagina one could see the bladder prolapsed through the opening and the two ureters spurring urine. What to do was a question. I finally used this technic, which I think is very simple. I took a fairly heavy rubber balloon and pulled the neck of the balloon through the urethra, leaving the body of the balloon in the bladder. With a little air in the balloon I was able to push the prolapsed bladder back in where it belonged. Then by increasing the air in the balloon I found, on looking in the vagina, that I had an opening the size of a quarter, and, with the red balloon as a background, I was able to make a complete dissection and place my sutures to good advantage, letting the air out before the sutures were tied.

There is this advantage: You can inflate the bladder to a considerable size before operating, which will increase its capacity after operation by breaking up adhesions that have formed in a bladder that has been collapsed for a long period. Your assistant can place pressure on the lower abdomen and you will be surprised how this brings down the opening in the bladder and gives you a splendid exposure. There was primary union. The sutures were removed in six days. This patient retained her urine six hours after removal of the catheter, and after one week did not have to get up at night. Such a technic gives a beautiful exposure and is a simple procedure.

DR. FREDERICK H. FALLS, CHICAGO, ILL.—I have found that it is a good plan to use the balloon in the bladder pre-operatively, to get the mobilization of the bladder wall. There is one type of incontinence that should be considered, the type due to spina bifida. We had a colored girl with a spina bifida who had also a marked deformity of the lower extremities, both knees drawn up and the feet deformed. They could not do anything for her in the orthopedic department because she had a sloughing ulcer of the buttocks due to the fact that she had sat in urine all her life. Since she was constantly wet they could not clear up the infection sufficiently to operate on the joints and they asked me finally if I would try to cure this incontinence. I could not operate from below on account of the lack of exposure, due to the deformities, so I made a suprapubic incision, separating the recti muscles, then, taking a strip from each side of the rectus fascia, sewed the strips together, and with a finger of an assistant in the vagina went down with an aneurysm needle and tried to pass a silk ligature underneath the urethra. I could not do it, so I took a curved forceps and got underneath the urethra, got the fascial strip through, brought it up and sewed it to the edge of the rectus muscle. Then when she kept the back straight it kinked the urethra and she was able to hold the urine for a period of two or three hours and she could be kept dry practically all the time during the day. The ulcerated area on the buttocks rapidly cleared up. The bladder capacity was 180 c.c.

DR. MARION DOUGLASS, CLEVELAND, OHIO (closing).—I did not mean to give the impression that I advocated the transvesical approach. I do not hesitate to use the Schuchardt incision on any case that is inaccessible, but there are certain cases where the transvesical approach gives better exposure, in my opinion.

As to the treatment of these cases, we keep the patient on the abdomen for practically a week, keeping the urine well acid to prevent incrustation of the sutures. I do not hesitate to do a suprapubic drainage where necessary. It very often adds materially to the improvement.