

VENTRAL PRE-PUBIC HERNIATION OF THE BLADDER FOLLOWING INCONTINENCE SURGERY

T. FOURIE AND S. RAMPHAL

*Departments of Urology and Gynecology, Nelson Mandela School of Medicine, University of Natal,
Durban, South Africa*

Objective: Ventral pre-pubic herniation of the bladder through an incisional hernia is an uncommon condition and reports in the literature are confined to one or two cases. We describe nine patients who presented with this condition 1 to 5 years after undergoing Burch colposuspension operations for stress urinary incontinence [SUI].

Patients and Method: All patients developed the condition following Burch colposuspension operations for stress urinary incontinence. Their non-specific presenting symptom complex is described and emphasized. The incisional hernias were difficult to diagnose on initial clinical examination and easily missed, unless the patient was examined in the erect position with a full bladder. Lateral cystography was the definitive diagnostic imaging modality. CT findings were dramatic and informative but not essential for the diagnosis. On urodynamic investigation bladder pain and urgency on low volumes were found, but no abnormal contractions were seen. Cystoscopy was essential to exclude other intravesical pathology and the specific findings are described. As these patients had intractable bladder symptoms, surgical repair was performed. The anatomical defect in the anterior abdominal wall was always more extensive than anticipated and closure incorporating Prolene mesh and sutures was performed. Co-morbid vaginal prolapse was repaired 4 to 6 months later. Recurrent stress urinary

incontinence in one patient was preferably treated with a transobturator suburethral tape.

Results: Two patients developed recurrent incisional hernias within the first year. Our first patient who had a primary closure only, had a subsequent successful closure with Prolene mesh. One other patient developed a recurrence in the upper part of the wound. The other patients were all symptomatically satisfied with their results at 6-month follow-up. The symptoms of bladder overactivity had reduced dramatically to satisfactory levels and clinically the repairs were secure. The subsequent vaginal repairs of their recurrent cystoceles and rectoceles in three patients seemed successful on short follow-up. The patient who had the transobturator suburethral tape placed is clinically continent.

Conclusion: The condition is probably more common than realised and significantly under diagnosed. It should be considered and actively excluded in patients with symptoms of bladder irritability and pain after previous suprapubic incontinence or prolapse surgery. Surgical repair utilising Prolene mesh is recommended and co-morbid urogenital prolapse or recurrent stress urinary incontinence can be adequately treated 4-6 months later.

Key Words bladder, Burch operation, CT pelvis, incisional hernia, lateral cystogram

INTRODUCTION

Ventral pre-pubic herniation of the bladder through an incisional hernia with pre-pubic extension is an uncommon condition rarely reported in the literature. Almost all reported cases deal with only one or two cases¹⁻³. A ventral incisional hernia is defined as an ab-

normal protrusion of a viscus through the musculoaponeurotic layers of a surgical scar⁴ and can be diagnosed and confirmed in various ways.

We report on nine cases of such hernias following previous Burch colposuspension operations for stress urinary incontinence (SUI).

Table 1: Previous Operations Performed on 9 Patients

Operation	No.	%
Burch colposuspension	9	100%
Abdominal hysterectomy	5	55%
Vaginal hysterectomy	3	33%
Anterior repair	2	22%
Posterior repair	5	55%
Inguinal herniorrhaphy	1	11%

Table 2: Co-Morbid Conditions in 9 Patients

Condition	No.	%
Recurrent cystocele	3	33%
Rectocele	6	66%
Recurrent rectocele	3	33%
Previous peri-umbilical hernia	1	11%
Previous inguinal hernia	1	11%

PATIENTS AND METHODS

Nine patients presented with ventral pre-pubic herniation of the bladder following previous Burch colposuspension operations for stress urinary incontinence. Their age varied from 41 to 74 years with an average age of 49 years. The interval between their Burch operations and presentation varied from 1 to 5 years with a median of just over 2 years. Three patients were white, one was black, one was coloured and the other four were of Indian descent. Eight patients had undergone their previous colposuspension operations through transverse suprapubic incisions while one had had a lower midline incision. Details of other previous abdominal and vaginal operations are listed in Table 1.

All nine patients presented with non-specific lower urinary tract symptoms including frequency, urgency, and pelvic pain and discomfort. Not one patient initially reported noticing a swelling or bulge in the pre-pubic area. Two patients had moderate recurrent SUI. The two most prominent and consistent symptoms were urge urinary incontinence and suprapubic pain on a full bladder.

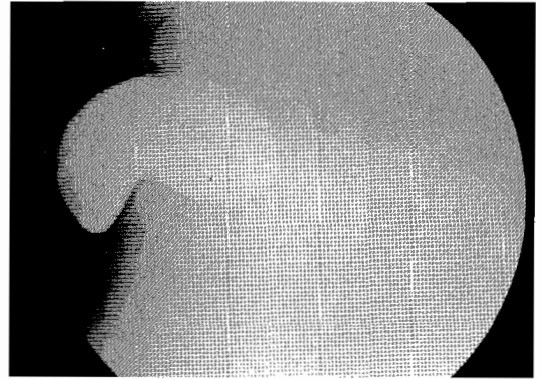


Fig. 1: Lateral cystogram of patient F.P. showing well-supported bladder base with marked anterior herniation of the bladder

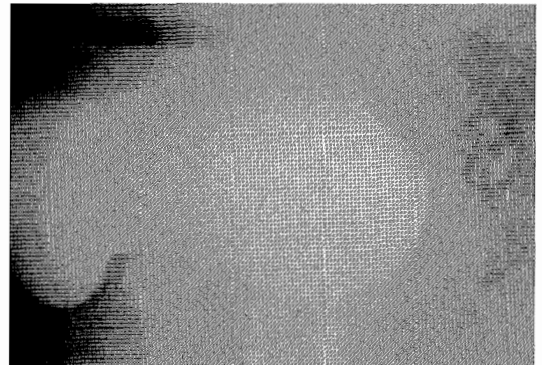


Fig. 2: Lateral cystogram of patient M.N. showing anterior herniation of the bladder with obvious pre-pubic extension.

On physical examination the ventral hernias involving the bladder were very difficult to detect in the supine position when the patients' bladders were empty. The swelling or bulge and cough impulse were only demonstrable in the erect position and when the patients' bladders were full. Various other co-morbid conditions associated with connective tissue abnormalities were found in these patients and are listed in Table 2.

Lateral and antero-posterior cystography was performed in all nine patients and proved to be the definitive diagnostic investigation. In all the patients the cystogram showed the following features: Adequate bladder capacity, smooth bladder outline, well supported bladder base and then marked anterior herniation of the bladder through the anterior abdominal wall with pre-pubic extension of the bladder

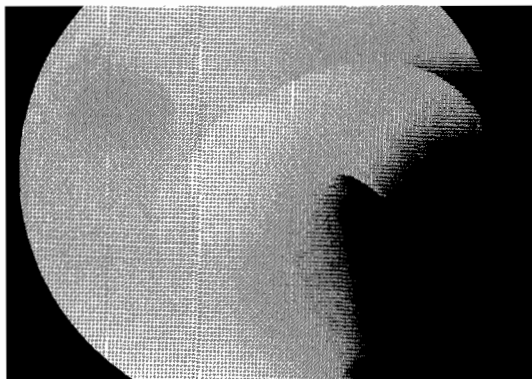


Fig. 3: Lateral cystogram of patient G.K. showing a well-supported bladder base and extensive pre-pubic herniation of the bladder



Fig. 4: CT scan of patient V.N. clearly showing the defect in the anterior abdominal wall and the anterior herniation of the bladder.



Fig. 5: Intra-operative photograph of patient V.N. with the Proline mesh sutured in place, showing the extent of the defect in the abdominal wall

(Fig.1,2,3). Excretory urography showed normal upper urinary tracts in all the patients.

Four patients underwent urodynamic studies. Marked sensory urgency and suprapubic pain on filling cystometry were the most consistent findings.. All four had normal bladder compliance and no uninhibited contractions were noted. Two patients had demonstrable recurrent stress incontinence with Valsalva leak point pressures below 30 cm H₂O.

Computerized tomography (CT) studies of the pelvis were performed on 5 patients. A suprapubic defect in the anterior abdominal wall was evident in all five cases. The bladder base was not displaced but there was obvious herniation or pointing of the anterior bladder wall through the defect, with extension of the bladder into the pre-pubic space (Fig. 4).

Cystoscopy was performed at the time of definitive surgery. In all patients the urethra and bladder neck area were well elevated and supported behind the pubic bone. No intravesical pathology was noted. However on filling , the anterior wall and dome of the bladder disappeared from view and could only be seen on manual reduction of the hernias.

As the patients had intractable bladder symptoms, we performed surgical repairs of the hernias in all nine patients. A vertical incision was used, the edges of the defect defined and exposed. The anterior bladder wall was mobilized and repositioned the pelvis. The exposed defect in the anterior abdominal wall was always considerably larger than anticipated and in one patient it measured 15 cm across (Fig. 5). In the very first patient we performed a primary closure of the defect. Her hernia recurred within nine months and in her second repair and all subsequent repairs the abdominal wall defect was closed with Proline mesh sutured to the posterior aspect of the defect in the rectus sheath (Fig. 5) as recommended by Micheau and Grolleau⁵ and Luijendijk et al.⁶. Continuous 2/0 Proline sutures with occasional locking were used, and technically a good result was obtained with this technique in all nine patients. The subcutaneous tissue was closed with absorbable sutures and the skin with clips. Suction drains were placed adjacent to the mesh in every case. All patients received peri-operative antibiotic coverage and an indwelling urethral catheter for two days.

We did not attempt to place any further colposuspension sutures or pubovaginal slings at the time of repair, as there were very dense

adhesions in the retropubic area from the previous surgery. Dissection here was difficult and we also wanted to avoid bladder perforations in the presence of a mesh repair. The three patients with recurrent cystocele and rectocele (one patient had both) underwent routine vaginal repairs 4 to 6 months after their hernia surgery. The two patients who had had pre-operative recurrent SUI, continued to leak on effort. One patient had a transobturator suburethral tape (Uratape; Porges/Mentor) placed 9 months later using the technique described by Delorme⁷. The other patient declined further surgery.

RESULTS

A satisfactory intra-operative result was obtained in all cases. One patient developed a wound haematoma with subsequent partial dehiscence of the wound, which healed well with regular outpatient wound care only. All the patients reported dramatic improvement of their bladder symptoms within the first post-operative week. The irritative symptoms especially the frequency, urgency and suprapubic pain on bladder filling subsided to satisfactory levels within 4-6 weeks in all 9 patients.

Two patients developed recurrent incisional hernias within the first year. Our first patient who had a primary closure only, had a subsequent successful closure with Proline mesh. Another patient developed a recurrence in the upper part of the wound. Her follow-up CT showed the bladder in a satisfactory position in the pelvis with loops of bowel in the recurrent hernia pouch. She is awaiting further surgery. The other patients were all symptomatically satisfied with their results at 6-month follow-up. The symptoms of bladder overactivity had reduced dramatically to satisfactory levels and clinically the repairs were secure. We did not think further invasive imaging or urodynamic investigations were warranted on these patients, as they were content with their results.

The subsequent vaginal repairs of recurrent cystoceles and rectoceles in three patients seemed successful on short follow-up. The patient who had the transobturator suburethral tape placed is clinically continent.

DISCUSSION

A ventral incisional hernia is defined as an abnormal protrusion of a viscus through the

musculoaponeurotic layers of a surgical scar⁴ and can be diagnosed and confirmed in various ways. In this series the presentations were atypical and the hernias were identified and defined by clinical examination in the erect position on a full bladder, various imaging techniques (Fig 1-4), cystoscopy and operative findings.

Ventral herniation of the bladder through an incisional hernia with pre-pubic extension is an uncommon condition rarely reported in the literature. Almost all reported cases deal with only one or two cases (1-3). We report on nine cases of such hernias following previous Burch colposuspension operations for SUI.

Eight patients had undergone at least two operations through transverse suprapubic incisions including caesarean sections, abdominal hysterectomy as well as the colposuspension procedures. One patient had undergone five operations through this incision. One patient had had a vertical midline incision as her Burch operation had been combined with a sacrocolpopexy mesh suspension. The patients presented at a median time of just over 2 years after their suprapubic operations. This may reflect a slow referral system to our unit.

The reported incidence of incisional hernias following suprapubic colposuspension is 2-3%^{8,9}. We do not know if these nine cases seen over 18 months reflect a higher incidence in our area or whether it reflects the fact that we are the only urogynecology clinic serving six large state referral hospitals, or just an increased awareness of the condition after seeing the first two patients. Our patients were representative of all the race groups we treat at our urogynecology clinic.

All our patients presented with the same symptom complex of non-specific LUTS with especially marked frequency, urgency with urge incontinence and significant suprapubic pain on a full bladder. No patient presented primarily with complaints of a suprapubic lump or bulge. Two of the patients reported recurrent stress urinary incontinence. Several authors reported similar non-specific symptoms but inclusive of prominent frequency, urgency, mixed incontinence and suprapubic pain^{1,2,3,10}. The presentation of mixed incontinence may even be suggestive of that seen in *de novo* induced detrusor instability as in the case described by Rovner and co-workers³, that they attributed to stretching of the muscle fibres. In

some of our patients the suprapubic pain on a full bladder was such a very prominent symptom that it was almost suggestive of interstitial cystitis. We would like to emphasize the non-specific nature of these symptoms in this group of patients, as Izes and co-workers have also mentioned¹⁰.

In the first two patients the ventral hernia was missed on initial physical examination and only confirmed on re-examination after being diagnosed on lateral cystography. All of these patients were mildly to moderately obese and it was very easy to miss the fascial defect if they were only examined in the supine position with an empty bladder, as is the custom in many clinics. If examined in the erect position with an uncomfortably full bladder, the suprapubic bulge and cough impulse was usually obvious. If there is any suspicion of such a hernia, the patient must be examined erect with an uncomfortably full bladder.

Lateral cystography proved to be the definitive diagnostic modality. The anterior herniation of the bladder as well as the pre-pubic extension was obvious in all cases (Fig. 1,2,3). Reports in the literature confirm the diagnostic value of this investigation and we agree with McGuire and English and others that it is a mandatory investigation in any patient where there is clinical suspicion of a ventral bladder hernia¹⁻³.

We performed excretory urography in every patient mainly to exclude lower upper urinary tract abnormalities. The investigation was normal in all nine patients. Izes et al. mentioned a diagnostic triad of lower ureteric and bladder abnormalities seen on IVP in bladder hernias. We did not see these changes in our patients and not surprising so as Reardon and Lowman originally described this triad in patients with bladder involvement in inguinal and femoral hernias¹¹. However, we still recommend excretory urography in these patients especially to exclude lower ureteric abnormalities after their previous pelvic surgery.

Four patients underwent urodynamic studies. The consistent findings were marked sensory urgency and suprapubic pain on filling cystometry. All four patients had normal bladder compliance. Unlike Rovner et al. and the one case described by Schulze and Wettlaufer, we did not find uninhibited contractions in any patient^{1,3}, neither did McGuire and English in their case report². The presence or absence of

such contractions should probably not affect the initial decision to do an operative repair of the hernia as the contractions resolved after successful hernia repair^{1,3}.

Five patients underwent CT studies of the pelvis. CT was very effective in demonstrating the defect in the abdominal wall as well as the pointing and extension of the bladder through the defect (Fig 4). The pre-pubic extension was also clearly demonstrated. Izes et al. made a correlation of CT and cystography/IVP and they proposed CT as the imaging modality of choice in patients with suspected bladder involvement in inguinal or incisional hernias¹⁰. Advantages of CT include a better definition of the disturbed anatomy, visualization of any disturbance of the lower ureters and the ability to diagnose any complications such as calculi or strangulation¹⁰. We did not find the information obtained from the CT of additional help in the clinical decision-making and regard the lateral cystogram as the definitive imaging technique. We did find CT helpful in the recurrent incisional hernias, but cannot advocate it as a routine primary investigation as the additional costs outweigh the slight advantages.

We performed a cystoscopy on every patient at the time of definitive surgery. The dome and anterior wall of the bladder disappeared from view on filling and could only be visualized on manual reduction, as also described by Rovner et al.³. This finding should alert the operator to the possibility of a ventral bladder hernia being present. Although no other abnormalities were found in this group, we advocate cystoscopy at the time of surgery to exclude other intravesical causes of urgency and bladder pain such as calculi or tumors.

We performed surgical repair on all nine patients as they all had intractable bladder symptoms. The defect in the abdominal wall was always considerably larger than anticipated and a vertical incision is imperative to expose the upper limit of the defect. In the first patient we did a primary closure of the defect, which recurred within nine months. In the other eight patients and this patient's second repair, we closed the defect with Prolene mesh sutured to the posterior aspect of the defect in the rectus sheath (Fig. 5) as recommended by Micheau and Grolleau⁵ and Luijendijk et al.⁶. Continuous 2/0 Prolene sutures with occasional locking were used, and technically a good result was obtained with this technique in all our patients. One other patient (11%) developed a recurrent

incisional hernia after 14 months in spite of the mesh repair. Her repeat CT scan showed the bladder in the normal position but confirmed the hernia pouch filled with bowel loops due to a recurrence in the upper part of the repair. The reported recurrence rates after mesh repair for incisional hernias varies between 10% and 24%^{8,9}. This can probably be reduced by a more holistic and multidisciplinary approach to this group of patients involving weight loss, muscle building, nutrition and physiotherapy, as recommended by Micheau and Grolleau⁵.

We were very careful not to perforate the bladder while mobilizing it and avoided a perforation in all cases. However, if a small controlled perforation of an uninfected bladder should occur which can be securely closed, we would still place the mesh. Extensive experience with the tension-free vaginal tape operation has shown that the polypropylene mesh can be safely placed in the presence of a small bladder perforation¹². We did not perform any other reconstructive procedures of co-morbid conditions (Table 2) at the time of the hernia repairs, as we did not know how these would be affected by the re-positioning of the bladder. Three patients underwent vaginal cystocele and rectocele repair 4-6 months later, which seems successful on short-term follow-up. One patient with persistent SUI underwent successful placement of a transobturator suburethral tape [Uratape; Porges/Mentor]. We chose this route so as to avoid compromising the hernia repair and it is reported to be as successful as the traditional procedures where the needles and tape exist through the suprapubic area⁶.

We conclude that ventral pre-pubic herniation of the bladder is probably significantly under diagnosed. This condition should be suspected and excluded in patients who present with bladder irritability and pain after previous suprapubic incontinence or prolapse surgery. Lateral cystography was found to be the definitive diagnostic modality. Surgical repair incorporating Prolene mesh and sutures is recommended. Co-morbid vaginal prolapse can be repaired successfully 4-6 months later. If these patients have recurrent or persistent SUI, placement of a transobturator suburethral tape [Uratape; Porges/Mentor] is recommended so as to avoid compromising the surgical repair⁶.

REFERENCES

1. Schulze KA, Wettlaufer JN. Ventral bladder hernia following Marshall-Marchetti-Krantz procedure for stress urinary incontinence. *Urology* 1986, 28:114-116.
2. McGuire EJ, English SF. Ventral bladder hernia following Vesica percutaneous bladder neck suspension for stress urinary incontinence. *J Urol* 1997, 158:1910.
3. Rovner ES, Gomes CM, Banner MP, Wein AJ. Ventral hernia of the urinary bladder with mixed urinary incontinence: treatment with herniorrhaphy and allograft fascial sling. *Urology* 2000, 55:145vii-ix.
4. Savage A, Lamont PM. *Hernias of the abdominal wall*. In: Morris PJ, Malt RA (eds.): *Oxford Textbook of Surgery*, 2nd ed., Oxford:Oxford University Press, p. 1412, 1994.
5. Micheau P, Grolleau JL. Incisional hernia. Patient management. Approach to the future operated patients. (French). *Annales de Chirurgie Plastique et Esthétique* 1999, 44:325-338.
6. Luijendijk RW, Hop WC, van den Tol W *et al*. A comparison of suture repair with mesh repair for incisional hernia. *N Engl J Med* 2000, 343:392-398.
7. Delorme E. The transobturator sling: a minimally invasive procedure to treat stress female urinary incontinence. *Progrès en Urologie* 2001, 11:1306-1313.
8. Wetzel O, Katmeh S, Plougastel-Lucas ML, Bourdon J. The treatment of genitourinary prolapse with promonto-fixation using a prosthetic material combined with complete hysterectomy: complications and results a propos of a series of 55 cases. *Progrès en Urologie* 1995, 5:221-230.
9. Roca Edreira A, Gutierrez Banos JL, Martin Garcia B *et al*. Stress urinary incontinence. Comparative study of suprapubic and vaginal surgical techniques. *Archivos Españoles de Urologia* 1994, 47:711-714.
10. Izes BA, Larsen CR, Izes JK, Malone MJ. Computerized tomographic appearance of hernias of the bladder. *J Urol* 1993, 149:1002-1005.
11. Reardon JV, Lowman RN. Massive herniation of the bladder: "the roentgen findings". *J Urol* 1976, 97:1019-1020.
12. Meschia M, Pifarotti P, Bernasconi F *et al*. Tension-free vaginal tape: Analysis of outcomes and complications in 404 stress incontinent women. *Int Urogynecol J* 2001, 12:S24-S27.

RESUME

Herniation Ventrale Sus-Pubienne de la Vessie Secondaire à une Chirurgie pour Incontinence Urinaire

Objectif: La herniation sus-pubienne de la vessie par éventration est rare, la littérature n'a décrit qu'un ou deux cas. Nous décrivons 9 patients qui se sont présentés dans cette condition 1 à 5 ans après avoir subi des opérations de colposuspension type Burch pour incontinence urinaire d'effort [SUI]. **Patients et Méthodes :** Neuf patients se sont présentés avec une herniation sus-pubienne de la vessie par éventration. Ils ont tous développé cette herniation suite à une opération de colposuspension type Burch pour l'incontinence urinaire d'effort. Leur présentation symptomatique est non spécifique, elle est décrite et soulignée. Il était difficile de diagnostiquer ces éventrations à l'examen clinique initial, à moins que le patient ait été examiné en position debout avec une vessie pleine. La cystographie avec des clichés de profil était la modalité diagnostique définitive. Les résultats de CT scanner étaient instructifs mais non essentiels pour le diagnostic. A l'examen urodynamique la douleur et l'urgence à bas volumes ont été retrouvées, mais aucune contraction anormale n'a été constatée. La cystoscopie était essentielle pour exclure d'autres pathologies intravésicales et les résultats spécifiques sont décrits. Car ces patients ont eu des symptômes insurmontables, la réparation chirurgicale a été indiquée. Le défaut anatomique dans le mur abdominal antérieur était toujours plus étendu que prévu et la fermeture incorporant la maille et les sutures de Prolene a été exécutée. Le prolapsus vaginal co-morbide a été réparé 4 à 6 mois plus tard. L'incontinence urinaire d'effort récurrente chez une patiente a été traitée par une bande sous-urethrale transobturatrice. **Résultats:** Deux patientes ont développé des hernies récurrentes dans la première année. Notre première patiente qui a eu une fermeture primaire seulement, a eu une fermeture réussie suivante avec la maille de proline. Une autre patiente a développé une récurrence dans la partie supérieure de la cicatrice. Toutes les autres patientes étaient satisfaites de leurs résultats à six mois. Les symptômes de l'hyperactivité du détrusor étaient nettement réduits. Les réparations vaginales suivantes de leurs cystoceles et rectoceles récidivant chez 3 patientes ont semblé réussir à court terme. La patiente chez qui on a placé la bande sous-urethrale transobturatrice est médicalement continente. **Conclusion:** Cette condition est probablement plus fréquente mais sous-diagnostiquée. Elle devrait être prise en compte et activement exclue chez les patientes présentant des symptômes d'irritabilité et de douleur de la vessie après chirurgie suspubienne pour incontinence ou de prolapsus. La réparation chirurgicale utilisant la maille de Prolene est recommandée et l'incontinence urinaire secondaire à un prolapsus urogénital co-morbide ou d'effort récidivant peut en juste proportion être traité 4-6 mois plus tard.

All correspondence to be sent to:

Dr. T. Fourie
 Department of Urology
 Private Bag 7
 Congella 4013
 Durban
 South Africa