

Review Article

The suprapubic approach in the surgical treatment of female stress incontinence

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Summary

Stress incontinence in women is a frequent and humiliating complaint, the aetiology and pathogenesis of which are not always apparent. Routine investigation followed by standard vaginal or abdominal surgical procedures will cure most uncomplicated cases. However, in complicated cases a more sophisticated pre-operative evaluation and a more versatile surgical approach are indicated in order to restore the changed anatomy and function.

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When urinary incontinence is the condition under investigation, numerous questions require clarification:

1. Is continence of urine based upon a rather simple relationship between intravesical and intra-urethral pressure, or is a more complicated mechanism involved?
2. What is the precise aetiology of stress incontinence? Is it entirely due to an incompetent bladder neck and proximal urethra or do other factors also play a role?
3. What is the diagnostic role of urodynamics? Is it essential or can treatment be based upon the clinical findings without resorting to sophisticated urodynamic investigations?
4. Should the surgical approach be suprapubic, transvaginal or a combined procedure, and should one evaluate results subjectively or objectively?

Patients, methods and results

Between January 1976 and December 1980 80 women, of whom 6 were nulliparous, underwent surgery for stress incontinence. The ages ranged from 16 to 78 years. Most patients had had previous surgery and some patients had undergone more than one procedure (Table I). All patients were operated upon via a suprapubic approach. In 17 patients an anterior colposuspension was performed; in 67 patients a combination of procedures was necessary.

Sixty-six patients (82%) are regarded as being cured; in 14 (18%) the result is regarded as a failure. Most patients were evaluated subjectively.

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TABLE I. PREVIOUS SURGICAL TREATMENT

Previous operations	No. of patients*
Abdominal hysterectomy	29
Vaginal hysterectomy	24
Abdominoperineal resection	2
Anterior colporrhaphy	37
Marshall-Marchetti-Krantz procedure	12

* Some patients had undergone more than one procedure.

Discussion

The Marshall-Marchetti-Krantz procedure has been categorized as being 'the brightest spot in this otherwise dismal picture'¹ in the management of female stress incontinence. In many instances it still forms the basis on which the various surgical procedures utilized have evolved. Many different procedures have been described, of which the majority appear to be effective according to their protagonists' results. However, there has been a glaring lack of objective assessment.

The continence mechanism

Urinary continence is maintained when the resting intravesical pressure is lower than the urethral outflow resistance. More than one factor could be involved in the achievement and maintenance of this relationship. Neurogenic control involving cortical, corticospinal and peripheral regulations is mediated via the parasympathetic, sympathetic and somatic nervous system.

The urethral sphincter mechanism functions as the sum of several components made up from or influenced by any one or more of a number of factors, described below. Playing an important role are the detrusor components, consisting of smooth muscle reflected onto the proximal urethra and looped around the bladder neck, and 'external sphincter' components, derived from striated muscle fibres reflected cranially from the urogenital diaphragm. The supradiaphragmatic length, width and tone of the urethra, including the vascularity of its interstitium, the turgor of its mucosa and, to a lesser extent, the vesico-urethral angle and the intra-abdominal urethral length, are also important, interrelated components in the urethral sphincter mechanism. The supporting tissues, viz. the vaginal vault, cervix of the uterus, corpus uteri, levatores ani and the rectum, all play a meaningful role. In addition, the effects of the hormonal cycle on pelvic structures and cell changes are important.

Aetiology

Stress incontinence is usually regarded as being due to bladder neck incompetence,² which may be inherent or acquired, e.g.

after childbirth or previous surgery.^{2,3} An incompetent bladder neck is often associated with detrusor instability,² and the underlying stress incontinence is then due to a combination of the abovementioned factors. Any change in the normal anatomy of the pelvic floor may lead to stress incontinence. This is frequently seen after hysterectomy where the posterior displacement of the bladder with concomitant widening of the bladder neck and shortening of effective intra-abdominal urethral length is a feature. The overall result is a diminished outflow resistance followed by stress incontinence.

Diagnosis

In the diagnosis of the condition much attention must be given to obtaining an accurate history. The bladder is a poor witness and so are many patients!² One must differentiate between stress incontinence and urge incontinence which is often a symptom of detrusor instability.² Instability of bladder function may be due to other causes; one should not make the sole diagnosis of detrusor instability if these causes have not been excluded. Careful history-taking as regards previous pelvic operations is important.

A thorough physical examination is essential, with particular emphasis on the neurological examination. The perineum will often show changes related to hypo-oestrogenism. Examination with the patient in the supine as well as in the standing position is essential; if the patient's bladder has not been emptied before the examination the examination should try to demonstrate stress incontinence. In post-hysterectomy patients careful note should be made of the relationship of the bladder to the vaginal vault. Bonney's test is not regarded as being of much value.

Cystoscopy and cystometrography are two basic special investigations used in all cases. Cystoscopy should be performed by an experienced endoscopist who, preferably, should be the surgeon who plans to perform the operation. The cystoscopy is carried out under local anaesthesia and one should obtain as much information as possible regarding the bladder and its outlet and the urethra. The patient's awareness of bladder fullness and her ability to contract the bladder neck and pelvic floor are important therapeutic guidelines. We also try to demonstrate stress incontinence with the patient in the lithotomy position. Cystometrography is a necessary investigation in the identification of the uninhibited or unstable detrusor.

A micturating cysto-urethrogram with the patient in the standing position is obtained in all cases. During the examination the patient is required to raise intra-abdominal pressure as if she were voiding, as well as to contract her 'sphincter' area and pelvic floor. This is done in order to determine the position and mobility of the bladder relative to the urethra and to demonstrate the degree of stress incontinence. During the act of micturition the patient is asked to interrupt the stream in order to determine her ability to milk back the column of urine in the urethra; after initiating flow once again we assess the residual urine.

In selected patients a full urodynamic work-up consisting of pressure and flow studies, a urethral pressure profile and an electromyogram is required. Nowadays much is being made of these sophisticated special investigations, but let us remember the words of Warwick and Whiteside:² 'The importance of cystoscopy by an experienced observer is manifest in all patients complaining of incontinence', 'A urodynamic clinic is not an alternative to a urological opinion, but part of it' and 'detailed urodynamic evaluation is not required for the majority of cases'.

The surgical approach should be planned according to the clinical evaluation of each patient and, where necessary, special investigations. Full urodynamic investigation should be reserved for those cases in which the clinical evaluation identifies a more complex problem which cannot be resolved by standard abdominal or vaginal procedures or where detrusor instability has to be assessed.

Indications for surgical treatment

We perform a surgical repair after a minimum period of 3 months of conservative treatment has failed. The latter consists in the main of α -adrenergic agonists, oestrogen in post-menopausal patients and bladder control exercises. Patients with simple stress incontinence and patients with stress incontinence complicated by instability, previous pelvic surgery or previous unsuccessful surgery for incontinence are considered. An unstable detrusor is not regarded as a contraindication if there is also clear evidence of true stress incontinence.

Surgical treatment

The aim of surgical treatment is to restore the normal pelvic anatomy so as to provide proper support for the bladder base and vesico-urethral area. No specific attempt is made to correct the urethrovesical angle or to over-elevate the bladder neck. For simple stress incontinence an anterior colposuspension alone will suffice. In cases of complicated stress incontinence, that is, incontinence after failure of operation or after other previous pelvic surgery, a combination of procedures involving the bladder neck, bladder base or vaginal vault may be indicated, depending upon pre-operative information.

Operative technique

There are really no new techniques. The only requirement is to be versatile in order to be able to accommodate the complicated situation which is often found after previous operations. In these cases, we advocate a suprapubic approach. One should not be afraid to open the bladder deliberately in order to evaluate the bladder neck and base.

The following techniques are used in our department:

Anterior colposuspension where the vaginal vault is bilaterally fixed with one or more stitches to Cooper's ligament at the level of the bladder neck. The technique of the urethropexy during anterior colposuspension is important. An exaggerated repair of the urethrovesical angle must be avoided at all costs so as to avoid vesical obstruction. The urethra must be free from the symphysis pubis and must be able to admit two fingers.⁴ An anterior colposuspension may be combined with an abdominal hysterectomy if there is both stress incontinence and a uterine lesion.^{1,5}

Anterior colposuspension may be carried out with the aid of rectus slings attached to (but not looped under) the pubovesical ligament at the bladder neck, especially if the vaginal vault lacks elasticity and/or Cooper's ligament appears to be too frail.

Posterior colposuspension with the aid of rectus slings is of value, especially if severe posterior bladder displacement as seen after abdominoperineal resection or hysterectomy is present. The slings are fixed to the posterior vaginal vault in the midline and are occasionally supplemented by plication of the levatores ani. This may also be combined with an anterior colposuspension.

Uterosuspension. If there is severe posterior displacement and the normal 'support' is still available, a uterosuspension is performed in association with colposuspension.

Anterior YV-plasty. Occasionally the diagnosis of both stress incontinence and outflow obstruction is made. In such cases an anterior and/or posterior colposuspension is sometimes combined with an anterior YV-plasty.

Where the outflow resistance in the urethra requires enhancement, an **anterior urethral plication** or lengthening procedure with or without a suspension of the bladder neck may be required. If this fails, additional support can be derived by placing a labial fat pad on its vascular pedicle between the urethra and anterior vaginal wall.⁶

In assessing the results of surgery for stress incontinence the only satisfactory result is a non-obstructive urinary continence.

Results can only be assessed 3 months postoperatively by means of videocystography and urodynamic evaluation to exclude the possibility of constriction of the bladder outlet by the surgical repair.

Conclusions

In the surgical treatment of female stress incontinence, the surgeon should consider all of the clinically indicated pre-operative informative investigations and must not confine himself to a single procedure without adequate pre-operative evaluation when he tries to restore the changed anatomy to 'normal' by correction, elevation, fixation and support of the bladder and the vesico-urethral area. In order to enable him to keep his options

open at all times, all cases of stress urinary incontinence are best managed by the suprapubic approach.

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The radiological investigation of hepatocellular carcinoma in children

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Summary

Malignant liver tumours are not unusual in infancy and childhood. Hepatocellular carcinoma is however much less common than hepatoblastoma. Four children with hepatocellular carcinoma, 2 Black and 2 White, have been seen at Baragwanath Hospital and the Johannesburg Hospital in the past 8 years. Three children were under 4 years of age, with no known predisposing cause; 1 child was 11 years old and had a history of tyrosinosis.

The radiological investigation of liver tumours is discussed.

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Primary malignant tumours of the liver are not uncommon in infancy and childhood. The estimated incidence is 0,16 - 0,6/1 000 hospital admissions.¹ The majority of these are examples of hepatoblastoma, which is the third most frequent solid malignant intra-abdominal tumour occurring in childhood, only neuroblastoma and nephroblastoma being more common. Hepa-

tocellular carcinoma in children is very much rarer. In only one series, from Uganda,² was hepatocellular carcinoma stated to be more common in children than hepatoblastoma. It is usually found that 11-38% of liver tumours in children are hepatocellular carcinomas.

While hepatoblastomas occur mainly in younger children (50% under 18 months of age) and are very rare in those over 3 years of age, hepatocellular carcinoma appears to have two peak age incidences, 50% being found in children under 4 years of age, and approximately 30% in children aged between 12 and 15 years.³

Hepatocellular carcinoma is more common in adults, and in most African countries the incidence is high. In the RSA the age-standardized incidence is reported as 19,2 - 28,4/100 000 per annum. In Mozambique this incidence is much higher, 103,4/100 000.⁴⁻⁷

It is accepted that in adults hepatocellular carcinoma is often due to environmental causes. A history of hepatitis and the presence of hepatitis B surface antigen in the serum have a proven relationship to this cancer, while dietary factors such as ingestion of aflatoxin have also been implicated.^{2,8} Hepatocellular carcinoma is also known to occur in association with cirrhosis from any cause, but in these cases it is always a slow-growing tumour in contrast to tumours associated with hepatitis and aflatoxin ingestion.

In children under 4 years old, the aetiology must be different. It may be an inherited disorder, or there may be a genetic predisposition to the occurrence of these tumours. It is known that metabolic disturbances also play a role in the aetiology of liver cancer, which has been reported to occur in patients with galactosaemia, tyrosinosis, type 1 glycogen storage disease, hereditary haemorrhagic telangiectasis, neurofibromatosis⁹ and biliary atresia.

Hepatocellular carcinoma is often multicentric and involvement of both lobes of the liver is more common than in patients

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