

PELVIC FLOOR DYSFUNCTION IN FEMALE : A REVIEW ON RECENT UPDATE

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Summary

Pelvic floor dysfunction including lower urinary tract disorders, pelvic organ prolapse and lower bowel dysfunction are common problems that adversely impact on the quality of life of many women. The past ten years has seen a dramatic improvement in our understanding and treatment of these problems by establishing a sub superspeciality named as urogynaecology.

Urogynaecology, more than any other gynaecological Patho-physiology needs careful assessment evaluation and an accurate diagnosis. The importance of careful history and detailed examination cannot be overemphasized. There are many pitfalls in evaluating symptoms that could implicate other discipline such as gastroenterology and arthropaddies .It is also of permanent importance to distinguish between stress and urge incontinence. These pitfalls ,if overlooked could lead to incorrect treatment and unnecessary surgery with potentially disastrous outcome. In this regard the indication for and interpretation of special investigations needs to be adequately understood. An example of this is the role of urodynamic studies which although not always essential, may provide valuable additional information to aid diagnosis and treatment choice. Besides the traditional management of urogynaecology, the newer techniques includes the use of different types of mesh inserted in the anterior and posterior compartments as well as intra abdominally, use of TOT and TVT for GSI and role of laparoscopy in urogynaecology.

We have to accept that these new techniques play a positive role in our management protocols but the scientific data at this stage does not fulfill the evidence required. In this regard older tried and tested techniques should also be considered. This review will focus on four areas of urogynaecology namely Urinary stress incontinence, prolapsed surgery, overactive bladder and urodynamic studies.

Key words: Pelvic floor dysfunction; urogynaecology; stress urinary incontinence (SUI); pelvic organ prolapse (POP); overactive bladder (OAB); urodynamic studies (UDS).

Introduction

Urogynaecology is one of the sub speciality which mainly deals with the pelvic floor dysfunction which includes- Genuine stress incontinence, detrusor instability (or over active bladder), voiding difficulties, vaginal and / or uterine prolapsed as well as VVF, RVF and anal incontinence¹.

Urogynaecology, a multidisciplinary team of urogynaecologists, gynecologists, urogynaecology trainees, obstetric and gynaecology trainee, a colorectal surgeon, nurses, physiotherapists and a dietician provide a dedicated service to optimise outcomes for our patients with Pelvic floor dysfunction.

The Urogynaecology offer a wide range of surgical procedures for the management of Pelvic floor disorders including primary and repeat surgery for urinary incontinence, primary and repeat surgery for pelvic organ prolapse, others procedures including - Repair of VVF & RVF, Vaginoplasties for vaginal stenosis. The new techniques including use of different types of mesh, TVT, TOT & laparoscopic management .

The complications of these new techniques include bleeding ,acute perforation of the bladder or eurethra, vasculature punctures and mesh erosions and directly related to a steep learning curve^{2,3,4}. Their use should therefore be supported by a stringent training program and be adequately controlled. Clinical urogynaecology research world wide recently completed several surgical randomised controlled trails in this regards.

Major challenge for urogynaecology is to ensure that sufficient numbers of gynecologists become skilled in both the assessment and treatment including surgery of women with pelvic floor dysfunction.

Stress urinary incontinence(SUI)

Risk factors for SUI includes

The prevalence of SUI increases steadily with increasing age. Urinary incontinence is a pervasive problem affecting 30-40% of the older women. With SUI being the most prevalent type in women⁵ .

There is a link between increasing parity and urinary incontinence . Childbirth may result in pelvic floor laxity due to weakening and stretching of the muscle and connective tissue during delivery .

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The added weight of obesity (like pregnancy) may bear down on the pelvic tissues causing strain and weakening of muscles and nerves of the pelvic floor. Symptoms have been shown to improve after weight loss⁵.

Hysterectomy is associated with an increase in urinary incontinence. The cause for this is unclear. It may be hormonal, or due to damage to nerves or musculofascial attachments of the bladder during the procedure.

Pathogenesis of SUI

SUI occurs when the bladder neck falls below the level of the pelvic floor due to tissue injury to pelvic fascia and muscles. As such with an increase in intra-abdominal pressure, downward forces on the bladder overcome urethral sphincter closure and urine leaks in the absence of bladder contraction⁶. SUI is therefore linked to pelvic floor weakness. The most important component of the pelvic floor are the levator ani muscles. The normal function of the pelvic floor is to squeeze around the vaginal, urethral and anal opening and lift them in and up. In order for continence to be maintained, there must also be a competent urethral sphincter⁷.

Treatment

Physiotherapy

Physiotherapy is the first line treatment for incontinence caused by pelvic floor dysfunction, as it is the only treatment which does not cause harm. Treatment involves muscle training using pelvic floor exercises, which are regular voluntary contractions and relaxations of the pelvic floor muscles. It aims to both improve urethral resistance and pelvic visceral support by increasing the strength of the voluntary pelvic floor muscle contraction, and to teach voluntary contraction of the muscles before increases in abdominal pressure⁸. It may take six months to train muscles effectively, and women should be advised of this.

In severe cases, electrical stimulation of the pelvic floor muscles can be used to provide induced contractions, improving strength and function⁸. Cure or improvement rates of up to 60% have been noted after physiotherapy^{9,10}. Kondo et al (2007)¹¹ followed up women with stress or mixed incontinence, and found that 39% of women were continent after eight years. Konstantions et al¹² found that women were 23 times more likely to have improvement/cure with physiotherapy compared to no treatment.

Physiotherapy is therefore not curative in all women programmes cannot be successful in patients who cannot locate and properly contract their pelvic floor muscles. It appears that the greatest benefit occurs in women with mild or moderate incontinence, although improvement is seen in those with severe symptoms¹⁰.

Pharmacological management

If a woman has had no improvement with physiotherapy and is either not suitable or on the waiting list for surgery, she may benefit from treatment with Duloxetine, a combined serotonin and noradrenaline reuptake inhibitor used to treat moderate to severe SUI. The recommended dose is 40mg twice daily⁸.

In a phase II study of Duloxetine versus placebo a significant decrease was seen in incontinence episode frequency on Duloxetine (64%) compared to placebo (40%)¹³. There were also significant improvements in quality of life. A phase III study produced similar results¹⁴. Further studies have shown a synergistic effect of Duloxetine and pelvic floor physiotherapy¹⁵, and many units now have a protocol suggesting that Duloxetine should only be administered along with physiotherapy.

Adverse effects are related to increases in noradrenaline and serotonin. Including gastrointestinal disturbances, dry mouth, headache, decreased libido and anorgasmia^{14,16}. Nausea appears to be the most troublesome side effect^{13,15}. In most cases it is mild to moderate and usually resolves within one week to one month.¹¹ In one study, adverse effects resulted in discontinuation in more than 10% of women¹⁵.

Other drugs which have been used for stress urinary incontinence include α adrenoceptor agonists and selective β adrenoceptor agonists⁵.

Surgical management

Historically, there are several different methods of treating stress urinary incontinence.

Anterior colporrhaphy is used to correct both incontinence and anterior vaginal wall prolapse. Continence after five years following this procedure has been variously reported between 45 and 87%⁵. However, it has a low risk of complications.

Stamey procedure has a cumulative failure with time¹⁶, probably due to poor fixation of sutures.

Marshall-Marchetti-Krantz is the procedure which is limited by the complication of osteitis pubis, which occurs in 2.5% of patients¹⁶.

Open (Burch) & laparoscopic procedure is highly effective and appears to remain so with time¹⁶. There are few randomized trials comparing laparoscopic with open colposuspension. Traditionally, this has been the surgery of choice, with a success rate of 85% after five years¹⁰. Complications following surgery are voiding disorder, detrusor overactivity and genitourinary prolapse. Cure rates were equivalent to the open procedure, but the technique has by and large been superseded by vaginal tape surgery.

TVT (Tension free Transvaginal tape) was first introduced in the mid 1990s, when the gold standard surgical treatment of stress urinary incontinence was Burch colposuspension¹⁷. The tape is inserted vaginally, being left under no tension. Cure rates of 94% are reported in those having TVT as a primary procedure^{18,19}. Complications of the surgery include vascular and bladder injuries and bowel perforations although these are rare. These are related to penetration of the retropubic space. Infection rates post-operatively are thought to be around 5% as is the rate of voiding difficulty and overactive bladder. Obturator nerve injury is rare, but can occur¹⁹.

In the short term, TVT has been shown to be as effective as colposuspension for the treatment of primary stress incontinence²⁰. Newer suburethral tape procedures include the transobturator tape (TOT). Costa et al²¹ found that 80.5% of women were completely cured after undergoing TOT.

TOT has the advantage over TVT of avoiding blind entry into the retropubic space, therefore reducing the risk of damage to the internal organs²². Bladder perforation, the most common complication occurring during the TVT procedure, is significantly reduced with TOT¹⁸. Complications following TOT include voiding difficulty, Moderate pain or discomfort in the things folds and uncommonly adductor brevis myositis²³ and perineal cellulitis²⁴.

A modification of the TOT procedure is to pass the tape from the obturator foramen from inside to out, known as TVT-O. This is thought to further reduce damage to the urethra and bladder²².

The newest surgical treatments for stress urinary incontinence are modifications of the TVT system. They have a shorter sling and do not require an exit point. The sling is fixed in the obturator internus muscle²⁵. Initial results suggest symptom improvement of up to 87%, but further long-term follow up is required^{25,26}. A new MiniArc single incision sling system is also currently undergoing clinical trials.

Pelvic Organ Prolapse (POP)

Risk factors for pelvic organ prolapsed include vaginal delivery, chronic lung disease (due to persistent cough and increases in abdominal pressure)²⁷ menopause,²⁸ hypoestrogenism, obesity, connective tissue disorders, constipation and heavy lifting²⁹. In addition, vaginal vault prolapsed occurs in between 0.2 and 45% of patients after hysterectomy³⁰.

Pathophysiology

Pelvic organ prolapse (POP) includes uterine prolapse with or without vaginal prolapse-urethrocele, cystocele, rectocele and enterocele. For POP (Pelvic organ prolapse) Various classification schemes are used to quantify and describe pelvic organ prolapse (POP). The use of POP-Q system has gained popularity lately due to its reproducibility between clinicians and the fact that it is more descriptive in identifying specific vaginal sites of prolapse. Discrete points and their displacement are measured, rather than the actual prolapsing structure.

Pelvic organ prolapsed may be asymptomatic, but symptoms can include vaginal bleeding, Back or lower abdominal pain, obstructive constipation, "heave" genitalia and urinary symptoms²⁸.

Treatment

Medical

Minor degrees of prolapsed are common after childbirth, and should be treated with pelvic floor exercises or a pessary. Pessaries are also in women who are unsuitable for surgery, for treatment of vaginal wall and uterine prolapsed. Types of pessary include ring and shelf. Pessaries should be replaced every 4-12 months³¹.

Surgical

The lifetime risk of surgery for pelvic organ prolapsed is 11%³⁴. Anterior colporrhaphy is used to treat cystocele. If there is coexisting stress incontinence, the urethrovesical angle is reconstructed by placing buttressing sutures, known as Kelly's sutures, under the bladder neck³¹. Posterior colporrhaphy for rectocele.

Treatment for uterine prolapsed is vaginal hysterectomy, with or without repair of the vaginal walls. If reproductive function is to be preserved, the treatment of choice is Manchester or Fothergill repair.

Vault prolapsed occurring after hysterectomy can be treated by sacrocolpopexy. Alternatively, sacrospinous ligament fixation can be undertaken. The main complication is injury to the pudendal nerve bundle³². Newer techniques include posterior intravaginal slintoplasty, which involves creating a "new" uterosacral ligament using polypropylene tape³³.

Due to a high incidence of recurrence with conventional floor repair, mesh augmented pelvic floor repair is now being used increasingly. Recurrence of prolapsed after surgical correction is common³⁴ with 29% of women requiring a second operation within five years³⁵. This may be due to the use of weak native tissues in classic pelvic floor repair³⁶.

Meshes have been associated with an increased risk of complications, due to both method of insertion and because they are foreign bodies. In a retrospective, multicentre study of 329 women who underwent surgical management of pelvic organ prolapsed using mesh repair kits³⁵ operative complications included bladder and rectal injuries and vascular damage. Cystoscopy is recommended to ensure no damage has occurred intra-operatively after completion of ensure no damage has occurred intra-operatively after completion of the surgery. Post-operative complications included voiding dysfunction, perineal haematoma, vaginal adhesions, buttock pain dyspareunia and vaginal erosion. There was one severe case of necrotizing fasciitis.

Other reported complications are adhesions, chronic severe pain dyspareunia erosion or rejection of the mesh. And mesh related infections²⁹. Infection after use of a vaginal polypropylene mesh has been reported in up to 8% of cases²⁸. Erosions have been reported to occur in up to 24% of cases^{29,35}.

Therefore, although mesh repair kits are associated with low recurrence and low morbidity rates, some of the uncommon complications are serious and potentially life threatening and these repairs should therefore only be carried out by specialists.

As of yet there is little evidence comparing the outcome of repair by mesh to standard pelvic floor repair. Early studies have shown that women with vaginal vault prolapsed treated with mesh had cure rates of 82.5% compared to 66% in patients treated with anterior and posterior colporrhaphy³⁶. However, more research is required in this area before meshes can become standard practice.

Overactive bladder (OAB)

This term replaces all previous terminology including detrusor instability/ overactivity/ hyperreflexia' or' hypocompliant bladder³⁷.

Treatment should start with conservative treatment and this usually includes two distinct approaches: lifestyle interventions and bladder retraining.

Lifestyle changes should include: Lose weight if BMI > 30; Stop smoking; Drinking enough. Cut down alcohol and restrict caffeine. Avoid fizzy drinks;

Bladder Retraining is another common non-pharmacological intervention in the management. The objectives are to tetrain the bladder to "hold on" The best results are achieved when done under the supervision of a continence nurse or specialist physiotherapist.

Medical therapy

Six anticholinergic or antimuscarinic agents are currently licensed for treatment of OAB:

Oxybutynin (Lyrinal XL, Ditropan, Kentera), Darifenacin (Enablex), Solifenacin (Vesicare)

Tolterodine (Detrusitol and Detrusitol XL), Trospium (Regurin), Propiverine (Detrunorm)

Controversially NICE guidelines have advocated immediate release Oxybutynin as the first line treatment, purely on a cost basis. The majority of patients however will not be able to tolerate the side effects of this, and all of the drugs in the above list have their place, there being little to choose between them in the available literature.

If medical treatment fails then all of the treatments below have a place, Sacral nerve root stimulation (Neuro-modulation), Electrical stimulation, Botulinum Toxin A injections, Detrusor myectomy, Augmentation cystoplasty.

Urodynamic Investigations

Of the more advanced tools employed in secondary care the gold standard investigation is conventional urodynamic studies (UDS). Involving filling and voiding cystometry with or, more commonly without the use of radiological screening. It should be pointed out however, that it is not mandatory and indeed NICE does not recommend performing these investigations prior to commencing anti muscarinic therapy, or prior to a first surgical treatment for stress incontinence. UDS are only performed when a patient fails to respond to conservative treatments or a sustained trial (usually three months) of different drug treatments, when there are symptoms suggesting bladder outlet obstruction. Or where surgery is being considered.

The aims of UDS in these circumstances are to diagnose stress incontinence, to confirm a diagnosis of OAB and assess its' severity, to exclude a reduced functional bladder capacity, to exclude a hypersensitive bladder, to assess the presence of bladder outflow obstruction.

Uroflowmetry and filling and voiding cystometry are the standard tests used for diagnosis, with video urodynamics or ambulatory urodynamics being reserved for those patients with complicated problems or in whom there is a mismatch between patients symptoms and the result of conventional UDS.

Flexible cystoscopy should be performed where there is suspicion of bladder pathology i.e. where there are symptoms of haematuria or recurrent infections or in the assessment of patients with a hypersensitive bladder or bladder pain where a hydrodistension may prove therapeutic.

Conclusion

In conclusion the basic principles of careful assesment, accurate diagnosis and appropriate management in good experienced hands will result in the management of urogynaecological problems attaining the level of evidence - based medicine required in this most difficult subject in our discipline of gynaecology.

To meet this major challenge urogynaecology subspecialty should be established in all the medical colleges of our country as well as formation of urogynaecology and reconstructive pelvic surgery society of Bangladesh (URPSB).

This obviously improves the status of the women, gives her a better quality of life, avoid patients consulting different specialties for the some problem and definetly avoid the need of repeated surgeries.

The objectives of URPSB (Urogynaecology and reconstructive pelvic surgery of Bangladesh) should be creation of urogynaecology subspecialty, updating the subspecialists about the recent advances by organizing periodical conferences and workshop, training, the specialists in basis of female urology, urogynaecology and urodynamics standardizing education, training and to encourage research activities in this specified field.

Disclosure

All the authors declared no competing interestes.

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