Laparoscopic Surgery for Female Urinary Incontinence: Prudence shall Prevail

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ABSTRACT

Advances in laparoscopic techniques continue to seek new domains and new indications with the sole objective of providing maximum benefit in a minimally invasive manner. During the last decade, several innovative laparoscopic procedures have evolved for the management of female urinary incontinence. At this juncture, prudence dictates a careful analysis of the principles behind and performance of these procedures so that our treatment recommendations for this common ailment can be based on unbiased scientific pragmatism. In this review, we attempt to analyze the available data and provide constructive criticism and recommendations toward the continued pursuit in this area of development in laparoscopy.

Key Words: Urinary incontinence, Laparoscopic surgery, Laparoscopic suspension.

DISCUSSION

Female urinary incontinence is a major personal and societal problem that is poised to assume national significance because of the astronomic cost involved in the direct and indirect care of incontinence. The 1996 agency for Health Care Policy and Research estimated that approximately 14 million Americans suffer from urinary incontinence, of which 80% are female. Based on that figure, Wagner and Hu calculated that a conservative estimate of annual cost of care for urinary incontinence could be as high as $46 billion. Growing evidence indicates that appropriate management can reduce the morbidity and the cost of urinary incontinence. The management strategies for female urinary incontinence include surgical treatment, medical therapies, behavioral therapy and no active treatment. The 1995 telephone survey of random samples of women over 45 years of age by the Bladder Health Council of American Foundation of Urologic Diseases revealed that 23.3% and 19.8% reported receiving surgical and medical therapy, respectively, and 19.7% were left untreated. The largest group of 38.8% received behavioral therapy in the form of exercises, timed frequent voiding, etc.

Even though surgery incurs higher initial cost, the expenses related to medical and behavioral therapy, along with the indirect cost of conservative management items, add up over a prolonged period of time. With a sophisticated cost analysis study, Ramsey et al found that the ten-year expected cost from surgical treatment of urinary incontinence would actually be lower than medical treatment or behavioral therapy.

The cost benefit and more predictable outcome justifies our century-old interest in surgical management of urinary incontinence. Our enthusiasm is reflected in the development of nearly 200 different surgical procedures to rectify incontinence. In 1907, von Giordano reported his technique of Gracilis muscle transfer around the urethra and several sling techniques followed over the next few decades. The complexities of these procedures and associated morbidities led to the decline in their popularity. Since around the middle of the century, our efforts and interests crystallized around the principle of bladder neck suspension whereby the often hypermobile proxi-
mal urethra and bladder neck is repositioned, suspended and fixed in the retropubic location. Later on, to reduce open surgical morbidities, several variations of vaginal needle suspension procedures were promoted. However, long-term surveys in the 1990s revealed the marked decline of postoperative continence over the years following vaginal needle suspension. Around the same time, the advent of laparoscopic surgery has kindled our interest in performing bladder neck suspension by laparoscopic technique with the aim of achieving long-lasting continence in a minimally invasive manner.

The only prospective randomized study by Bergman et al in 1989, comparing the results of Burch colposuspension, vaginal needle suspension and anterior colporrhaphy, showed that Burch suspension provided the most sustained postoperative continence among the three groups. Because of this observation by Bergman et al, complimented by other retrospective reports of good performance of Burch suspension, the majority of laparoscopic suspension procedures have tried to emulate the principles of Burch suspension. In the process, however, many of the innovators have strayed from the original Burch procedure and have tried to promote their own method of retropubic suspension. It is important to emphasize that the term laparoscopic Burch procedure is often loosely applied to a variety of techniques not necessarily simulating the original Burch procedure.

It is unfortunate that throughout the evolution of incontinence surgery we have been handicapped by the lack of scientifically controlled long-term comparative outcome analysis of different treatment modalities. A similar trend is adversely affecting the evaluation of the true outcome of laparoscopic suspension procedures. The major deficiencies in most of the reports of laparoscopic suspension include a) small cohort of patients, b) lack of long-term outcome data, and c) lack of prospectively randomized comparative analysis. Lose reviewed the literature through Medline search between January 1991 and January 1997, and through critical analysis, came up with 15 papers to evaluate, of which only one was prospectively randomized, and ten were open observational clinical series. Virtually all the reports indicated an excellent outcome at early follow-up of 3-12 months. There were only three reports of relatively longer follow-up. Burton and Das observed 97% and 90% early success at 12 and 10 months, which declined to 60% and 40% at 3 years, respectively. McDougall et al reported 82% postoperative continence at 3 months, but on continued follow-up at 40 months only 30% of the patients were dry. This precipitous decline in postoperative continence over longer follow-up is a deja vu of our similar experience with vaginal needle suspension. Similar decline is observed with abdominal Burch suspension, where, in a highly selected group of women, Bergman and Elia observed that an 89% cure rate at 12 months declined to 70% at 5 years.

It is time to pause and ponder upon our dismal results and analyze the possible reasons, so that our endeavors may be geared to pragmatic direction. In 1979, Enhorning observed that a well-supported proximal urethra lies in an intra-abdominal location where increased intra-abdominal pressure is equally transmitted to the bladder and proximal urethra, thereby preventing stress incontinence. A hypermobile urethra, with stress incontinence, is displaced from that privileged location and is subjected to stress incontinence. Bladder neck suspension, (abdominal, vaginal, or laparoscopic) procedures are based on that premise that retropubic repositioning and secured fixation of the bladder neck and proximal urethra in the intra-abdominal pressure zone should restore continence. This hypothesis is over simplistic because, on the one hand, a hypermobile urethra is not always associated with incontinence and, on the other hand, suspending the bladder neck does not provide continence in the long run. We now realize that stress incontinence is multifactorial of which urethral displacement and hypermobility is only one of the significant factors. Through elegant topographic and dissection studies, DeLancey has analyzed multiple additional factors affecting the sphincteric function, support, and continence of the vesical neck and proximal urethra.

One of the important support factors observed by DeLancey is the arcus tendinous fascia pelvis and vaginal-levator attachment that stretches bilaterally like a hammock, providing strong posterior support to the proximal urethra. If this often attenuated support is not attended to, then the already somewhat noncompliant urethra has no strong backboard to compress against during stress. Bladder neck suspension (abdominal, vaginal, or laparoscopic) does not help this hammock of backboard support.

Deficiency of the urethral factors causes incontinence from intrinsic sphincteric deficiency (ISD). Until recently, ISD has been considered often secondary to failed
prior anti-incontinence surgeries, urethral surgeries, radiation therapy, etc., implying that ISD is mostly secondary or iatrogenic. However, routine abdominal leak-point pressure studies in virgin stress incontinence patients now reveal that an element of ISD, as proven by low leak-point pressure, exists in 60-75% of patients. This can be designated as primary ISD of presumed vascular and/or hormonal etiology. Bladder neck suspension procedures (abdominal, vaginal, or laparoscopic) are not expected to help ISD. The management of ISD entails urethral coaptation with pubovaginal slings, artificial sphincters, or injection of periurethral bulking agents.

Therefore, it is evident that stress incontinence results from multiple etiologic factors. Bladder neck suspensions address only the element of displaced hypermobile urethra and do not take into account other significant anatomic factors, thereby leading to recurrent stress incontinence with time.

In this scenario, laparoscopic bladder neck suspension shares a similar fate of postoperative recurrence as abdominal or vaginal needle suspension. At the same time, laparoscopic surgeries are attractive choices because of their proven lower postoperative morbidity in comparative analysis. Therefore, it may be worth pursuing laparoscopic surgeries for female urinary incontinence, but we need to proceed cautiously, with the following caveats;

Patient Selection

It appears that bladder neck suspension procedures are likely to succeed in patients with hypermobility of the urethra as the only etiologic factor. Abdominal leak-point pressure studies should be done routinely to exclude ISD patients with low leak-point pressure. Similarly, any patients with symptoms of urgency should be evaluated with urodynamic studies to exclude detrusor instability. With strict selection criteria, one may still expect 20-25% of stress incontinent women with hypermobile urethra to be suitable for laparoscopic bladder neck suspension. The majority of the remainder with ISD may benefit from pubovaginal sling suspension, the feasibility of the laparoscopic application of which has not been adequately explored.

Burch Suspension

Despite some decline in postoperative continence over the years, it appears that Burch suspensions have a higher rate of success amongst all varieties of bladder neck suspension. Laparoscopic suspension endeavors should therefore simulate Burch suspensions.

Laparoscopic Pubovaginal Sling Suspension

Because of the high incidence of ISD in stress incontinence and the observation of decline in continence after bladder neck suspension, there is an increasing trend to recommending pubovaginal sling for all stress incontinent patients across the board. Continence following sling suspension seems to sustain better over the years. Sporadic attempts at laparoscopic sling procedures have not been gratifying. Also, because the latest cadaveric fascial sling procedure is already minimally invasive, there appears little interest in further development in laparoscopic sling suspension. However, there is emerging evidence that suspension procedures necessitating vaginal incision lead to a higher incidence of sexual discomfort and dysfunction in women compared to the laparoscopic approach. Therefore, we need to explore the feasibility of laparoscopic pubovaginal sling suspension that will have the distinct advantage of less postoperative sexual morbidity.

Associated Defects

Laparoscopy allows unique perspective and visual assessment of associated pelvic defects of the vault and anterior and posterior vaginal compartments. Laparoscopic correction of anatomic defects by apical vault reinforcement, paravaginal repair, and posterior vaginal repairs, as needed, should be combined with bladder neck suspension procedures.

Critical Analysis

Our endeavors must be channeled in a scientific manner, including large cohorts of patients, preferably randomized prospectively to other orthodox procedures for comparison. Follow-up must extend for at least two years, with periodic subjective analysis by third-party review of validated, anonymous questionnaire surveys. Patients with recurrent incontinence should be studied with objective urodynamic testing to determine the reasons for failure. Ideally, multicenter involvement under the aegis of our society will expedite completion of well-controlled studies and provide the answers in a timely manner.
The last thing we want to do is reinvent a broken wheel. In the development of ideal therapy for female urinary incontinence, we shall prevail by continual efforts to decipher potential causes of failure through critical self-analysis that will lead to better remedial strategies. To succeed, our pursuit must be guided by prudence and not by orthodox bias—as Oliver Wendell Holmes said, “The most important thing is not where we stand, but in which direction we are moving.”

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