EVOLUTION OF MINIMALLY INVASIVE SLING PROCEDURES FOR STRESS URINARY INCONTINENCE: SINGLE–INCISION MIDURETHRAL TAPE

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Treatment of female urinary incontinence female stress urinary incontinence **(SUI)** can be dated as far back as early 1900s, with the first description of a pubovaginal sling.

Von Giordano is usually credited with performing the first pubovaginal sling operation in 1907, using a gracilis muscle graft around the urethra. In 1914, Frangenheim used rectus abdominus muscle and fascia for pubovaginal slings. In 1942, Aldridge, Millin, and Read corrected urinary incontinence using fascial slings. In 1965, Zoedler and Boeminghous first introduced synthetic slings.

Over 200 surgical procedures to treat SUI have been reported in the medical literature. The basis for these suspension procedures relied on proximal urethra and bladder neck elevation restoring the anatomic position of the urethra while applying an imprecise amount of external compression, creating a partial obstruction to prevent leakage during stressful activities. Thus, the gold standard treatment for stress urinary incontinence (SUI) remained colposuspension and autologous pubovaginal slings until recently. Although efficacious, the need for hospitalization and morbidity associated with these procedures was unsatisfactory for treatment of this frequent, benign disorder.

The current midurethral sling concept has its roots in work by Asmussen and Ulmsten during the early 1980s with the discovery of the physiology and pathophysiology of the midurethra and its importance as a mechanism for continence during stress in women. Their findings led to the theory of weakening, and damage to pubourethral ligaments led to impaired midurethral function and less anterior urethral support, thus creating an environment for urinary incontinence under stress. Further work of pathophysiology by DeLancy resulted in his hammock theory of midurethral support, a musculofascial layer used as a backboard during stressful events to create urethral closure and maintain continence.

Previously, the Burch procedure was offered to patients with stress urinary incontinence as the gold standard primary surgery. When compared with the outpatient minimally invasive procedures, the Burch has the obvious drawbacks of an abdominal incision and a hospital stay. Laparoscopic Burch colposuspension has demonstrated high subjective cure rates, but objective cure varies. Success with this procedure is very dependeent upon the surgeon's skill and experience. Because of shorter operating room time and greater simplicity, the midurethral slings have supplanted the laparoscopic Burch as the preferred minimally invasive procedure.

Ulmsten et al. first described the tension-free vaginal tape **(TVT)** procedure, which has become the new gold standard for SUI. Although this new, ambulatory procedure was a significant improvement to the prior standards of care, the complications particularly associated with the blind passage of the trocars in the retropubic space, although rare, has led to further refinement in technique.

Attempting to incorporate Ulmstens innovations in a less invasive technique, the first transobturator midurethral sling **(TOT)** was described by Delorme et al. in 2001. Due to the uniformity of anatomy and a perception that a transobturator approach poses less risk for iatrogenic injury, the TOT route has become the preferred access to placing midurethral slings for many surgeons.

Because the insertion of these slings requires the blind passage of needles through the retropubic or obturator space, depending on the sling chosen, these procedures can muscle training have failed, surgical management is the be associated with several complications, such as bleeding, infection, damage to nerves and vessels, bladder perforation, bowel perforation, injury to the ureters, and muscle pain. These risks are uncommon and tolerated due to the high rate of success demonstrated with the use of tension-free midurethral slings. Other beneits associated with the midurethral sling procedures include their minimally invasive nature, shorter operating times, and ability to be performed under local anesthetic. Although procedural risks are infrequent and perhaps rare, they can be devastating. Endeavors to further reduce such risks have led to the development of potentially safer modiications that eliminate the exit of instrumentation and reduce postoperative pain.

The latest in the logical progression of synthetic slings used in the minimally invasive treatment of USI is the mini-sling. The new step towards a less invasive, midurethral tension-free sling was to develop a system that could be placed through one small vaginal incision without having to pass needles through the abdomen or groin.

There are three "next-generation" single-incision minislings that currently are available in

the anti-incontinence devices market, notably the TVT-Secure System (Johnson & Johnson) , the Mini-Arc Single Incision Sling (AMS) and Ajust™ Adjustable Single Incision Sling (Bard).

Owing to the relatively new market introduction of minislings (TVT-Secure in 2006, AMS Mini-Arc in 2007 and Ajust in the beginning of 2009), there are limited published data available for either of these product entries.

The Gynecare TVT Secure System **(TVT-S)** from Ethicon, Inc. — the third TVT generation, a novel midurethral sling implant has been, as it was mentioned, introduced for clinical use in 2006. This polypropylene mesh tape which is four times shorter that traditional slings, is introduced to the patient with a new attach-and-release mechanism that promotes stable, controlled placement without skin exits. It's virtually no scientific papers appeared in the literature on this subject.

The first in Israel TVT-S has been done by the author in August 2006. Following the previous success of TVT-O slings on more than 250 patients, it has been decided to carry on a prospective randomized comparative study of these two minimally invasive different techniques for stress urinary incontinence performed by one experienced surgeon.

The author's experience composed from more than 600 cases of midurethral slings of different branches.

The aims of this clinical trial were to prospectively compare the incidence of intraoperative complications and to assess the perioperative morbidity (primary end point) and one year postoperative efficacy (secondary end point) of TVT-O vs TVT-S in women with urodynamic stress incontinence. The author initially performed 10 TVT-S operations for "to know-how" purposes. These cases were not included to the study.

Eighty four consecutive patients were included comprising 2 clinical groups with 42 women in each group: TVT-O and TVT-S. Both groups were similar by age, parity, BIM and menstrual status. TVT-S "hammock" only fixation was used. No patients were lost to follow-up. The shortest follow-up was 12 months and the longest — 2 years.

No bladder injury or abnormal bleeding happened in both groups. Vaginal perforation occurred in 1 patient from the TVT-O group. Thigh, groin or vaginal pains were noted in 13 patients from the TVT-O group (31 %) and in 6 in TVT-S (14.3 %). Urine obstruction or retention lasted more than 72 hours happened in 4 women from TVT-S group (9.5 %) and in non in TVT-O. Tape was removed in 2 cases from patients who received TVT-S (4.7 %). No tape exposure was observed during the follow-up period. Thirty nine women (93 %) from TVT-O group were cured, while only 26 (62 %) from TVT-S group. De-novo urgency of 7.1 % (3 women) was documented in TVT-O group and 26 % (11 patients) in TVT-S group.

From our study we conclude that TVT-O technique is more superior to a new non tension — free TVT-S device to treat urinary stress incontinence.

The Ajust™ Adjustable Single-Incision Sling System includes: a fully Adjustable Sling with self-fixating polypropylene anchors; an Introducer designed to consistently place the sling in the obturator membrane in a safe and secure manner (due to its curvature and length); and a Flexible Stylet used to lock the sling after adjustment. With the Ajust™ Sling, one can tighten and loosen the sling after insertion of the anchors, permitting the surgeon to achieve the optimal sling setting without visual obstruction from introducers in the surgical space.

Since the introduction of Ajust sling in we have performed more than 30 operations. Primary outcome measures as subjective cure rate, and secondary outcome measures, notably, intraoperative complication rate, blood loss, postoperative complication rate and postoperative pain have been investigated for the short term, and will be presented.

Until now the author doesn't have enough experience with another single incision minisling Mini-Arc (AMS), hence we can't bring our own data. But we'll discuss the available on this subject literature.

ВЗГЛЯД АМБУЛАТОРНОЙ ХИРУРГИИ СКВОЗЬ ПРИЗМУ ТАЗОВОГО ДНА

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Актуальность проблемы

По данным терминологического комитета Международного общества по удержанию мочи (International Continence Society — ICS), недержание мочи — это любое состояние, приводящее к непроизвольному выделению мочи.