

## Modified technique of vaginal hysterectomy, placing polypropylene mesh TOT Sling and IVS methods in solving the associated static disorders of female genital organs and stress incontinence of urine

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**SUMMARY:** Modified technique of vaginal hysterectomy, placing polypropylene mesh TOT Sling and IVS methods in solving the associated static disorders of female genital organs and stress incontinence of urine.

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**Introduction:** static disorders of female genital organs, present a problem and a professional challenge for any gynecologist who deals with the operational urogynecology. Frequent relapses of these disorders, after using the classical surgical techniques, have led to new research, technological progress in the production of polypropylene grafts and development of modern operational approaches to these problems. Newer surgical techniques have led to the construction of retaining polypropylene mesh, in terms of solving the disorders. Stress incontinence of urine (SUI) and strengthening of the pelvic bottom, as well as prevention of a relapse Rectocele and Enterocoela. The aim of the study was to present a modification of the classical techniques of vaginal hysterectomy, taking into consideration the recommendations of the authority in the field of vaginal surgery. Also, it indicates the great importance of introducing operational techniques of application polypropylene mesh grafts in connection in the following SUI and strengthening of the pelvic bottom. Case: we present a case of sexagenarian patient with total prolapse of the uterus, followed by the SUI of the middle level, and with evident Rectocele and Enterocoela. At council has decided to do a modified technique of total vaginal hysterectomy (TVH), and after that, we did a setting of semi rigid polypropylene mesh by transobturator (TOT Sling) method, in order to obtain SUI correction, and setting of intravaginal slings (IVS) by polypropylene mesh, in order to make a correction of Rectocele and Enterocoela. The surgery has been done in spinal anesthesia. Operative and postoperative flows occurred regularly. The catheter was removed the third postoperative day. The patient urinates spontaneously without residue, controls the micturition. Fifth postoperative day the patient passed faeces, proper and controlled, and was dismissed to home care, for recovered.

**Discussion and conclusion:** problems of our female patient were solved using the described technique and interdisciplinary approach. We removed the prolapsed uterus, solved the problem of SUI and strengthened the pelvic bottom. Interdisciplinary solving of the static disorder of

**RIASSUNTO:** Una nuova tecnica a di isterectomia vaginale basata sull'impianto di una protesi di polipropilene semirigida può risolvere i disturbi statici degli organi genitali femminili e lo stress da incontinenza urinaria (SUI).

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**Introduzione:** i disturbi statici degli organi genitali femminili presentano un problema e una sfida professionale per ogni ginecologo che si occupa di urologia e ginecologia chirurgica. Le frequenti recidive di questi disturbi secondari alle tecniche chirurgiche classiche, hanno stimolato nuove ricerche e sviluppi tecnologici basati sulla produzione di innesti di polipropilene e sul perfezionamento degli approcci operativi. Le più moderne tecniche operative si basano sull'impianto di protesi di polipropilene con lo scopo di risolvere lo SUI, rafforzare il pavimento pelvico al fine di prevenire il prolasso rettale.

**Metodo:** riportiamo il caso di una sessantenne con prolasso totale dell'utero, con SUI di livello medio e prolasso rettale.

L'isterectomia vaginale è stata seguita da impianto di una rete di polipropilene semirigida con il metodo transobturator (TOT sling) al fine di correggere la SUI e dall'impianto dello sling intervaginale (IVS) con rete di polipropilene al fine di correggere il prolasso rettale. L'operazione è stata eseguita in anestesia spinale.

**Risultato:** il periodo operatorio e post-operatorio ha seguito un iter regolare.

La rimozione del catetere è avvenuta in terza giornata. La paziente ha urinato spontaneamente, senza residuo, e ha mostrato un buon controllo della minzione ed è stata dimessa in quinta giornata.

**Discussione e conclusione:** con la tecnica descritta e l'approccio interdisciplinare, si è risolto sia il prolasso uterino che la SUI. I controlli a un mese e a tre mesi, hanno mostrato l'assenza di problemi soggettivi, una minzione regolare e controllata e assenza di prolasso rettale. L'ecografia ha mostrato l'assenza di residuo. Ciò ha permesso il ritorno della paziente alle normali attività quotidiane. Pertanto, queste tecniche, rappresentano l'approccio ideale alla soluzione dei problemi trattati.

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*female genital organs is necessary, in order to achieve optimal solving of these problems. The controls after a month, after three and six months, showed that our patient has no subjective discomfort, micturitionis orderly, controlled and there is no sign of Cistocoellae and Enterocoellae. Ultrasound finding is neat, after micturition there is no residue. The patient lives a normal life and has returned to normal life activities. We think that these techniques are, currently, in our conditions, the ideal approach to solve these problems.*

KEY WORDS: Static disorders of female genital organs - Vaginal hysterectomy - TOT Sling - Intravaginal slings.  
Disordini statici di organi genitali femminili - Isterectomia vaginale - TOT Sling - Sling intravaginale IVS.

## Introduction

Nearly half of women over 50 years of age suffer from pelvic organ prolapse. Urination disorders significantly reduce the quality of life for women and present an important issue to the wider community, which affect the physical and mental health of women. Namely, it is well known that even 25-30% of women in the older age suffer from static urine incontinence (stress incontinentio urinae, SUI). Stress urinary incontinence is the most common form of transurethral urinary incontinence in women. Normal bladder function depends on the coordinated action of central and peripheral nervous system, m. detruzora and regular function and anatomical relationship of the urinary bladder neck and urethra (1). SUI occurs during periods of increased intraabdominal pressure (e.g., sneezing, coughing, or exercise) when the intravesical pressure rises higher than the pressure that the urethral closure mechanism can withstand, and urine loss results (9). Normal urethral closing can be achieved by a combination of internal and external factors. External factors include the structures that create support below the bladder neck and urethra (DeLancey Hammock hypothesis) (2).

The support keeps the neck of the urinary bladder in the abdominal pressure zone, corresponding to the increase of intraabdominal pressure by tightening (splitting), and thus enables the urethral closure. The anatomical structures that are supported include m. levator ani, endopelvic fascia and their tack weld for the pelvic wall and urethra, and pubourethral ligament. When the supportive mechanism becomes defective because of fascia (relaxation, muscle weakness or a combination of both elements, the normal support is lost and creates hipermobility of urethra and bladder neck). Bladder neck goes down and destabilizes, which leads to the inner mouth the of urethra permanently opened or it opens whit sudden increase of intraabdominal pressure, which is clinically manifested by incontinence of urine. For many women the loss of support is hard enough to cause SUI. However, many women remain continent, despite the loss of urethral support. Internal factors

that lead to the closure of the urethra include transverse-stripped and smooth muscles of the urethral wall, congestion of submucous venous plexus, and coaption of mucosis. Prolapse is the dropping of pelvic organs in or through the vaginal canal. Almost half of women older than 50 years suffer from this disorder while the prevalence of prolapse is between 30% to 50% (3). It is estimated that women are 11.1% at the risk or due to be operated for prolapse or incontinence of urine by their 79th birthday (4). We distinguish uterine prolapse, anterior vaginal wall prolapse (Cistocoellae) and rear vaginal wall prolapse (Rectocoellae and Enterocoellae).

Static disorders of female genital organs represent a professional challenge for any gynecologist, who deals with the operational urogynecology. They are often associated with different degrees of disorder micturition, mainly with stress incontinentio urinae (SUI). Regarding this, in the purpose of correcting these problems, more than one hundred operational techniques have been implemented, described in literature, with recommendations of various modifications of operational techniques. Modifications, sometimes minimal, may be useful in practice, in terms of facilitating the performance of operations, shortening the duration of operational procedures, sewed material savings, and faster postoperative recovery of patients. Also, recurrent static disorders of female genital organs, after the previous operating solving techniques of vaginal surgery, represent a significant problem and complicate the final outcome of corrective surgery. Newer surgical techniques, go towards supporting embedding polypropylene meshes, with the purpose of resolving SUI disorders and strengthening of the pelvic bottom, incorporating the same, as well as prevention of Rectocoella and Enterocoella relapse. Today, the trend is to change the previous approach to surgical treatment of SUI in women, by applying simple, practical and safe laparoscopic techniques, as well as numerous Sling methods (TVT, TOT, SPARC, etc.), in the treatment of bottom pelvic defects. We believe that the interdisciplinary approach in solving problems is required in order to achieve optimal results. It is advisable to have the

cooperation of gynecologists and urologists, and unavoidable role of the anesthesiologist, due to regional anesthesia and intensive postoperative monitoring of patients. Today it is considered that damages to the endopelvic fascia, along with neuromuscular impairments, are the basis of the problem of the pelvic bottom defects.

## The aim of the study

The aim of the study was to point out the modified technique of total vaginal hysterectomy (TVH), with transobturatoral (TOT) sling method, in order to correct SUI and the method of intravaginal Sling (IVS), in order to resolve the static disorder of rear pelvic compartment and strengthen the pelvic bottom. We stress the interdisciplinary approach to the problem, cooperation between Urologists, Gynecologists and Anesthesiologists. We have shown the significance of introducing the polypropylene meshes in our everyday urogynecological practice, as a successful way of solving problems and a significant step forward in modern treatment in our institution.

## Case report

We presented a case of a 60-year-old patient, who came to the gynecologic clinic of the General Hospital in Bar, with complete prolapse of the uterus, accompanied by marked SUI and Rectocele. 11 years ago, the patient had the front colporaphia with raising of the urethra by Kelly, and colpoperineoplastic with mioaphia of levator muscles pelvic bottom. At council we decided to do TVH with TOT Sling and IVS.

A modified TVH was carried out. Due to the specific operative technique, which in Montenegro has only been done in our institution, it follows its description, with authentic photographs:

1. Anterior vaginal wall was sharply separated from the bladder with scissors, without previous undermining of mucous membranes of the front wall of the vagina with physiological saline or some other solution, as it had previously been the practice (Fig. 1). Also, last vaginal wall was strongly separated from the back of the cervix so we could access the back colpotomia and with scissors opened Douglas string.
2. After a sharp and blunt extension of the opening was made to the last colpotomia (by forefinger), we put forefinger of right hand through Douglas string, from back to the front side of the uterus, and with sharp scissors cut lig. pubovesicale and opened the peritoneum plicae vesicouterinae. The next step is careful control of Haemostasis, because in this area possible dangerous bleeding can occur, after cutting lig. pubovesicale.

3. With Wertheim terminal we hooked, and then cut and tourniqueted the lig. sacrouterina and paracervical tissue lig. Mackendrota (still together), which is, in our opinion important for further course of operation and achieving optimal static.
  4. Independently, we tourniqueted aa. uterinae on both sides, after precise processing, hooking and cutting. The above mentioned, has never been done in the block, with other surrounding structures, due to the danger of possible bad Haemostasis.
  5. For fixation of the urinary bladder after its lifting, we always use the method of fundoplication with quilting serose bladder in three layers, and its folding, unlike to the previous setup of "suture tobacco-bag" VICRYL 2-0.
  6. In patients with emphasized symptoms and signs of SUI, we always decide to place TOT Sling (Fig. 2). Previously, we have used the classical surgical techniques for solving the above problems, the most common method by Kelly.
  7. Douglas string peritoneum, after TVH, is not closed. Previously, we have always performed the closing of Douglas string's Peritonei. As mentioned it has been done in techniques of abdominal hysterectomy, which is a logical approach.
  8. After TVH, in Douglas string we put a Foley catheter diameter 24. Foley catheter is used because filling the balloon with saline we fix it in the abdominal cavity, and its removal is extremely easy and painless. This abdominal cavity is drained so we have a good insight into any possible post-operative bleeding in the abdominal cavity, in the immediate postoperative period (Fig. 8).
  9. With the suture, where previously lig. sacrouterinum and lig. Mackendrotum were bound up after TVH was made, we sewed up the anterior and rear wall of the vagina and thereby connected the mentioned structures on both sides of the vagina in order to improve the above-mentioned static vaginal wall, since the lig. sacrouterinum is only rigid uterine connection.
  10. The vagina was not reduced.
  11. The rear wall of the vagina was separated from the rectum sharply, without previous undermining with saline, which reduces the time of surgery and does not jeopardize the safety of the operating procedure.
- After completing TVH, we did TOT Sling in the standard way, so we placed a needle into a continuous semi rigid polypropylene mesh, about 2 centimeters wide, through an obturatoral opening on both sides, and its lower part on the bottom of the urethra (Fig. 2). After setting of TOT Sling, the patient was asked to cough (surgery was done in spinal anesthesia), so placed mesh was gently tightened to the negativity of the test. This method has always been done in regional (spinal) anesthesia, because of the cooperation

with the patient, as patient can cough to increase short intraabdominal pressure and thus help the operator to determine the optimal degree of tightening the mesh.

Then we began solving the relapsed Rectocele and Enterocoelle, with a newer method- IVS (Intra Vaginal Sling): the mucous membranes of the rear vaginal wall are sharply separated from the rectum. Then, partly sharp and partly dull, levatory Lodges open. Under levatory muscles you enter with the forefinger of the left hand, first to the left side of patient, and then to the right and pass with the forefinger slowly and carefully, close to the spine schiatica, and come to the sacrospinal ligament (Fig. 3). Then from the external side, on the skin of gluteal part, to about 4-5 cm laterally from the anus, skin is cut, and with a curved, large needle we enter through the hole made to the top of the forefinger on sacrospinal ligament through which the needle tip is threaded, and following the fingertip which draws the same way through the levatory boxes, we pass the needle up above the rectum (Figs. 4 and 5). At the top of the needle (through existing hole) which is placed suprarectal (Fig. 5), we set up and attach continuous semi rigid, polypropylene mesh, which is in the middle part about 5-6 centimeters wide, and at the ends about 2cm, and then pull the needle out slowly, the same way it entered through the skin of gluteal area and with it pull out one end of the mesh (Fig. 6). The same procedure is done with the right hand, and after that, with gentle traction you place set mesh suprarectal (Fig. 7). Over the mesh in the classical technique of sutures, the levatory muscles are connected. Then Homeostasis control follows, then the sewing up of the rear vaginal wall with extension VICRYL suture, 2-0, without reduction of the vagina.

Drain from Douglas string was removed 24 hours after surgery, the bladder catheter was removed 72 hours after surgery (Fig. 8). Released on home care on the fourth postoperative day for recovery. Recovered without subjective difficulties, with neat ultrasound findings and micturition without residue.

The check-up examination, after a month, and in the check-up after three months, clinical and ultrasound findings were neat, no recurrence of Enterocoella, or e-Cystocoella. Micturition is regular and controlled, without residue. The patient has no subjective difficulties.

## Discussion

The genital and urinary tracts are intimately associated anatomically and embryologically from the earliest stages of their development. The bladder is located directly above the anterior vaginal wall, and the urethra is fused to it. Both of these structures, as well as other structures of the pelvic floor, are placed at risk during pregnancy and childbirth. Each organ system in the pelvic floor – urinary, genital, intestinal – traverses the pelvis and exits through

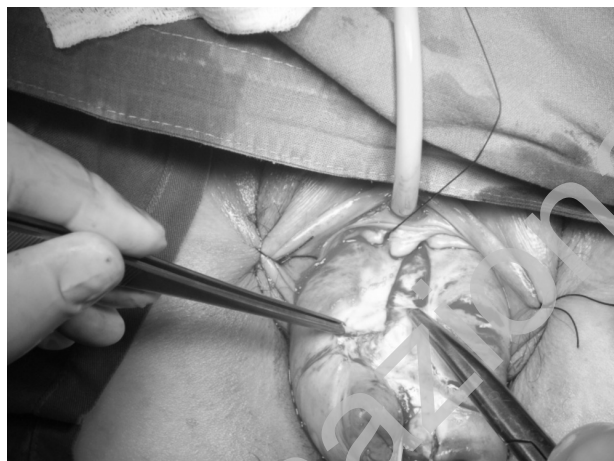


Fig. 1 - Evident total prolapse of the uterus at the beginning of the operation. Sharp separation of the front wall of the vagina from the cervix.



Fig. 2 - Review made after TVH and built-in TOT Sling. The ends of polypropylene mesh are visible.



Fig. 3 - Forefinger of the left hand passing through the Lodge m.levatoris Ani, on the left side of patient.



Fig. 4 - After processing through Lodge m.levator Ani, it comes from inside to the sacrospinal ligament, then the skin is cut with a scalpel outside and through this incision, a large circular needle is pulled through the top with the forefinger, which is on the sacrospinal ligament. The needle then passes through it, and following the direction of drawing to the top with the forefinger, needle is placed through the Lodge m.levator ani, up above the rectum. The same is done with the opposite side.



Fig. 6 - Then for the needle tip a mesh is attached and it is drawn the same way, where it is drawn together with one end of the mesh. In this way the mesh is dragged through sacrospinal ligament, and further, to the skin of gluteal area.



Fig. 5 - Review after complete infiltration of needle, its top is show with the aperture, through which goes the end of the mesh Goes, it is fixed, and then it is dragged on the skin, pulling the needle backwards.

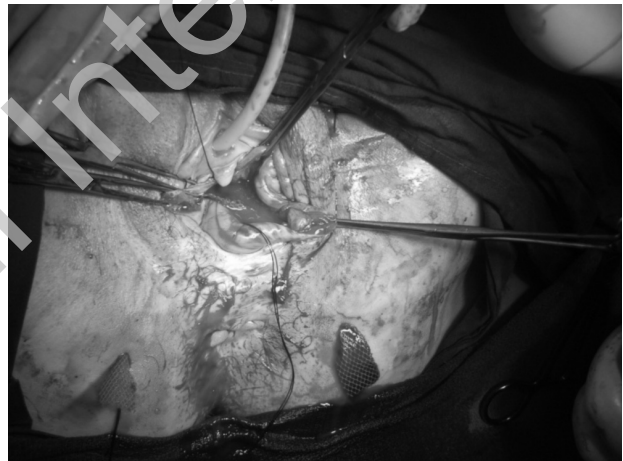


Fig. 7 - Review after infiltration of mesh mutual has been seen mesh ends, about 3-4 cm laterally from the anus.

its own orifice. Thus, these systems are intricately related in function and anatomic support (7).

Urinary incontinence is defined as involuntary loss of urine that is a social or hygienic problem and that is objectively demonstrable (8).

Operations for stress incontinence can be classified into four broad categories (10, 11 and 12):

1. Traditional anterior vaginal colporrhaphy.
2. Operations to correct stress incontinence resulting from anatomic hypermobility (retropubic bladder neck suspension operations, needle suspension procedures, tension-free vaginal tape, and some sling procedures).
3. Operations for stress incontinence resulting from in-



Fig. 8 - Review after completing the operation. The upper catheter was placed in the bladder; the lower is drained from Douglas string.

trinsic sphincteric weakness or dysfunction (sling operations and periurethral injections).

4. Salvage operations (intentionally obstructive sling operations, implantation of an artificial urinary sphincter, urinary diversion).

Today there are more than one hundred surgical methods, which are trying to solve the problem of SUI. The goal of Surgery is to restore the bladder neck to place where normal urethral closure pressure can be achieved, and under it to obtain a quality base, on which the urethra will lean with straining. Residual urine must be solved by surgery, and allow the ease of urination without effort. Indications for application of the sling method are hipermobility of urethra and/or damaged internal sphincter of urethra (5). The sling can be made of organic or inorganic materials. Synthetic materials (e.g. Silastic, Gore-Tex, Marlex) are popular because of their consistent strength and easy availability, but these substances are often plagued by problems with erosion and infection when they are used around the urethra.

Traditionally, sling operations have been used principally for patients with complicated stress incontinence, usually resulting from intrinsic sphincteric damage or weakness. Patients requiring a sling typically have demonstrable stress incontinence with normal urethral support or stress incontinence with a low leak-point pressure (9). In our hospital the technique of TOT sling as been perfected. All sling methods consist of placing a neutral polypropylene tape under the mid urethra, which adjusts angulation of urethra and vesicle urethral angle. Polypropylene tape in the body acts as a permanent implant, it is not subject to proteolyses or does not cause tissue reaction. According to the opinion of American Urological Association (AUA), Sling operations are most successful in the short and long-term treatment of women with SUI, compared to other methods (6).

The advantages of suburethral Sling methods are minimal invasion, rare complications, a minimum duration of interventions (surgery takes 30 minutes) and long-term effectiveness. Most failures occur because of difficulties of accurate assessment of tightening polypropylene tape under the middle part of the urethra, which leads to urinary retention or incontinence. So far, TOT Sling method in our hospital has successfully resolved more than two hundred cases of SUI. This approach can achieve much better results with the restitution of urethra sphincter function in a large percentage, unlike a significant percentage of unsuccessful standard operating techniques. Sling procedures for simple and complex stress urinary incontinence continue to be an important treatment option with low morbidity when performed by experienced surgeons.

Total vaginal Hysterectomy with TOT Sling IVS has been done successfully in 10 of our patients and we did not have immediate and late postoperative complications, except in one patient, in where there was a problem of in-

complete postoperative retention, which was successfully resolved with prolonged wearing of the catheter for 7 days.

Sharp wall separating of the vagina from the cervix and bladder, as well as on the back of the rectum does not endanger the safety of surgical procedures and final outcome of treatment, it reduces the runtime of surgery, and doesn't lead to stronger than normal bleeding. The tissue is well prepared. During this work, on performed vaginal hysterectomies, and the large number of the performed plastic vaginas, we didn't have any complications.

Fundoplication of the bladder does not significantly change the result of the operation, and even more urologists recommend this technique, instead of placing suture "tobacco bags". It is interpreted that in this way the bladder detrusor is shortened and strengthened.

Reduction of the vagina is being left by a growing number of authors. We believe that the reduction of the vagina does not come into the operational treatment, so we leave the above procedure, especially in women who are sexually active and we always close their vaginas transversely. This prevents dyspareunia, such as sewing lines on the upper side of the front wall of the vagina. Only sewing up the lig.sacroterina for the wall of the vagina provides support and prevention of the vaginal wall falling postoperatively, with the later applied IVS.

Connecting lig.sacroterinum with sutures, with both walls of the vagina, before its closure, we get the improvement of static vaginal wall, since the uterine lig.sacroterinum is of rigid connections.

In 1980 Harold Ellis showed that closing peritonei, at the end of abdominal surgery, is not necessary (16). It has also been proved that closure of peritonei with vaginal hysterectomy is not necessary (13). The British Royal College of Obstetrics and Gynaecology recommended in its guideline No. 15 from July 2002 to leave peritoneum open (17). The advantage of this technique, gives time to establish intestinal peristalsis shortened, and it shortens the time of surgical procedures. There is no irritation of the colon, since there is no sewing of serosis during peritonization. In addition, especially in women who have a normal sexual life and who has undergone TVH, closing and folding of Douglas string's peritonei, drawing closer to the adnexa vaginal wall is fixed and, as stated in various studies, such patients may have some problems later with dyspareunia (13-15). In a survey among our patients, we did not have these problems. Foley catheter in Douglas space is the preventive measure, in order for earlier detection of accidental, intraabdominal, postoperative bleeding.

Surgery was finished in 80 minutes, which is considered as successful.

We did not have operative and postoperative complications. The patient subjectively felt well the first postoperative day, with renewed intestinal peristalsis. On the fifth postoperative day the patient was discharged from hospital as recovered.

Static disorder operations of female genital organs, associated with SUI, is best done in regional (spinal) anesthesia, considering the necessity of cooperation between gynecologist and the patient. After setting TOT sling, when the patient coughs, increasing intraabdominal pressure, it shows the operator if there is unwilling flow of urine, if it is well set the polypropylene mesh is tight or if it should be corrected. Another reason is that the patients some time after surgery feel really comfortable, without pain and easily tolerate immediate postoperative period.

## Conclusion

We believe that in the case of joint static genital micriturition disorders, in terms of SUI, a multidisciplinary approach is needed to solve the problem, ie. Cooperation between urologists and gynecologists is necessary, in order to optimally solve of these problems.

Each surgical procedure is composed of hundreds of movements. Each should have a defined purpose and a precise way of performance. Surgical steps and sequences often result from traditions and personal preference.

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