

Case Report

Laparoscopic Creation of Neovagina

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Abstract

Background: MRKH syndrome is also defined as müllerian agenesis. There are several surgical as well as nonsurgical methods for the treatment of vaginal agenesis still there is not any standardized treatment established. The laparoscopic procedure is a simple surgical technique with good cosmetic outcome.

Aims and objective: The objective of the study was to perform laparoscopic creation of neo-vagina and analyze the outcome for the same with slightly modification of method with available instruments which leads to reduction in overall cost.

Materials and methods: A total of 8 patients with vaginal agenesis were enrolled and all were treated with laparoscopic procedure.

Results: Patient were treated successfully with laparoscopic procedure with satisfactory sexual life however patient were also facing slight pain manageable by oral analgesics, patients were having dyspareunia & coital difficulty also. Laparoscopic procedure decreases operative time as well as post-operative hospitalization. No significant additional equipment required at hospital during surgical procedure.

Conclusion: Laparoscopic creation of neovagina appears to be safe, simple and effective method.

INTRODUCTION

Mayer-Rokitansky-Kuster-Hauser (MRKH) syndrome is defined as congenital malformation which is characterized by absence of vagina associated with a variable abnormality of the uterus and the urinary tract however it includes functional ovaries [1]. Vaginal agenesis in karyotypic (variation from the normal set of chromosomes characteristic) female may be escorted by defects of urogenital and skeletal systems. Combination of these anomalies are entitled as MRKHS. 6MRKH syndrome is also defined as müllerian agenesis or müllerian aplasia [2].

Two types of syndromes found in female as per following

Typical: Isolated form of congenital agenesis of the vagina and uterus and,

Atypical: Agenesis of the vagina and uterus is a major and perhaps even obligatory characteristic [1]. The atypical form by aplasia of one or both buds, one bud smaller than the contralateral one, with or without dysplasia of one or both fallopian tubes. A suggestion has been made to call this type the GRES [genital (G), renal (R), ear (E), skeletal (S)] syndrome.

The second most frequent cause of primary amenorrhoea is müllerian agenesis, found in 1:4000 to 1:5000 female from births [3].

Patients with müllerian agenesis is almost always associated with a contralateral agenesis. It represents an exceptional occurrence and it may suggest that underlying genetic anomalies, which leads to an important surgical challenge as the pelvic anatomy is different. This causes an impractical and most of the currently used procedures for creation of a neovagina [3]-
Phrasing not clear, english syntax??

Multiple genes concerned in the normal development of the müllerian, renal, and bone structures, but two groups appear to be the strongest candidates

- HOXA genes and
- WNT4 genes.

Since HOXA10 represents the area of the developing uterus, HOXA11 the lower uterine segment and cervix, and HOXA13 the vagina. It is biologically plausible that altered expression of these genes would result in the anomalies found in MRKH.

Interestingly, the HOX genes are also associated with the normal development of the kidneys, bone, and vascular structures, which would reinforce the hypothesis of dysregulation of developmental genes involved in the embryonic origin of the female reproductive tract.

Müllerian agenesis classified as per following: [1]

M0-unilateral system normally formed but unfused or septum retained,

M1-vaginal agenesis alone,

M2-vaginal and uterine agenesis.

M3-müllerian agenesis total, and

M4-müllerian and ovarian agenesis.

Both ovaries are normal in most of the cases, and affected women have "normal" sexual activity. Occasionally one ovary with ipsilateral fallopian tube may be absent. Hormone profile and secondary sexual characteristics are normal in the cases of MRKH syndrome.

To diagnose müllerian agenesis structure, ultrasound and magnetic resonance imaging (MRI) are mainly the options. Ultrasound is easily accessible and readily available in many settings, but it is not always effective in identifying underdeveloped müllerian structures and ovaries, which are usually located high in the pelvis, often at the level of the pelvic brim. The presence of extra-pelvic ovaries has been reported in 16%–19% of the patients. For surgical planning, MRI is the most useful method, but it is more expensive than ultrasound [4].

If müllerian agenesis is left untreated, there will be sexual inability (only if the vagina is too short for intercourse) and patients may develop severe psychological problems. Many procedures have been described for development of neo-vagina with acceptable function, feeling and appearance.

Procedures for development of neo-vagina: This list is irrelevant. Include only techniques relevant for MRKH Syndr_ Non surgical and surgical methods–

Surgical techniques:

1. Davydov Procedure
2. McIndoe surgical technique
3. Baldwin surgical technique
4. Pull through or Vecchietti procedure
5. Williams surgical technique

Non-Surgical techniques:

1. Frank's dilators method

Advantages of surgical techniques include

- Quick recovery,
- Risk of bleeding reduced,
- Smaller incision size reduces risk of pain,

Disadvantages of surgical techniques include:

- Post-procedure pain,
- Skin infection,
- Blood clots,
- Expensive treatment,

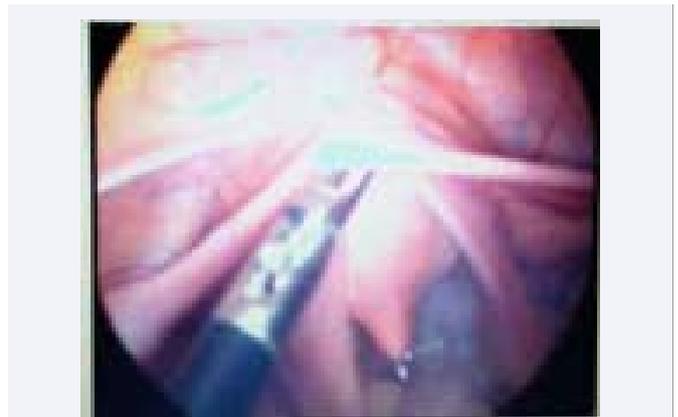


Figure 1 Dissection with blunt needle.



Figure 2 Glass Olive and Thread.



Figure 3 Mould creation.

- Failure may cause major life threatening impacts

Advantages of non-surgical techniques include

- not requiring abdominal surgical entry,
- it can be carried out even when there has been extensive previous surgery in the area,
- No wound or scar,

- Reduced pain and discomfort,
- Shorter recovery time,
- Reduced risk of side effect,
- Low cost

Disadvantages of non-surgical techniques include:

- May require more radiation exposure of body,
- Uneven results,
- More duration of treatment exposure,
- Radioactive exposures

Among the above options, the modified Mc Indoe technique became very popular which is the simplest operation with very low donor site morbidity [5].

As there are several surgical as well as nonsurgical methods for the treatment of vaginal agenesis with MRKH syndrome, still there is not any standardized treatment established. The laparoscopic Davydov procedure is a simple surgical technique with good cosmetic outcome [2].

Currently most commonly used surgical procedures are McIndoe, Williams, Vecchietti, Davydov, Baldwin, and the non-surgical technique is Frank's method. Original techniques have been refined and implemented, such as William's technique modified by Creatsas.

McIndoe's technique consists of three phases: the first provides the dissection of an appropriate space between the rectum and the bladder, the second provides the collocation of a flap of an autologous cutis, and the third consists of a continuous and extended dilatation by using vaginal intruders.

William's method arose as an alternative to McIndoe's technique and aims at creation of a peritoneal bridge in order to reconstruct a normal anatomy of vaginal channel.

The main aim of **Vecchietti's method** is to make a neovagina from gradual stretching of vaginal cutis of a patient. This implies the insertion of an olive-shaped tool in vaginal dimple, which is linked to nylon traction threads that, after having crossed the pelvic peritoneum, go out through abdomen and are subsequently fixed to a device of progressive traction.

The main goal of **Davydov's technique** is to make a neovagina using patient's peritoneum as covering.

Baldwin's method implies a great surgical operation, as well as risks typical of a surgical intestinal operation. This procedure, which is usually made in laparotomy, provides the sample of a segment from intestine of a length peer to about 10 cm–12 cm, with its vascular peduncle still unharmed; this segment is graft on pelvis making a neovagina with a closed proximal extremity.

Vaginoplasty with William's method modified by **Creatsas** is a simple and fast technique in which a perineal cutaneous flap is used to make a sac; at the beginning, the hymen is cut to avoid haemorrhages during the first sexual intercourse, afterwards a shaped "U" cut is made in the perineum, and subsequently, tissues are mobilized, and the margins of internal skin of the created flap are stitched together with reabsorbed stitches.

Frank's method is not surgical and aims at the creation of a neovagina by using dilators with large calibre and gradually greater length. This method is used by a patient, through self-management of insertion and maintenance of the "intruder" at level of vaginal fovea, at least, for 2 hours a day 53. The best outcomes are achieved when there is already a retrohymenal pit not inferior than 2-3 centimetres.

Laparoscopic methods having many advantages compared to surgical/non-surgical treatments as per following:

- Less post-operative pain,
- Shorter hospital stay,
- Quicker recovery period,
- Reduced infection rate,
- Reduced blood loss etc.

There are certain disadvantages for laparoscopic procedure as well e.g. expensive equipment required, special training required, it may not be possible for complex surgery etc.

The objective of the study was to perform laparoscopic creation of neo-vagina and analyze the outcome for the same with slightly modification. Modification includes that the laparoscopic method has been performed with available instruments which are already used for surgical method and it leads to reduction in total overall cost.

Aim for creating neo-vagina is to achieve a sufficient length and successful coital function. The surgery was performed before female is about to marry which is the best time as there is no need to do regular dilatation for long time and the chances of stenosis is minimal.

MATERIALS AND METHODS

Study was conducted in the Department of surgery, St.Jude's Hospital, Jhansi, India.

Informed consent was obtained from patient prior to enrollment as a part of study. Total 8 patients were enrolled in the study.

Steps for creating Neovagina followed during study:

- Neovaginal space created by blunt dissection.
- Right rudimentary uterine horn with normal tube and ovary.
- Enlarged left uterine horn with hematosalpinx.
- Uterine cavity catheterized with a hystrometer which is pushed downward until neovaginal space was accessed.
- The specially designed vaginal mould was placed in its central lumen.
- The mould with its tip located in the uterine cavity.
- The mould in neovagina and sutures put in between labia majora and the small holes located at the distal end of the mould.

During the surgery, as a first step of using needle for suturing, a veres needle usually available in all hospitals which was used in the current study practice to pass the sutures as this helped in avoiding injury to the peritoneal organs and the blunt tip in the dissection in the a vascular plain.

Moreover to a veres needle, a suture grasping needle was used to pull out the traction sutures and tied to the locally developed traction devise with a locking bolt to apply gradual traction on the glass olive placed at the hymen dimple.

As a part of preparing neo-vagina, an in vagination was created in the vesicorectal space in 10 to 12 days. The space thus created was maintained with regular mould application till the patient became sexually active.

The whole procedure of planning neo-vagina was performed under laparoscopic/cystoscopy vision which leads to negligible chances of injury to the bladder or intraperitoneal. Due to laparoscopic view, there was no need of skin grafting during creation of neo-vagina.

The problem of vaginal dryness or obliteration of neovagina does not happen as sufficient epithelization occurs in three to four months time.

RESULTS

- Measurements of result were carried out depending on following parameters: Post-operative period: Uneventful
- Patient complains:
- Slight pain (Controlled by oral analgesics)
- Dyspareunia
- Coital difficulty

During the procedure the dyspareunia and coital difficulty were not reported as calibre. The depth of the created neovagina was sufficient for the laparoscopic procedure.

Moreover to above observations, following results were observed during study:

- Less post-operative hospitalization
- Less operative time
- Sexual life of patients was satisfactory with slight pain which was manageable
- No skin drafting required
- Laparoscopic procedure was performed with available equipment at hospital
- Safe and effective results

DISCUSSION

As per Paul BM et al., & L. Michala et al., the most common methods of surgical vaginal creation (eg, McIndoe, intestinal segment interposition) may adversely affect urinary, fecal continence and it may leads to prolong hospitalization due to operative procedures [6,7] however after laparoscopic surgery of patient for neo-vagina, it has been observed that there was less post-operative hospitalization as well as there was less

operative time for laparoscopic method. Similar type of results were observed by K. Takahashi et al. [2], where Davydov technic with laparoscopy was used and it has been observed that with laparoscopic method patient operative time and post-operative hospitalization time get decreases with time. As per L. Fedele et al. [3], by whom McIndoe and modified Vecchietti procedures were used however it was observed that a laparoscopic procedure require less operative time as well as shorter post-operative stay at hospital. C.L.Templeman et al. [8], observed similar result with laparoscopic method that shorter operative time as well as shorter post-operative hospitalization stay were required due to laparoscopic method for creation of neovagina.

As per L. Michala et al., after developing neovagina by Davydov surgical method, women were sexually active and they reported a very good sexual life however in some proportion of women the pain were high and it was a decrease in lubrication observed which were concern for surgical methods [7]. Whereas in current study, it was observed that sexual life of patients was satisfactory after laparoscopic treatment moreover patients were having only slight pain which was manageable with oral analgesics. According to K. Tajahashi et al. [2], where Davydov technic with laparoscopy was used due to which post-operative pain was less in patient with developed neo-vagina. Additionally dilators were used for patients and they may have initially pain due to dilator however it was manageable. Post-operative sexual life for patients was found satisfactory. According to L. Fedele et al. [3], by whom McIndoe and modified Vecchietti procedures were used however it was observed that patients have reported a normal sexual life and no dyspareunia or long term urologic long term complications by laparoscopic methods compared to other surgical methods. However in current study, patients were also reported dyspareunia. As per E. Leblanc et al., surgical treatment of vaginal neoplasia is a source of dyspareunia or dehiscence however the specific impact of this situation is variable according to patient and her partner. As per study by E. Leblanc et al. [9], patients were also complaining of reduced sexual function because of short vagina size or even post-coital vaginal dehiscence by colpohysterectomy. However, laparoscopic modified Davydov's procedure seems to be an effective procedure, adaptable to each patient's anatomy.

As per L. Michala et al., the McIndoe Reed vaginoplasty compared Williams vulvovaginoplasty, (Vecchietti

Procedure, McIndoe Reed and Davydov techniques with laparoscopic techniques which is a surgical technique. It has the advantage of not requiring abdominal surgical entry. Skin grafting was done for a cavity which is dissected between the urethra and rectum. The skin is usually obtained from the buttocks. The mould is left in situ for 7-10 days initially, after which regular dilation or sexual intercourse is required in order to maintain vaginal patency [7]. In current study there was not any need of skin grafting for developing neovagina. Similar results were observed with E. Leblanc et al. [9], that by laparoscopy procedure, no skin grafting, flap or any foreign material were needed.

As per Musa K et al., in low resource countries like Uganda such women find it hard to get any medical help for development of neovagina because there are a few or no surgeons with the expertise to handle these conditions. Even in areas where

experts are available, the equipment and supplies like vaginal molds (forms) are not easily available [10]. As per Sara Y.B. et al., three endoscopically introduced suprapubic trocars are required for tunneling [11]. In this study laparoscopic procedure was performed with available equipment at hospital only. No significantly new equipment were required as per current study. Similar type of comment was found by S.Y. Brucker et al, [13]. According to S.Y. Brucker et al. [12], while using modified Vecchietti laparoscopic procedure, no instrument-related complications were seen with new instrument set for neovagina creation in vagina agenesis however previous Vecchietti laparoscopic procedure having many limitations.

As per L. Michala et al., with McIndoe Reed vaginoplasty, there is a reported risk of developing squamous cell carcinoma of the neovagina, and regular follow up is required [7]. Attempts to avoid the drawbacks of skin grafting have included the use of amnion as an alternative to line the neovagina. However, this technique is now rarely used mainly due to the possible risk of donor-participant viral infection such as hepatitis and HIV as well as the practicalities of obtaining tissue and appropriate storage [7]. One of the potential complications of both the Davydov and Vecchietti procedure is the risk of prolapse, and a recent publication describes a modified McCall's culdoplasty for additional support of the vaginal vault [7].

As per Paul BM et al., operative techniques hold the distinct advantage of being faster, but most require hospitalization and significant risk for perioperative morbidity, such as infection and graft rejection [6].

As per Marta B. et al., Intestinal vaginoplasty are the need for preoperative bowel preparation and additional abdominal surgery with intestinal anastomosis, which increases the risk of postoperative ileus. In addition, diversion colitis, as well as adenocarcinoma of neovagina, introital stenosis, mucocele and constipation have been reported [13].

After current study it was observed that laparoscopic procedure for creating neovagina is a simple, safe and effective procedure which allows patient with vaginal agenesis to have a satisfactory sexual life. Similar type of results were observed by E. Baptista et al. [14], where anatomic and functional results of a laparoscopic modified Vecchietti technique for the creation of a neovagina in patients compared with congenital vaginal aplasia and it was concluded that laparoscopic technique is a simple, safe and effective procedure, which allows patients with congenital vaginal aplasia to have a satisfactory sexual activity, comparable to that of normal controls. According to S.Y. Brucker et al., [12] laparoscopic procedure is therefore a safer, shorter, more effective, and less traumatic. As per L. Fedele et al., [3], by whom McIndoe and modified Vecchietti procedures were used however it was observed that laparoscopic technique seems to have the important advantages of being brief, safe, effective, and yielding optimal anatomic-functional results in this critical subset of MRKH patients with a known higher perioperative risk factor E. leblanc et al. [9], found that laparoscopy is a simple and promising method for creation of neovagina.

CONCLUSION

Depending on the out-comes and discourse specified over, it

has been found that Laparoscopic creation of neovagina appears to be more & more secure, straightforward and compelling method. Moreover to that, during follow up visit of the patients, it has been observed that laparoscopic procedure gives anatomically and functionally grafting results.

Hence, Laparoscopic strategy can be performed with a few alteration in locally and effectively accessible materials without much expanding within the add up to taken a toll of the method. Be that as it may due to destitute financial status, the advancement of utilization of laparoscopic strategy gets to be exceptionally difficult.

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