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Surgical neovagina reconstruction in mullerian agenesis

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Abstract

Introduction: Functional neovagina reconstruction is a challenge faced by plastic surgeons. Different patients with varied etiologies present for vaginal reconstruction as in congenital vaginal aplasia, transsexuals and acquired defects following trauma, resection of carcinoma. Different techniques are available for vaginoplasty.
Aim: To evaluate the anatomical and functional outcomes of vaginoplasty using two well established surgical techniques McIndoe with split skin graft and vaginplasty using Full thickness skin graft
Material and Methods: This is a prospective study conducted at the department of plastic surgery,at a tertiary care centre at Bangalore ,India over a period of 2 years from January 2013 to January 2015.
Results: A total 19 patients in age group of 15 to 34 years were operated during this period. 10 patients underwent vaginoplasty using Full thickness skin graft and 9 patients underwent vaginoplasty using Mcindoe technique with split skin graft. Average vaginal length at 2 months for FTSG was 9.0cm and average vaginal length at 6 months for FTSG 9.25 cm. Average vaginal length in SSG cases at 2 months was 8.7 cm and average vaginal length at 6 months 8.9 cm. There was no statistical difference in two groups regarding vaginal length ($p>0.01$). Mean FSFI score in patient treated with vaginoplasty with SSG was 26.6 ± 1.8 and FSFI in patients treated with FTSG was 30.4 ± 1.1 ($p<0.01$).
Conclusion: From this study we found that vaginoplasty with FTSG was associated with lesser donor site morbidity and patients were more satisfied with scar and also that the early vaginal length was better in FTSG and none of the patients treated with FTSG needed dilatation under anaesthesia. Operative time was marginally increased in FTSG cases as compared to the SSG patients.
Keywords: Vaginal agenesis, Mayer Rokitansky Kuster Hauser Syndrome, Vaginoplasty

1. Introduction

Vaginal agenesis is one of the most significant congenital anomalies of the female reproductive tract from physical and psychological perspective. The need for neovaginal reconstruction can be in congenital case like in mullerian agenesis (MRKHS), complete or partial androgen insensitivity and transsexuals or in acquired defects as in cases of trauma and cancer resection.

Vaginal agenesis is estimated to occur in 1 in 4,000-5,000 live female births and occurs either as an isolated developmental defect or within a complex of more extensive anomalies.[1-2] Vaginal agenesis is most commonly associated with Mayer-Rokitansky-Küster-Hauser (MRKH) syndrome. The MRKH syndrome is described as congenital vaginal agenesis in an individual with normal female genotype, phenotype and normal endocrine status. These patients have a rudimentary development or total absence of uterus, but they have normal ovaries [3]. The vaginal agenesis is often associated with anomalies of the renal (34%) and the skeletal (12%) systems. The Renal anomalies may include unilateral agenesis of the kidney, ectopic kidney(s), horseshoe kidney, and crossed-fused ectopia and skeletal anomalies may include fused vertebrae or other variants.[4]

The primary goals of surgical intervention in patients with vaginal atresia are to relieve obstruction and pain, to restore a normal sexual functioning, and to preserve the patient's reproductive potential. The timing of surgery depends on the patient's anatomic configuration and on the presence or absence of functional endometrial tissue. Neovagina creation needs to reconstruct a vagina of adequate length and diameter and need a stable lining. Numerous procedures were described for creation of neo-vagina with acceptable function, feeling and appearance. [5]

They included serial dilation [6-7], Vecchietti's technique [8-10], sigmoid or ileal flaps [11-16], gracilis flap [17], Singapore flap [18-19] and expanded vulval flap [20]. Among these options the modified Mc indoe technique gained popularity being the simplest operation with very low donor site morbidity.[21]

2. Materials and Methods

This prospective study included nineteen patients with mullerian agenesis to whom modified McIndoe vaginoplasties were done in Plastic and Gynecology Departments by single surgeon. A total 19 patients in age group of 15 to 34 years were operated during this period. Sixteen patients were a case type 1 mullerian agenesis out of which 3 had partial mullerian agenesis with intact uterus. Three patients were type 2 mullerian agenesis with single kidney in 2 patients and bilateral ectopic kidney in one. CT scan abdomen and pelvis was done in all the patients undergoing surgery to assess the exact anatomy and other associated anomalies.

Ten patients underwent vaginoplasty using Full thickness skin graft (FTSG) and nine patients underwent vaginoplasty using Mcindoe technique with split skin graft (SSG).

Modified McIndoe operations was performed as described in previous articles [18]; through a transverse incision an average thirteen centimeter pouches were created between the urethra & bladder anteriorly and the rectum posteriorly. In patients undergoing vaginoplasty with FTSG, the FTSG was harvested from the non hair bearing skin of both the groins and in SSG cases split skin was harvested from anterolateral thigh. After careful hemostasis these pouches were covered with partial thickness skin graft or full thickness skin graft over soft moulds. After surgery patients were kept on low residue diet until the first dressing which was done five days after surgery. During this dressing, neo-vagina was washed by normal saline, grafts taking were reported, and moulds were washed and returned back to the neo-vagina patients were instructed to keep the mould in place continuously for at least three months, and it was removed only for washing. In three patients with partial agenesis cervical canal was reconstructed using the buccal mucosa and vaginoplasty was done using FTSG. Patients were followed every other day till the complete epithelialization of pouches, then every month for one year.

During this visits, vaginas were inspected for bleeding, discharge, stricture, granulation and any donor site morbidity. Sexual intercourse was allowed and encouraged one to two months after the operation according to the percentage of graft taking. One year after the operations the final dimensions of the neo-vaginas were measured, after using a proctoscopy. Functional assessments of neovaginas were done at the same time using female sexual function index (FSFI). FSFI is a reliable self assessment questioner contains nineteen items measures the six basic component of sexual function (desire, arousal, lubrication, orgasm, satisfaction and pain), the total score range from 2 to 36.

Case 1

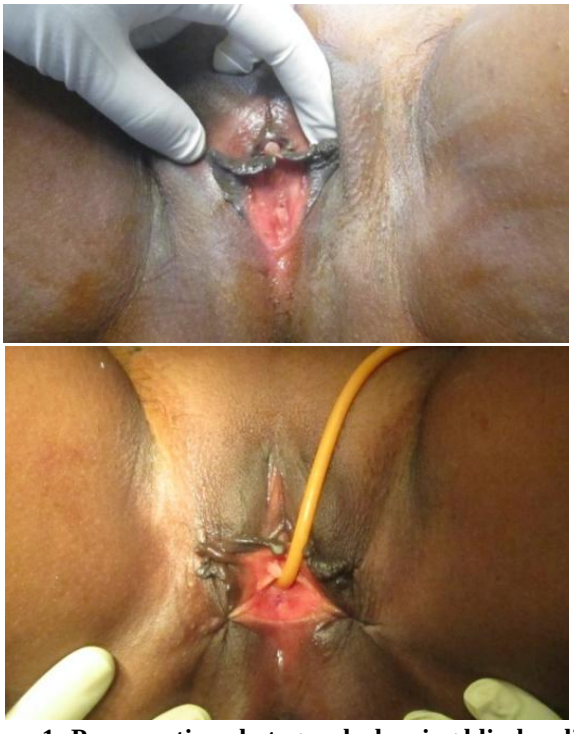

Figure 1: Preoperative photograph showing blind ending vaginal dimple.

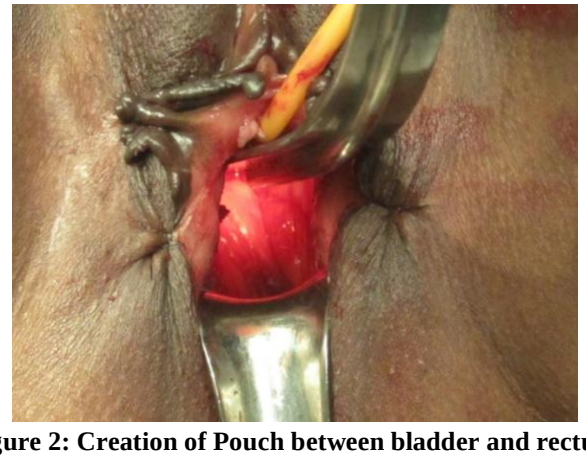

Figure 2: Creation of Pouch between bladder and rectum

Figure 3: Bilateral Groin Full thickness graft marking

Figure 4: Harvested FTSG

Figure 5 Suturing of FTSG to create tube.

Figure 6: Stent made up of sterilised sponge and condom

Figure 7: FTSG placed in rectovesical space.

Figure 8: Stenting of vagina with Foam mould.

Case 2

Figure 9: Preoperative Blind ending vaginal dimple

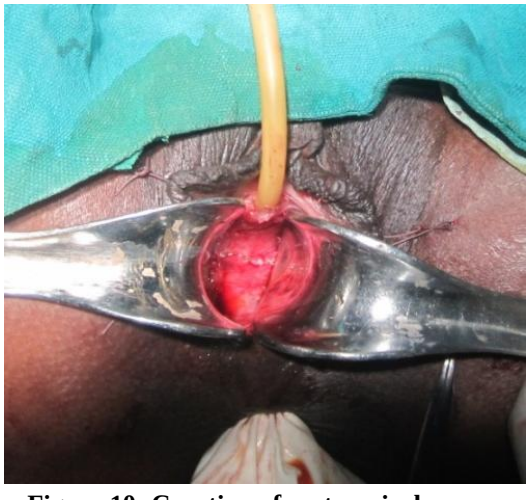

Figure 10: Creation of rectovesical space.

Figure 11: Split skin graft wrapped around a foam stent.

Figure 12: Donor site Scarring.

3. Results

A total of nineteen patients were operated Mc indoe with SSG in nine patients and Modified McIndoe with FTSG in ten patients. Mullerian agenesis was complete in17 and partial in 2 patients. Patient Age ranged from 15 years to 34 years, average age was 22 years. Average operative time in SSG cases was 75 minutes and in FTSG cases 100 minutes. Anatomical success early at 2months in 16 pts and at 6months 19 had success (vaginal length more than 6 cm). Average vaginal length at 2 months for FTSG was 9.0cm and average vaginal length at 6 months for FTSG 9.25 cm. Average vaginal length in SSG cases at 2 months was 8.7 cm and average vaginal length at 6 months 8.9 cm. There was no statistical difference in two groups regarding vaginal length ($p>0.01$). Mean FSFI score in patient treated with vaginoplasty with SSG was 26.6 ± 1.8 and FSFI in patients treated with FTSG was 30.4 ± 1.1 ($p<0.01$). Only one of the nineteen patient had poor functional outcome (FSFI<23). Three of the patient treated with SSG required dilatation under anesthesia. Two patients developed hypertrophic scarring at donor site treated with Silicone sheeting and steroid injections. One case of FTSG developed wound gapping which healed secondarily. Patient treated with Buccal graft had difficulty in mouth opening which later improved with exercising with balloon.

Table 1: Demographics and outcome of vaginoplasty

Sl No.	Age	Procedure	Vaginal length 2 months	Vaginal length 6 months	FSFI	Complications
1	15	Vaginoplasty with SSG	7.5	6.5	22	Stenosis
2	18	Vaginoplasty with SSG	7.6	8.3	28	Nil
3	16	Vaginoplasty with FTSG	8.7	9.2	30	Nil
4	20	Vaginoplasty with SSG	9.0	9.2	27	Keloid
5	21	Vaginoplasty with SSG	9.2	9.4	29	Nil
6	21	Vaginoplasty with FTSG+ Buccal graft for cervix	9.1	9.2	32	Nil
7	22	Vaginoplasty with FTSG	8.9	9.1	30	Nil
8	19	Vaginoplasty with SSG	9.4	9.4	26	Hypertrophic scar
9	34	Vaginoplasty with SSG	9.1	9.3	28	Stenosis
10	26	Vaginoplasty with FTSG	9.1	9.3	30	Nil
11	24	Vaginoplasty with FTSG+ Buccal graft for cervix	9.2	9.4	29	Gaping of donor site
12	23	Vaginoplasty with FTSG	9.3	9.3	31	Nil
13	21	Vaginoplasty with SSG	8.1	8.7	27	Stenosis
14	25	Vaginoplasty with FTSG	9.1	9.2	29	Nil
15	17	Vaginoplasty with SSG	9.7	9.8	28	Hypergranulation
16	24	Vaginoplasty with FTSG+ Buccal graft for cervix	8.9	9.3	31	Nil
17	23	Vaginoplasty with FTSG	9.3	9.4	32	Nil
18	21	Vaginoplasty with SSG	8.9	9.2	25	Nil
19	25	Vaginoplasty with FTSG	8.8	9.1	30	Nil

4. Discussion

Because there are several available techniques to treat vaginal agenesis, the patient's medical history, preference, lifestyle and underlying condition, along with the surgeon's capability, play an important role in choosing the correct approach. Although there is no consensus on which technique to use, the modified McIndoe has been the preferred method for many clinicians. In addition, the McIndoe technique does not require a transabdominal approach, which mitigates surgical risk. However, it does have disadvantages including scarring in the grafted area, keloid formation and infection risk.

The Vechietti technique requires traction rather than dilation to create the neovagina. Although, it is usually performed laparoscopically, due to the potential need to switch to laparotomy, the complication rate is high. In addition, traction of the 'olive' at the vaginal dimple can be very painful and may not be easily tolerated by the patient.

The sexual satisfaction rate reported in the literature is approximately 80% to 90% when using the McIndoe technique [22-23]**,** which is higher than the previously mentioned rate achieved with Vechietti. In our case series, the sexual satisfaction rate was approximately 94% (18 of 19 patients) in patients who used the mould regularly.

Another surgical approach to treat vaginal agenesis is to create a new vagina using a peritoneal flap. This approach was first used by Davydov in 1969[24]. This approach can be performed laparoscopically or laparotomically. However, there is a significant risk of damage to the bladder and/or ureter, and risk of peritonitis and vesicovaginal fistula formation. [25]

Vaginoplasty using intestinal grafts. The procedure has advantages such as not needing dilation after surgery, a natural lubricant effect and lack of shrinkage or narrowing after surgery. On the other hand, due to the need for laparotomy, the risks of serious infection, intestinal stenosis, dehiscence, and fistula formation preclude it as a first choice for many surgeons. Additionally, vaginas created with intestinal grafts will be less sensitive and prone to produce significant mucous. Therefore, the patient may need to use sanitary pads continuously. There is also a rare risk of malignancy.[26-28]

The success of the surgery is not necessarily correlated with the length of the postoperative neovagina. A successful surgery indication is creating a new vagina with adequate length that is also functional and sensitive. Therefore, successful metaplasia in the graft mucosa also plays an important role in the sensitivity and elasticity of the newly created FTSG with its pliability and lesser shrinkage offer a better functional outcome.

Availing treatments for the diseases and abnormalities of the genital tract and handling genital area are still considered taboo subjects in the community. This can partially explain the problem of poor compliance for follow up visits. Long term anatomical and functional results of this operative technique could not be assessed for the aforementioned reasons. One of the most important criteria for this operation is the surgeon's conviction that the patient is mature enough to wear the vaginal mould for at least 6 months, unless she is engaging in regular sexual intercourse. Failure to wear the vaginal form, especially with the split-thickness skin graft, is the major cause of failure in this operation.

5. Conclusion

From this study we found that vaginoplasty with FTSG was associated with lesser donor site morbidity and patients were more satisfied with scar and also that the early vaginal length was better in FTSG which resulted in better sexual functioning.

Conflict of interest: None

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