Surgical Treatment of Complicated Transverse Vaginal Septum Using Combined Simultaneous Ultrasound Guided Perineal - Abdominal Approach

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Transverse vaginal septum results when the vaginal plate, formed from the fused sinovaginal bulbs fails to break or canalize during the embryogenesis.[1] It may occur anywhere within the vagina, but most frequently at the junction of the cranial and middle third. It has an estimated prevalence of about 1 in 75,000 women.[2] A complete septum produces obstructive symptoms similar to an imperforate hymen without bulging of the introitus. A partial septum allows passage of menstrual flow but causes dyspareunia, foul smelling vaginal discharge or laceration during childbirth.

This report has demonstrated the restoration of the normal anatomy of a 13 year old presenting with complicated transverse vaginal septum with bilateral hematosalpinges. The technique was a simultaneous ultrasound-guided drainage of hematocolpos combined with perineal-abdominal approach. Management is best if diagnosed at an early age to obtain favorable outcome and to prevent psychological problems that will arise at a later age.

Key words: Transverse vaginal septum, combined perineal-abdominal approach

Introduction

Congenital developmental anomalies of the genital outflow tract can either result from the failure of vertical fusion such as imperforate hymen, transverse vaginal septum and cervical atresia or from the developmental failure of the mullerian duct.[3] Examples of which are vaginal or mullerian agenesis and androgen insensitivity syndrome.

Anomalies of the mullerian duct are relatively common with a mean incidence of 4% in the general female population.[4] In comparison to the genital outflow tract disorders, the exact incidence is unknown since they are unreported at birth. However, during pubertal years, they are over-reported when patients already present with cyclic abdominal pain or amenorrhea.

For the past 5 years, a total of 144 outpatient consults were seen for mullerian duct anomalies and genital outflow tract disorders. Thirty seven patients were admitted and managed surgically. Out of the 37 cases, 10 (27%) of the cases were diagnosed with transverse vaginal septum. All underwent excision of the septum. This year, 4 cases were already admitted. One of which is the case of complicated transverse vaginal septum in a 13 year old. The case differs from the other case reports of this nature due to the concurrent management employed to its complexity. It is hoped that this report will encourage gynecologists to better document cases in order to establish guidelines for the optimal management of transverse vaginal septum.

The Case

M.R., a 13 year old high school student, was admitted for cyclic hypogastric pain for 5 months duration. She has no known medical illness. She is the eldest among three siblings and her developmental milestones are at par with age. She has had no menarche. Five months prior to admission, patient presented with cyclic pelvic pain

associated with primary amenorrhea. Consult was done with a private physician where she was given unrecalled medications which afforded no relief. She was lost to follow up thereafter. On the day of admission, she had another episode of cyclic pelvic pain now associated with a palpable cystic abdominal mass.

On physical examination, she had stable vital signs with normal systemic findings. Breasts were at Tanner stage 3. The abdomen was slightly globular, with normoactive bowel sounds. Cystic masses were palpated on the right lower quadrant measuring 8cm x 8cm, and on the left lower quadrant measuring 6cm x 6cm. Both were tender and non-movable. On inspection of the genitalia, pubic hair was at Tanner Stage 3 (Figure 1). There is a fibromuscular band covering the introitus located 1cm from the hymenal ring (Figure 2). The band did not distend at the introitus on Valsalva maneuver. Rectoabdominal examination revealed an indentation 3 cm from the anal verge, an enlarged uterus 12-14 weeks size and a palpable fluctuant mass measuring 10cm x 10cm at the cul de sac area. On abdominal ultrasound, there was a fibrous tissue measuring 0.3 cm which completely traversed the vaginal canal anteroposteriorly (Figure 4). Hematotrachelocolpos was 593ml (Figure 5). There were 2 tubulocystic masses with incomplete septations noted on the right (Figure 6) and left (Figure 7) adnexal area measuring 7.4cm x 3.9cm x 3.4cm and 8cm x 6cm x3.5cm, respectively. The right kidney was essentially normal while the left kidney had pelvocaliectasia (Figure 8). The preoperative diagnosis was primary amenorrhea secondary to transverse vaginal septum, with bilateral hematosalpinges. The planned procedures were drainage of the hematocolpos, incision of the transverse vaginal septum and laparoscopic drainage of the hematosalpinges.

On surgery, the patient was placed in the dorsal lithotomy position under general anesthesia. Urethra identified followed by aseptic catheterization of the

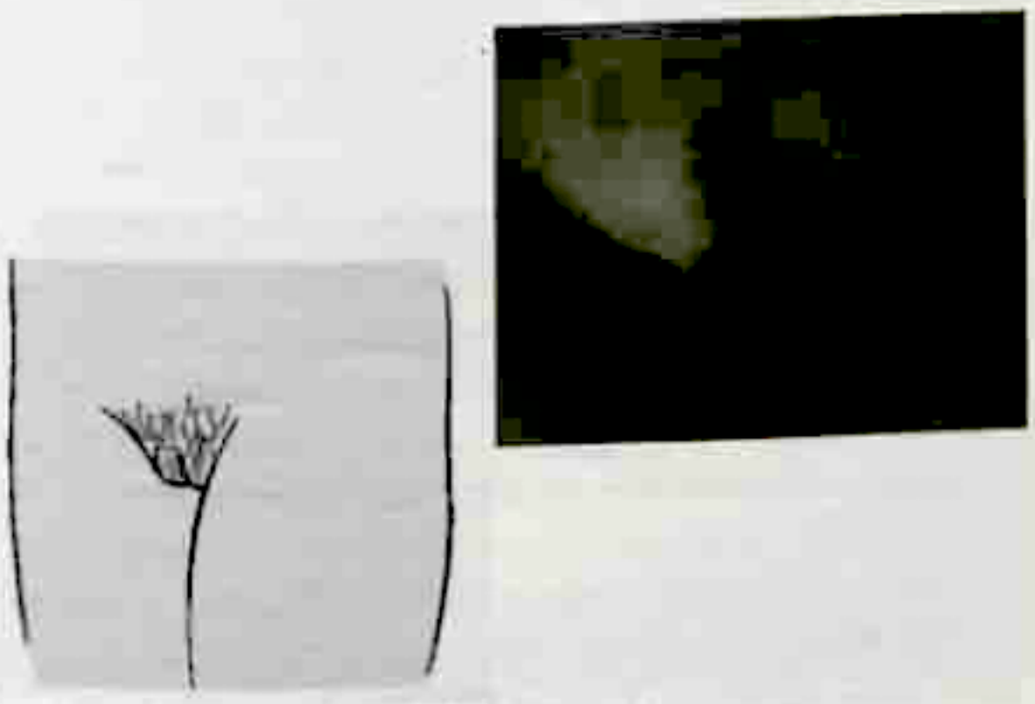

Figure 1. Pubic hair at Tanner stage 3.

Figure 2. Presence of fibromuscular band covering the introitus.

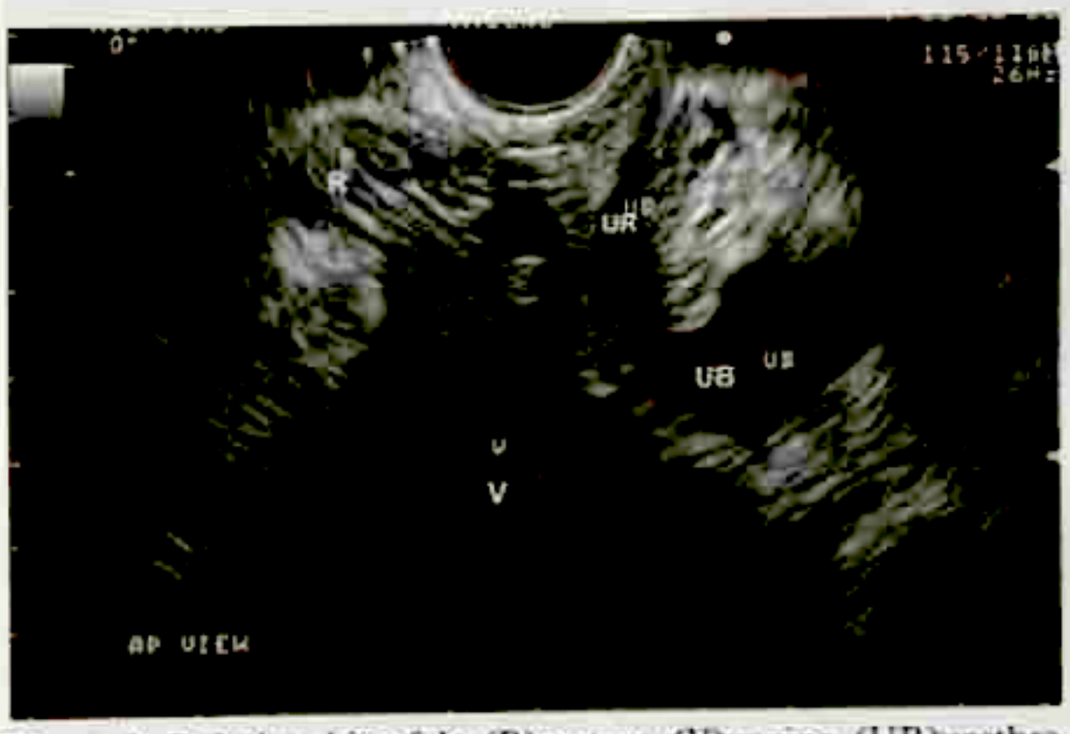

Figure 3. Relationship of the (R)rectum, (V)vagina, (UR)urethra and (UB)urinary bladder.

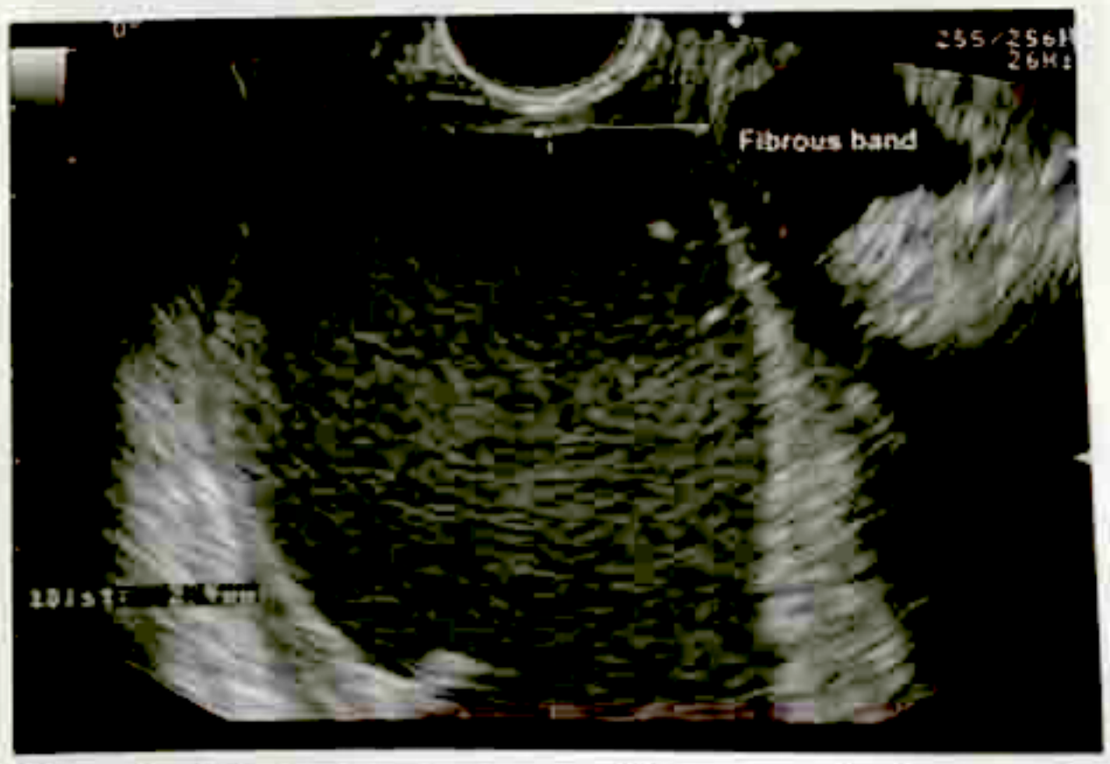

Figure 4. . Fibrous tissue measuring 0.3cm completely traversing the vaginal canal.

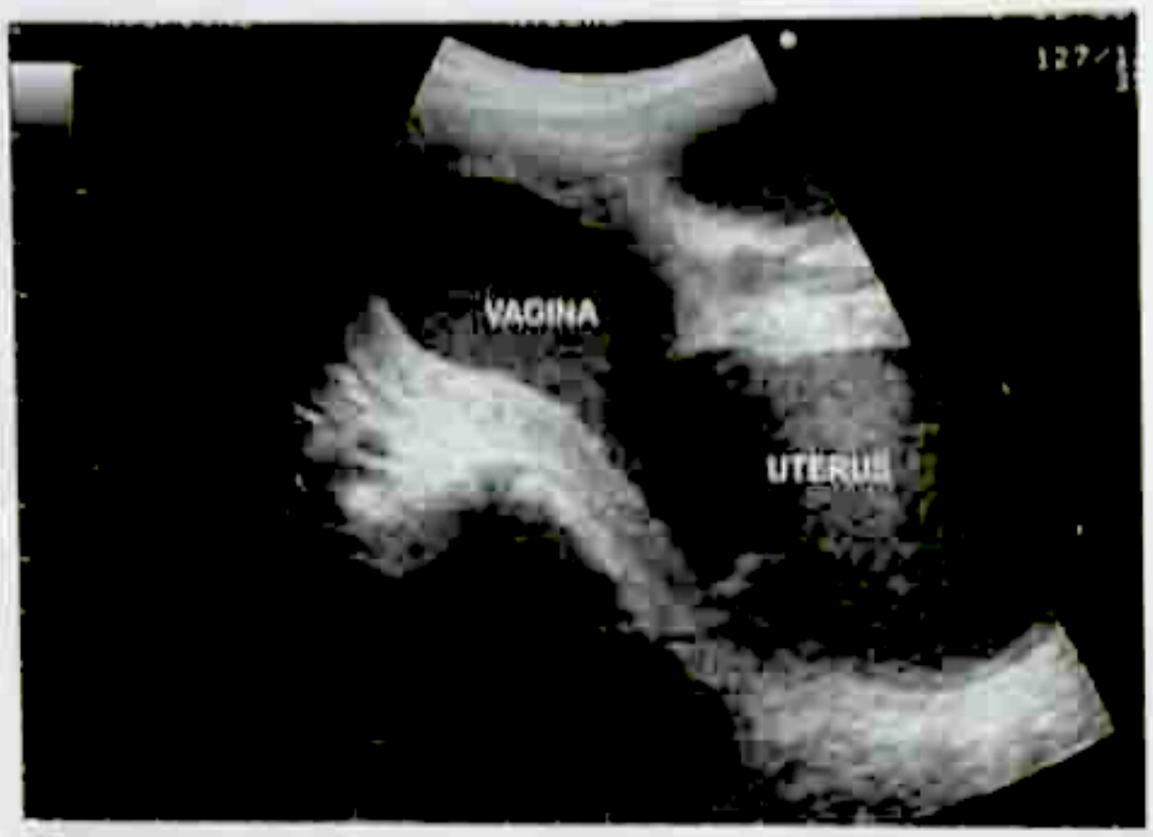

Figure 5. Hematotrachelocolpos measuring 593ml.

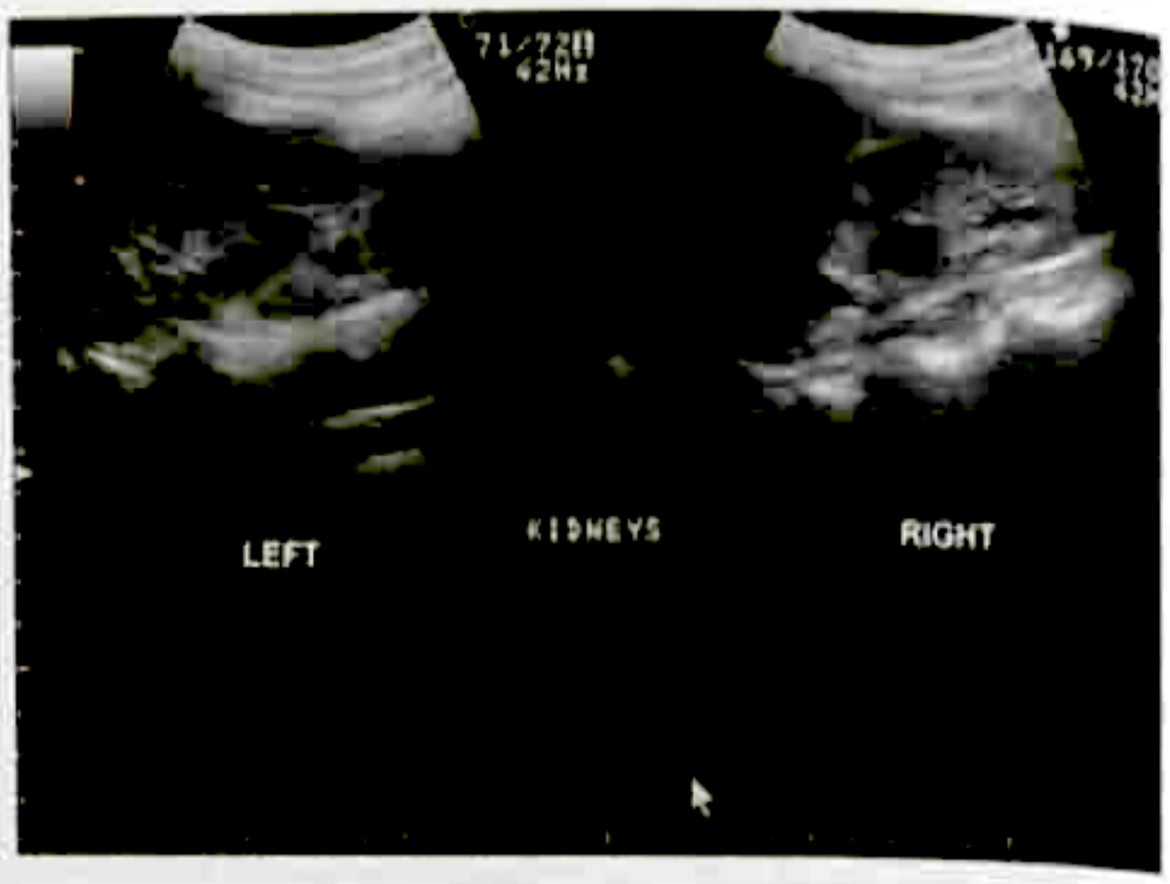

Figure 8. Left kidney with pelvocaliectasia, Normal right kidney.

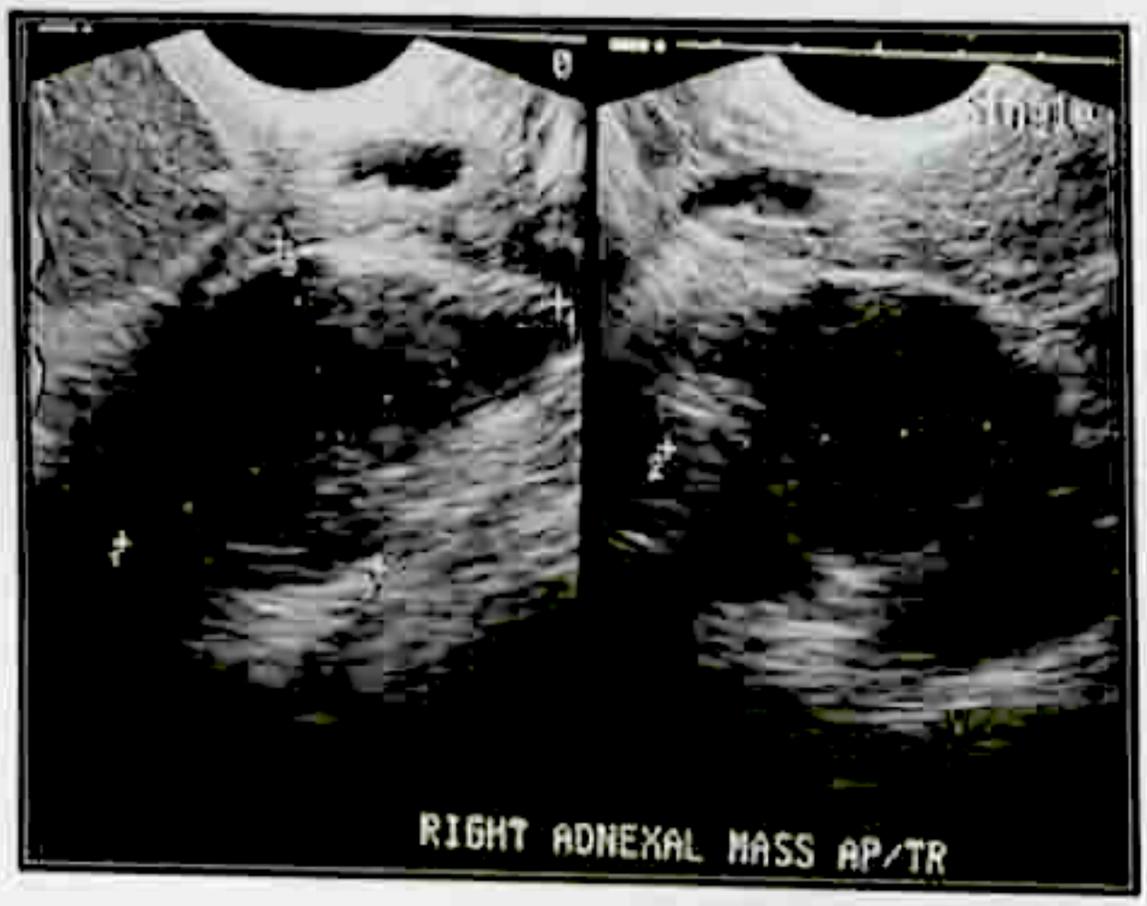

Figure 6. Right adnexal mass measuring 7.4cm x 3.9cm x 3.4cm.

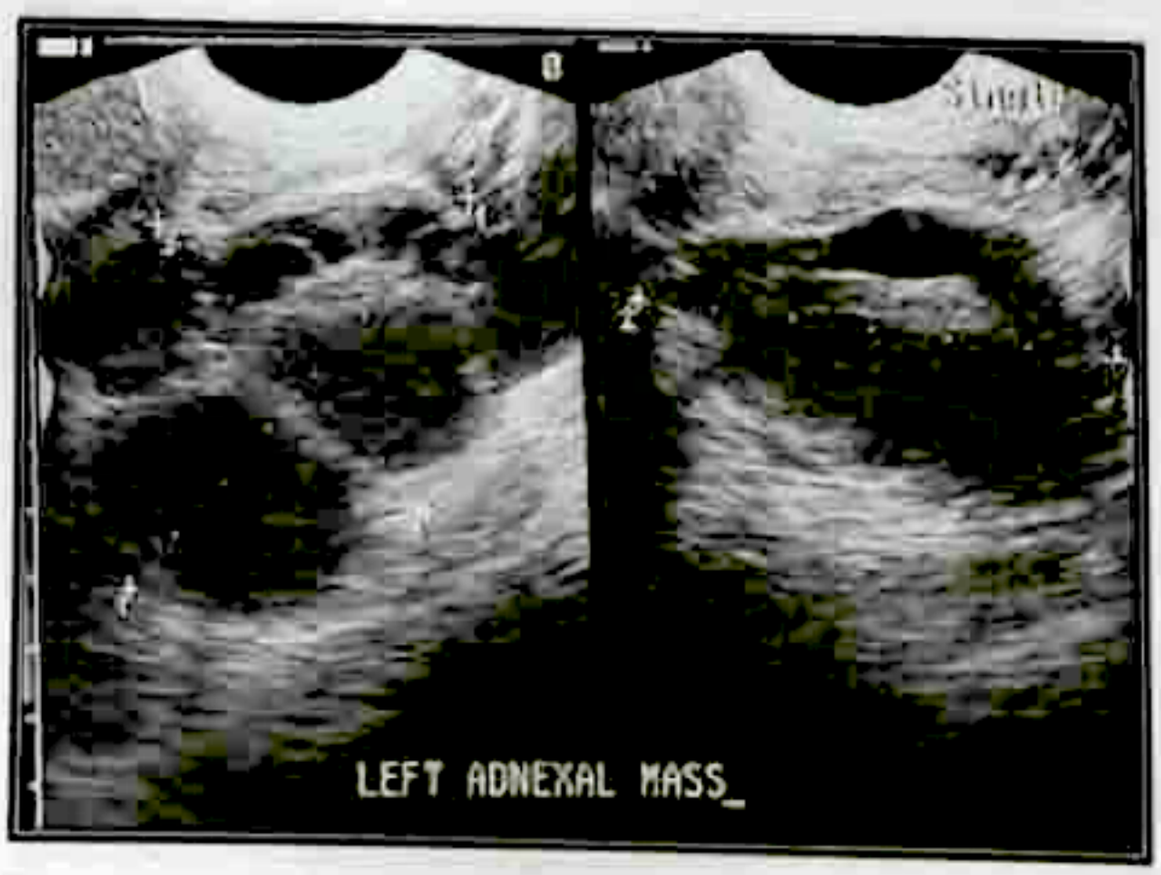

Figure 7. Left adnexal mass measuring 8cm x 6cm x 3.5cm.

bladder. Internal examination revealed a normal external genitalia. At the level of the introitus, 3cm from the hymenal ring was a transverse band (Figure 9). On rectal examination, there was a fluctuant mass palpated anteriorly 3cm from the anal verge. No intraluminal masses were noted. The abdominal and vulvar areas were cleaned aseptically and draped. The procedure was started with an ultrasound guided needle drainage of the hematocolpos (Figures 10a & 10b) followed by creation of menstrual outflow tract by careful digital dissection through the hematocolpos (Figure 11). Vaginal mucosa was visualized and grasped using allis forceps. A syringe with a gauge 18 cannula was used to puncture the septum with egress of 250cc of chocolate like fluid (Figures 12a & 12b). The vaginal mucosa was stabbed with a blade 11 surgical knife along the needle track after undermining the loose perineal tissue. Hematocolpos drained after enlarging the aperture (Figure 13). The transverse septum measured 1cm. Cervix was palpated and measured 1cm x 1cm. Total vaginal length was 7cm. There was a 2cm rectovaginal laceration incurred while excising the septum's attachment posteriorly. Its most distal angle was located 3cm from the anus. Episiotomy done and rectovaginal layered repair was accomplished by continuous suturing, using Vicryl 2-0 suture. Vertical mattress suture applied at 4 quadrants using Chromic 2-0 to pull down the vaginal mucosa to the introitus. Hemostasis achieved. Vaginal mold was inserted and anchored at 3 o'clock and 9 o'clock position (Figure 14). The perineum was washed using sterile plain normal saline solution.

Following the perineal approach, diagnostic laparoscopy was done. There were blood clots on the peritoneal surfaces (Figure 15). The fallopian tubes were filmly adherent on the omentum. Adhesiolysis done. Both

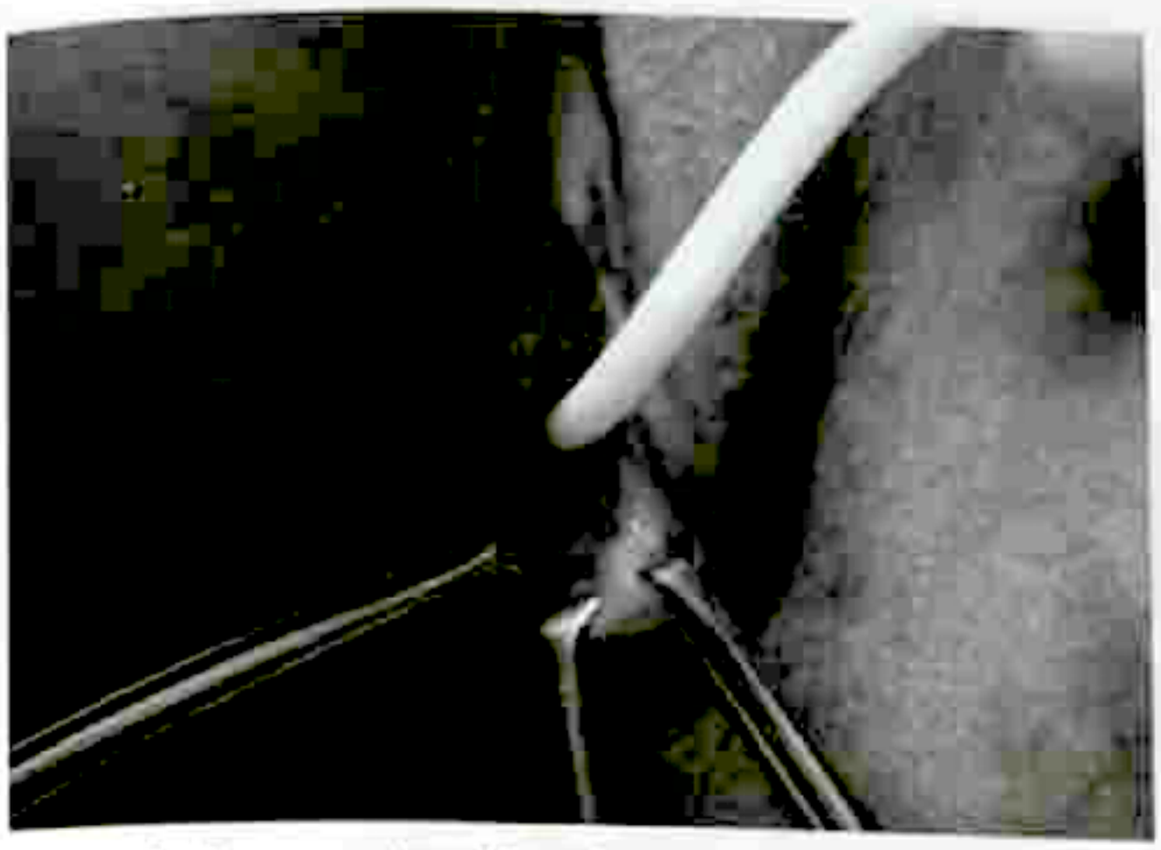

Figure 9. Transverse band 3cm from the hymenal ring.

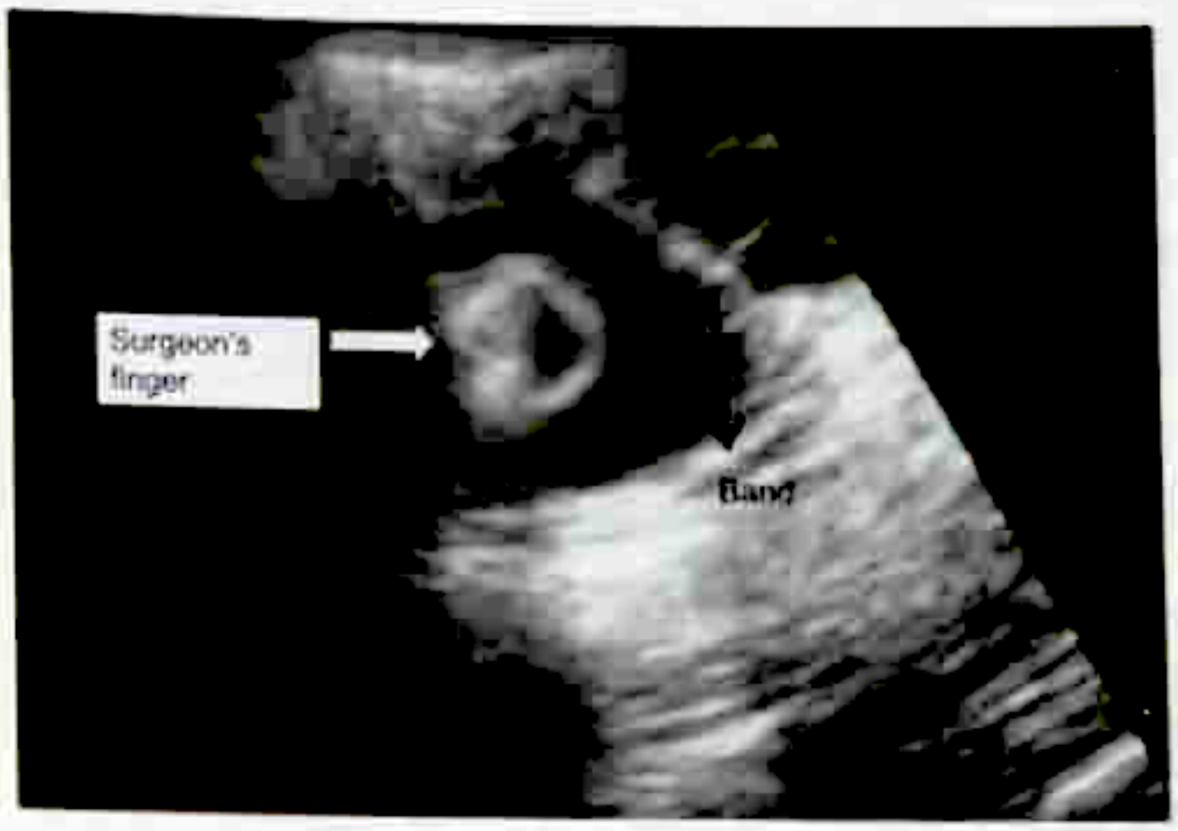

Figure 11. Digital dissection through the fibrous band.

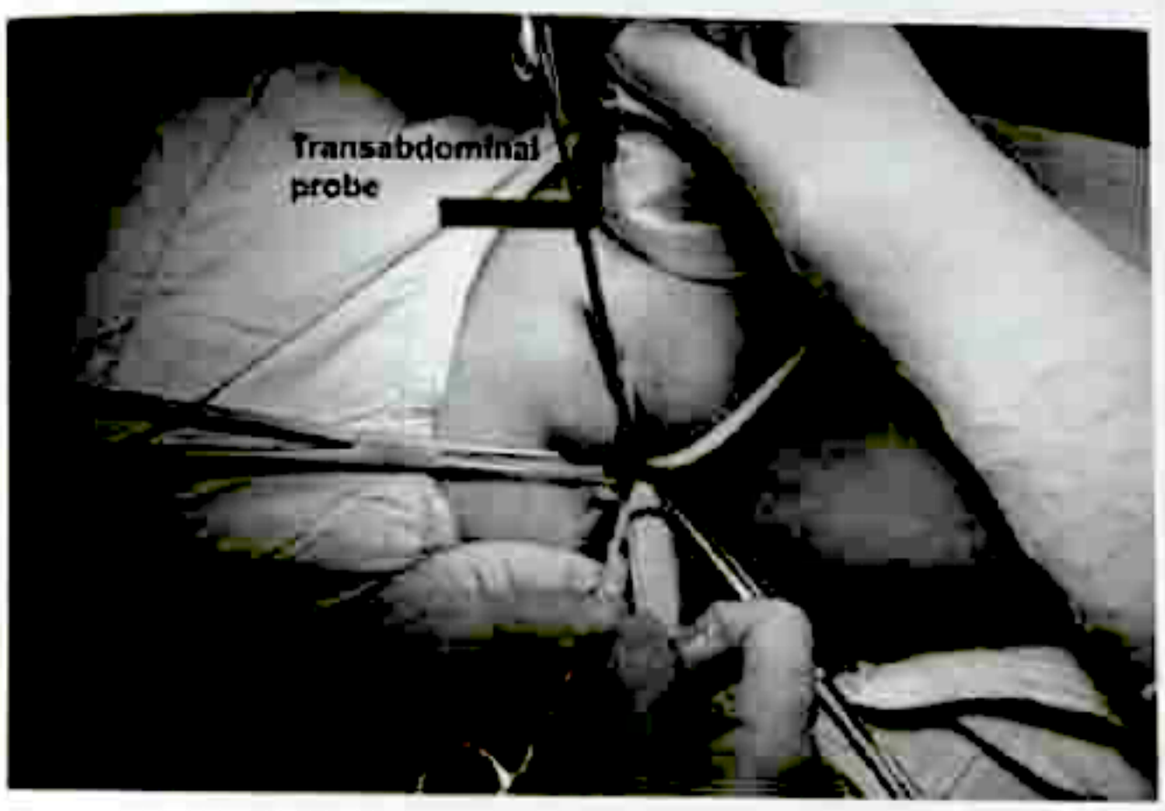

Figure 10a. Ultrasound guided drainage of hematocolpos using a 10cc syringe, gauge 18 needle.

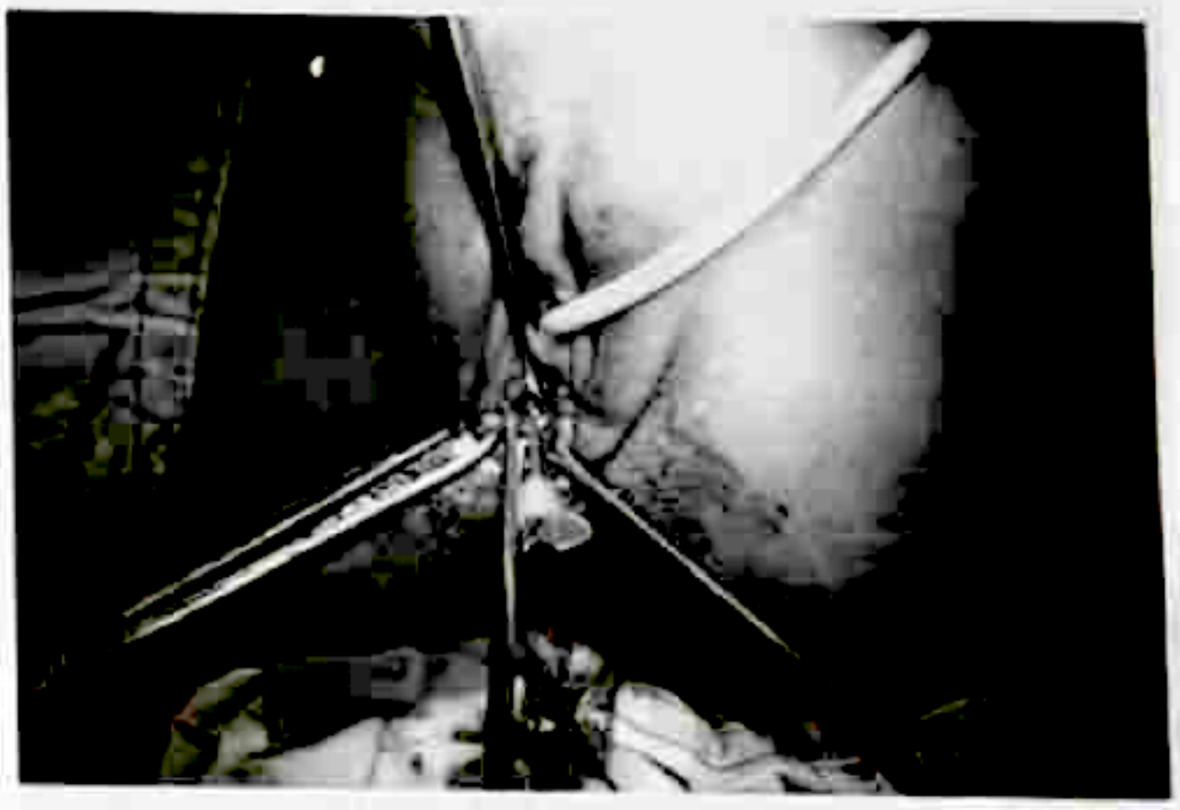

Figure 12a. Ultrasound guided drainage of hematocolpos using a gauge18 cannula.

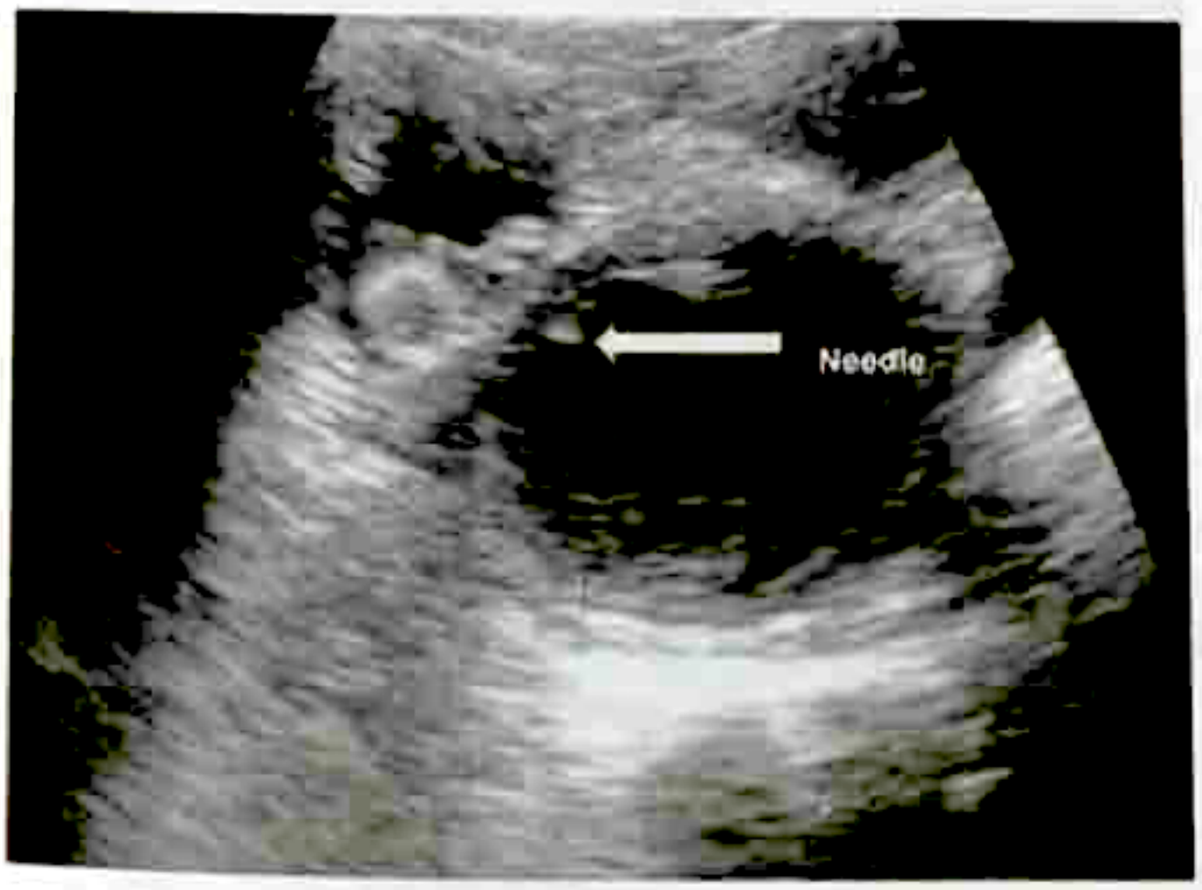

Figure 10b. Gauge 18 needle traversing the fibrous band.

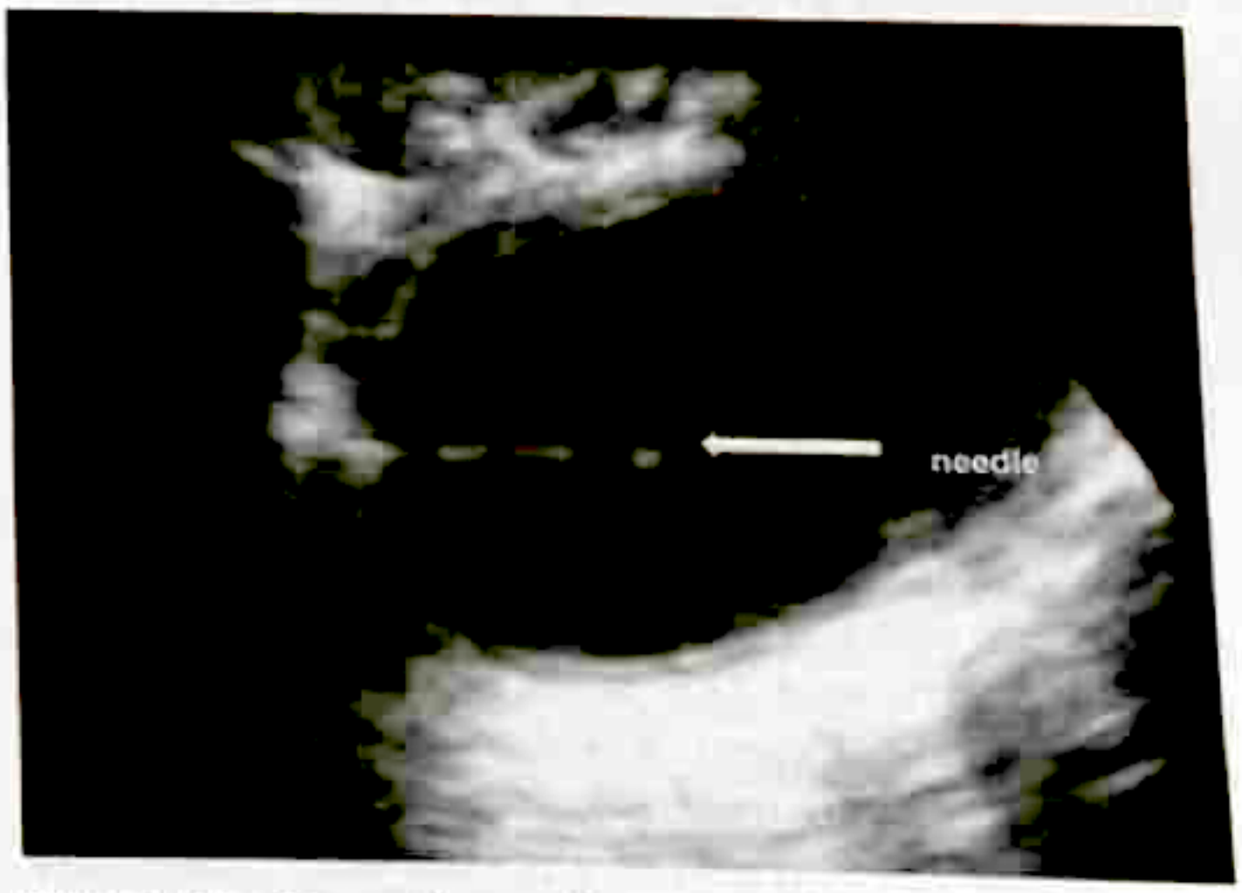

Figure 12b. Gauge 18 cannula traversing the fibrous band.

Figure 13. Post incision of transverse vaginal septum.

After removing the mold, the patient was given option to use either the mold or her index finger to be introduced in the vagina to prevent stricture. She continued daily self-dilatation in addition to being seen weekly for 4 consecutive weeks. For lubrication and to support an enhanced epithelialization, the vaginal scar was applied with 0.1% estriol cream thrice a week. Patient was advised to follow up weekly. Her last visit was 6 weeks after the operation, and she already experienced one cycle of menses without pain. Her vagina was patent on examination with normal cervix and uterus.

Discussion

Transverse vaginal septum is a developmental defect in vaginal embryogenesis that leads to an incomplete

Figure 14. Vaginal mold inserted and anchored at 3 o'clock and 9 o'clock position.

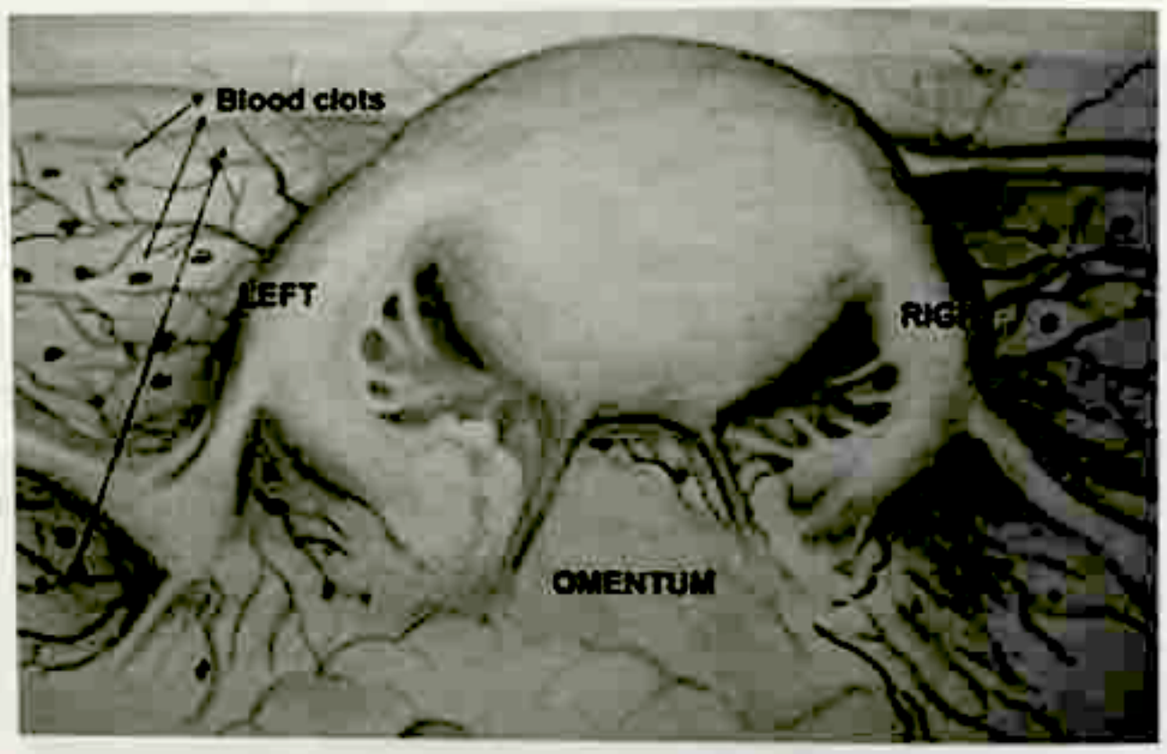

Figure 15. Intraoperative findings on diagnostic laparoscopy (top view): blood clots on peritoneal surface, dilated fallopian tubes with filmy adhesions on the omentum.

fallopian tubes were dilated. The right fallopian tube measured 6cm x 5cm x 4cm while the left was 7cm x 7cm x 4cm. The uterus was anteverted with smooth surface. The cul de sac and the uterosacral ligaments were also smooth. No nodularities were seen. The left fallopian tube was traced from the uterotubal junction to the fimbriated end. After identification of the left tube, a 0.5cm incision was done on its ampullary portion to facilitate drainage of the hematosalpinx (Figure 16). This was also done on the contralateral fallopian tube. Hemostasis was observed. Abdomen was closed in anatomic layers. Patient tolerated the procedure well. The bladder catheter was maintained for 24 hours and the mold was kept in place postoperatively. Patient was discharged on the third postoperative day (Figure 17).

The mold was removed after ten days (Figure 18) when the chromic 2-0 sutures were absorbed within the vagina and re-epithelialization of the tissue was evident.

Figure 16. A 0.5 cm incision on both fallopian tubes done to drain the hematosalpinges.

Figure taken from http://www.gynsurgery.be/wp-content/uploads/2009/04/fig1_endoscopy.jpg

Figure 17. Perineum at postoperative day 3.

Figure 18. Perineum at postoperative day 10, vaginal mold was removed.

fusion between the mullerian duct component and the urogenital sinus component of the vagina. Delaunay first described the transverse vaginal septum in 1877.[5] Its approximate frequency is 1 in 75,000 females.[2] The incomplete vertical fusion results in a transverse vaginal septum that varies in thickness and can be located at almost any level in the vagina. Literature shows that 46% occur in the upper vagina, 40% in the midvagina, and 14% in the lower vagina.[4,6] In general, the thicker septum is noted to be more common closer to the cervix. No evidence indicates that this disorder is genetically inherited although a study on an inbred Amish community suggested that hydromucocolpos due to obstructed transverse vaginal septum was the result of a rare autosomal disorder.[7]

In neonates and young infants, imperforate transverse vaginal septum with obstruction can lead to serious and life-threatening problems caused by the compression of surrounding organs by fluid that has collected above the septum. The fluid undoubtedly comes from endocervical glands and mullerian glandular epithelium in the upper vagina that has been stimulated by the placental transfer of maternal estrogen. Continued fluid collection in infants, even after the first year, has been reported; thus, the possibility of a fistula between the upper vagina and the urinary tract should be considered. The distended upper vagina creates a large pelvic and lower abdominal mass that can displace the bladder anteriorly, displace the ureters laterally with hydroureters and hydronephrosis, compress the rectum with associated obstipation and even intestinal obstruction, and limit diaphragmatic excursion to indirectly compress the vena cava and produce cardiorespiratory failure. Fatalities have been reported. The hydrocolpos develops along the axis of the upper vagina and therefore may not necessarily cause the outlet or perineum to bulge when there is compression of the mass from above. After careful preoperative radiologic and endoscopic investigations of the infant, the septum should be removed through a perineal approach. Due to the subsequent tendency for stenosis and re-accumulation of the fluid in the upper vagina, follow-up studies to assess the recurrence of urinary obstruction are important. Reconstruction of the vagina may be required in later years to allow satisfactory menstruation and coitus.[8]

In the index patient, hematocolpos did not develop until puberty. Symptoms included cyclic lower abdominal pain, absence of menarche, and a gradual development of a hypogastric mass. Differential diagnoses for transverse vaginal septum were imperforate hymen and distal vaginal agenesis. All of the disorders would present as primary amenorrhea and cyclic pelvic pain. However, imperforate hymen was unlikely. On genital examination, there was a fibromuscular band noted 3cm from the hymenal ring which did not bulge on Valsalva maneuver. A shortened vaginal orifice was also present. In patients with imperforate hymen, classic finding would be a thin, bluish perineal membrane which distends on valsalva and absence of a vaginal orifice.

Another close differential would be distal vaginal agenesis. Like transverse vaginal septum, it had a fibromuscular band which did not distend on valsalva. However, on genital examination, a normal external genitalia with a short blind pouch could be appreciated. It was ruled out since the patient had a hymenal ring following the thick membrane. This finding would be typical for patients with transverse vaginal septum.

Several operative techniques have been modified through the years since the diagnosis of transverse vaginal septum. The classic technique is to do a transverse incision through the vault of the short vagina. A probe is introduced through the septum after a portion of the barrier has been separated by sharp and blunt dissection until continuity

can be established with the upper segment of the vagina. The lateral margins of the excised septum are extended widely by sharp knife dissection to avoid postoperative stricture formation. The edges of the upper and the lower vaginal mucosa are undermined and mobilized enough to permit anastomosis with the use of interrupted delayed-absorbable sutures. In most surgical procedures, the obstructing membrane can be readily identified, after which the surgeon can probe the mass and aspirate old menstrual blood. The upper vagina is then opened and the septum excised.[4]

Several authors have described the innovative approaches in the surgical treatment of transverse vaginal septum. The first involves using the Olbert Balloon Catheter to mobilize the proximal vaginal mucosa and facilitate low anastomosis. The objective is to mobilize and make available for anastomosis the maximal amount of mucosa from the expanded upper vaginal tissue and minimize postoperative narrowing of the vagina. The use of high pressure dilatation balloon expansion of the proximal vagina avoids midvaginal narrowing due to retraction of the suture line in the surgical management of transverse vaginal septum with hematocolpos.[9]

The other approach used a foley catheter to drain the hematocolpos. This was done on a 13 year old, whose family refused vaginal surgery in order to preserve hymenal integrity for sociocultural beliefs. At laparotomy, a vertical incision was made on posterior vaginal wall. An artery forceps was introduced from the hymenal opening while preserving the hymenal integrity. The septum located on the upper third of vagina was perforated by the help of a forceps introduced from posterior vaginal wall via an abdominal route. A Foley catheter was introduced from the introitus toward the septal perforation and was held by the forceps. The balloon of the catheter was placed on the perforated septum and it was insufflated with 10 ml of fluid. The Foley catheter was in place for 2 weeks. After removal of the catheter, she received oral contraceptive pills for 3 months postoperatively. She had regular spontaneous menses on follow-up for 6 months duration.[10]

Finally, laparoscopic drainage of hematocolpos was done for the acute treatment of transverse vaginal septum. Three patients presenting with pain and hematocolpos underwent laparoscopic drainage of the hematocolpos. All patients were free of pain after the procedure. Two patients had a second laparoscopic procedure to drain the hematocolpos which had re-accumulated while awaiting definitive surgery. All three patients had resection of the septum. Laparoscopic drainage provides pain relief without compromising the success of definitive surgery which can be performed at a later date.[11]

The index case underwent a simultaneous ultrasound-guided drainage of the hematocolpos with blunt dissection of the vaginal septum, to guide the surgeon in avoiding critical areas such as the rectum and the bladder. Aspiration of the hematocolpos under ultrasound guidance was necessary to relieve the acute pain. Instead of using a foley catheter or a balloon dilator, a silicone vaginal mold was used. It was placed to avoid constriction of the resulting circular scar. This can be used as a long term vaginal stent in young girls. A concurrent operative laparoscopy, salpingostomy to drain the hematosalpinges was done.

Transverse vaginal septum diagnosed after the onset of puberty can be a challenge. A large segment of the vagina is often absent, making anastomosis of the upper and lower segments difficult. Furthermore, postoperative vaginal dilatation is necessary to prevent stenosis at the anastomosis site. To prevent constriction, the mold must be worn for many months during the constrictive phase of healing. Frank dilators are used to distend the vagina until it is healed to prevent vaginal adhesions.[12] Patients have a fully functional reproductive system after surgery. Patients with a repaired high transverse septa, however, may have lower pregnancy rates. Poor compliance with dilatation in a poorly motivated pubertal patient is always a concern. However, rarely is the surgeon able to delay vaginoplasty until the patient is more mature because of increasingly severe cyclic abdominal pain caused by the hematocolpos. Thus, a difficult vaginoplasty can have less than optimal results.

In the long term clinical implications and fecundity of females with obstructing vaginal malformations, Joki-Erkkila, et al. stated that accurate diagnosis together with adequate treatment may reduce the need for re-operations in cases with obstructing vaginal malformations. No specific gynecologic long-term clinical symptoms were identified. Female infertility was not found in those patients who were attempting to conceive. The live birthrate is 82% in the longitudinal obstruction and 94% in the transverse septum.[13]

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