



Case series

Case series: Interdigitating “Y” flap for transverse vaginal septum management

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ABSTRACT

Introduction: Transverse vaginal septum found in 1/2100 dan 1/72.000 women. The classical management for transvers vaginal septum was septum excision, with risk for vaginal narrowing and vagina shortening after surgery. We reported four cases underwent interdigitating “Y” flap with no vaginal narrowing or shortening after procedure as alternative surgical technique for better result.

Presentation of case: The transverse vaginal septums were right behind hymen to 5 cm proximal from hymen (low to mid location). The post-operative evaluation up to eleven months after surgery found no vaginal narrowing or vaginal shortening. A Case with haematosalping was re-evaluated one month after surgery and found that the haematosalping has been resolved and no recurrency on 10 months after surgery. Another case with bigger haematosalping underwent laparotomy salpingostomy concomitantly with “Y” flap procedure and on 11 months evaluation found no recurrent haematosalping.

Discussion: As the septum was relatively thick and composed of 2 embryonic origins, dividing them into distal flaps and proximal flaps was possible. Interdigitating “Y” flap technique offer better preservation in vaginal length and less constricture as the technique spread the tissue tension evenly. Cases with haematosalplings implies that adequate drainage through vagina help evacuate the haematosalping and prevent recurrency. However longer-term evaluation shall be performed.

Conclusion: Interdigitating “Y” Flap offers satisfying outcome besides short hospital stay (less intra operative bleeding, no need for postoperative vaginal dilatation, preserved vaginal length and vaginal caliber).

1. Introduction

Mullerian duct anomaly found in 0,5-6,7 % population, and 16,7 % among women with recurrent abortion [1]. Transverse vaginal septum found in 1/2100 dan 1/72.000 women [1]. Transverse vaginal septum could be classified correspond to the location from vaginal introitus (low: <3 cm, mid: 3-6 cm, and high: >6 cm), correspond to the thickness (thin; <1 cm and thick: ≥1 cm), and correspond to the perforation (perforate a nonperforated) [2]. The common sign of complete transverse vaginal septum was primary amenorrhea [1], and periodic lower abdominal pain. The classical management for transvers vaginal septum was septum excision. However, classic septum excision had some risk for vaginal narrowing and vagina shortening after surgery. Alternative technique to reduce the shortening and narrowing is flap technique, such as interdigitating “Y” flap [3]. During May to June 2021, we had 4

transverse vaginal septum cases managed by interdigitating “Y” flap technique. This case series were being managed by urogynecologist, pelvic reconstructive and aesthetic surgeon team in dr Cipto Mangunkusumo Hospital Jakarta, a national top referral hospital of Indonesia which is also an educational hospital of Universitas Indonesia. Those cases were being evaluated until June 2022 in our hospital, and one of them was being evaluated at a nearby OBGYN (as she lived in remote rural area). This case series has been reported in line with the PROCESS 2020 [4].

2. Patient information

First Case was a 12 years-old girl with lower abdominal pain referred to our outpatient clinic by urologist with closed vaginal outlet and congenital anomaly. Since 2 months ago se felt cyclic lower abdominal

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pain, but no menstrual blood flow. One month ago she was unable to void and went to emergency unit on the referrer hospital. They did catheterisation, came out 1000 cm³ urine and no vaginal opening found. On our clinic, she could urinate spontaneously and completely. No previous surgical history or other significant medical problems.

Second case was Miss 13 year-old referred with chief complain no period instead of periodic lower abdominal pain since several months ago. She went to an OBGYN and being examined and being told that she had haematometra, then being referred to our hospital. The lower abdominal pain was quiet mild for her, and just starts few months ago. She declined previous history off illness and surgical history.

Third case was 12 year-old referred to our office due to cyclic abdominal pain without starting her period. She felt the cyclic abdominal pain since 1 year ago, every month, for 4 days long. But since the last 4 months the abdominal pain felt almost everyday that she need some pain killer for it. She had ultrasound an MRI evaluation, found haematocolpos with transverse vaginal septum. She had no previous surgical history or other significant medical problems.

Fourth case was 1 10 year-old girl referred to our clinic due to lower abdominal pain. Since 9 months ago she felt cyclic lower abdominal pain every month. She had not got her period. She went to prior hospital, being diagnosed as haematocolpos due to transverse vaginal septum. Since one month ago the abdominal pain was increases (VAS3–4) and she needed to use suppository analgesic. No complain on micturition nor defecation. No previous surgical history or other significant medical problems.

3. Clinical finding

On our first case physical examination we found her secondary sexual development was tanner M2P3. The external urethral meatus and minor labias were normal. Seen hymenal ring with vaginal mucous close

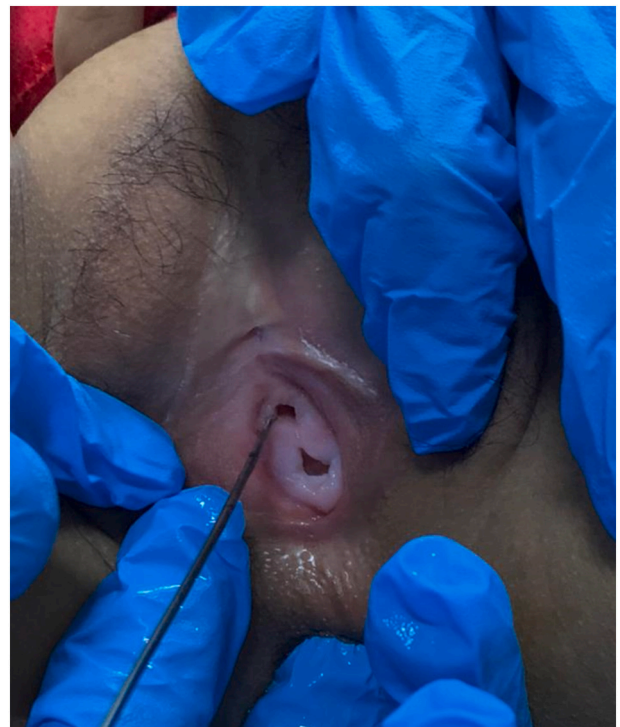


Fig. 2. Physical examination of second case. Note the urethra pointed by sound, hymenal ring located below the external urethral opening. The transverse vaginal septum was not seen in this picture.

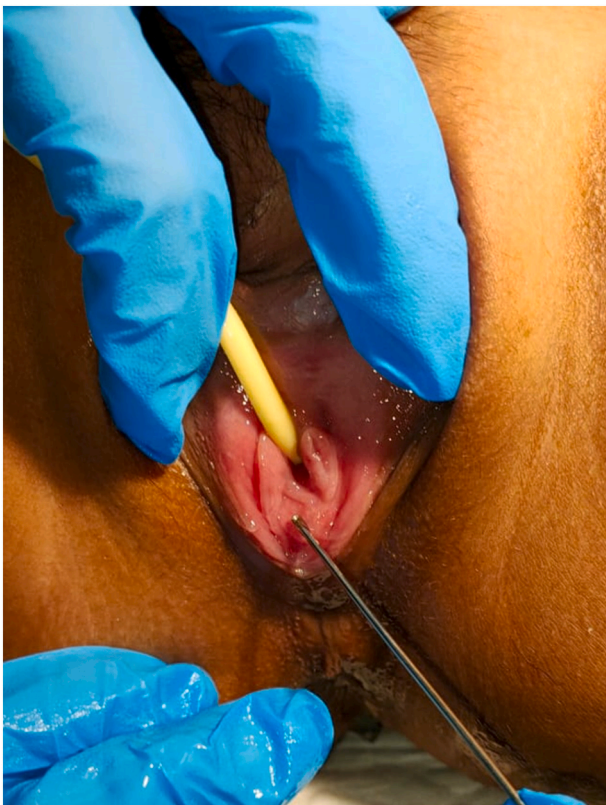


Fig. 1. Physical examination of first case. Note the urethra with foley catheter, transverse vaginal septum pointed by sound, hymenal ring located around the sound and in front of the septum.

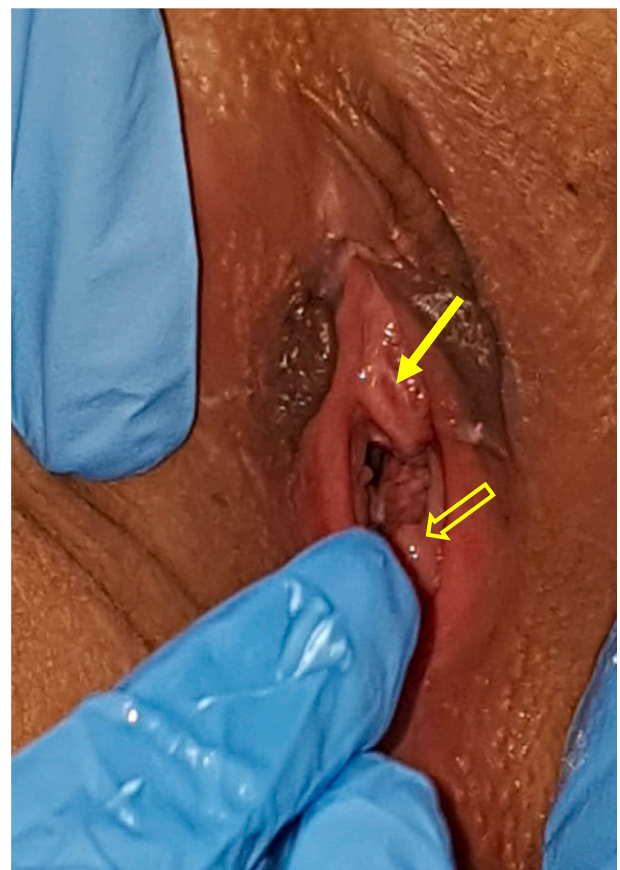


Fig. 3. Physical examination of third case. Note the urethra pointed by blocked arrow, the hymenal ring pointed by arrow.



Fig. 4. Physical examination of fourth case. Note the urethra pointed by blocked arrow, the sound stopped at 3 cm proximal from hymenal ring, and the hymenal ring seen around the sound.

the vaginal canal right behind the hymenal ring. No bulging or bluish mass seen. On rectal toucher bimanual we found haematocolpos size 6×5 cm, with pain on palpation (Fig. 1).

Our second case had M3P2 tanner development. We found no palpable nor painful lower abdominal mass. On gynecologic evaluation we found normal external urethral meatus, normal major and minor labias, and normal hymenal ring. No bulging mass seen. The soundage was retrained at 2 cm proximal from hymenal ring. On bimanual rectal toucher we found solid soft-solid structure at the vagina, 2 cm proximal from the anal opening, 1 cm width. We also found haematocolpos 10×7 cm sized, with normal uterine and no adnexal mass (Fig. 2).

Our third case, on physical examination found that her secondary sexual growth was correspond to tanner M3P2. On abdominal evaluation we found cistic mass until 2 fingers above navel, VAS 1 on pressure. On gynecologic examination we saw scanty pubic hair, normal hymen, normal vaginal introitus, no bulging mass. We did not perform inspeculo nor vaginal toucher. The tubal sound was stopped 5 cm proximal of the hymenal ring. On bimanual rectal toucher we found cystic mass on anterior rectum, $3 \times 3 \times 2$ cm sized, connected to the abdominal mass size $8 \times 4 \times 3$ cm corresponded to haematocolpos haematometra. At the distal edge of haematocolpos we palpated thick structure, 5 mm width, corresponded to transverse vaginal septum (Fig. 3).

On our fourth case, we found secondary sexual development was tanner M4P3, with lower abdominal mass up to 3 fingers above pubic bone. We found normal major and minor labias, normal external urethral meatus, normal hymenal ring. No bulge of mass on vaginal introitus. Vaginal sound retained at 3 cm proximal from the hymen. On bimanual rectal toucher evaluation we found cystic mass at vagina, 3 cm proximal from anal opening, sized $6 \times 7 \times 6$ cm with tenderness; correspond to hematocolpos. The vaginal mass was integrated with the abdominal mass size $7 \times 7 \times 7$ cm, tenderness (+), correspond to hematometra. Felt cystic mass at right adnexa size $6 \times 5 \times 6$ cm, pain on palpation (+) (Fig. 4).

4. Diagnostic assessment

On our first case ultrasound evaluation we found distal transverse vaginal septum with haematometra size $(1.7 \times 0,5 \times 0,5$ cm), haematocolpos $(8.70 \times 5,01 \times 6,38$ cm), and mild bilateral haematosalping (right: $3.77 \times 1.49 \times 2.75$ cm, and left: $4.11 \times 1.51 \times 1.00$ cm). Both kidneys and both ovaries were normal. The distal vaginal transversal septum thickness was 0.65 cm (Fig. 5).

On our second case, the ultrasound evaluation found haematocolpos $(9.6 \times 6 \times 5.23$ cm sized), with normal uterus (endometrial line was positive and endometrial thickness was 7.45 mm). the right ovary was normal with no right haematosalping, but the left adnexa was had to be visualized. We found hyperechoic structure in vagina 8.7 mm thick at distal edge of the haematocolpos correspond to the transverse vaginal septum (Fig. 6).

On our third case ultrasound we found haematometra $(4.18 \times 2.38$ cm) haematotrachelos $(3.7 \times 1.6$ cm) hematokolpos $(6.3 \times 4.5 \times 6.4$ cm). We found transverse vaginal septum 6.4 mm thick. Both adnexa were hard to be evaluated. Seen pseudocyst at douglas cavity, seen right and left gonad. The cariotyping result was 46XX (Fig. 7).

On our fourth case's ultrasound evaluation, we found haematometra $(4 \times 3.6 \times 2.68$ cm), haematocolpos $(7.4 \times 5.4 \times 6.8$ cm), and bilateral haematosalphynx (right was $3.9 \times 4.7 \times 4.9$ cm and left was $2.27 \times 1.1 \times 2.3$ cm) with 4.9 mm thick distal-transverse vaginal septum. Both kidneys were normal (Fig. 8).

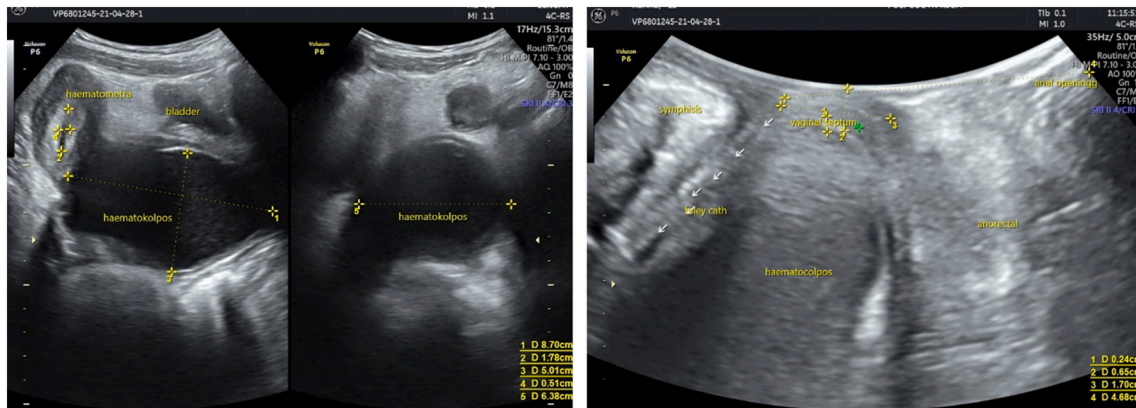


Fig. 5. Ultrasound evaluation of first case. Note the vaginal septum located very distally.

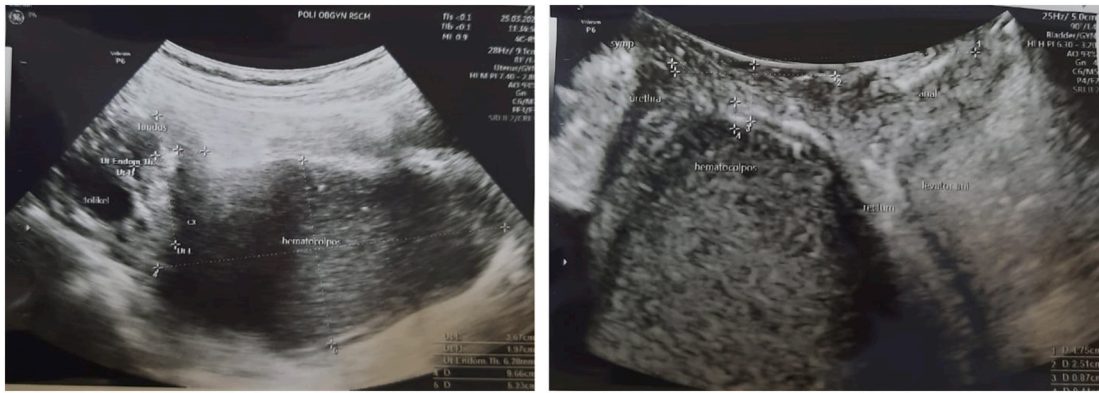


Fig. 6. Ultrasound evaluation of second case. Note the vaginal septum located distally.



Fig. 7. Ultrasound evaluation of third case. Note the vaginal septum located distally.



Fig. 8. Ultrasound evaluation of fourth case. Note the vaginal septum located distally, with bigger bilateral haematosalphing.

5. Therapeutic intervention

All of the cases were underwent interdigitating “Y” flap procedure. On the first case, under anesthesia we explore the distal transverse vaginal septum, we found it closing the vaginal canal right behind the

hymenal ring. We did inverted “Y” incision on the distal septum surface, prepared the three distal flaps. Then we did “Y” incision on the proximal septum surface, prepared the three proximal flaps and evacuated 150 cm³ brownish retained blood (Fig. 9).

Then we stitched the distal to proximal flaps with interdigitating “Y”

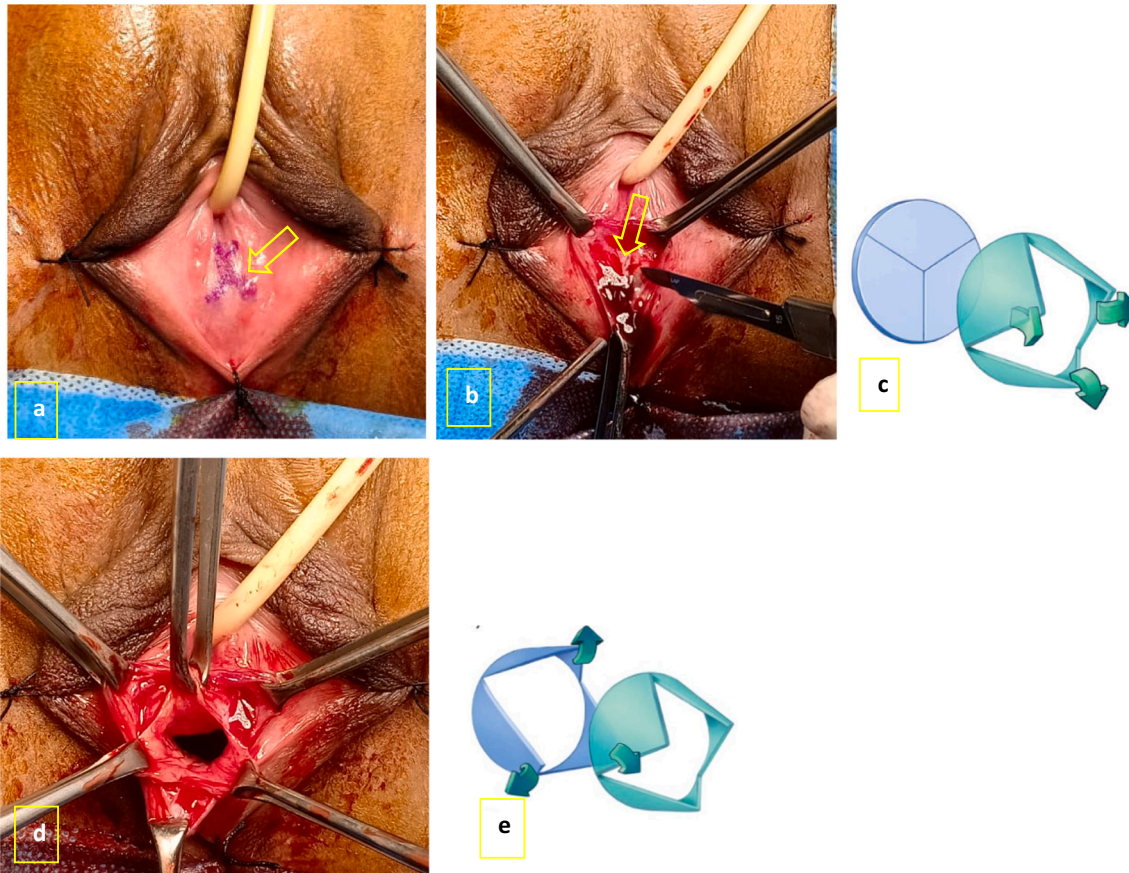


Fig. 9. Surgical procedure of first case. a. Inverted “Y” pattern on distal septum surface pointed by arrow. b. Three distal flaps developed, clamp with allis. “Y” pattern on outer part of proximal vaginal septum has been made sharply, and the leg of “Y” pattern has been perforated with chocolate fluid came out. c. illustration of photo “b”, the green layer is the distal flap, the blue layer is the proximal flap [3]. d. three distal flaps and three proximal flaps has been created, grasped by allis clamp. d. illustration of the distal and proximal flaps. e. illustration of photo “e”, the green layer is the distal flap, the blue layer is the proximal flap. Note the direction of the flaps [3]. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

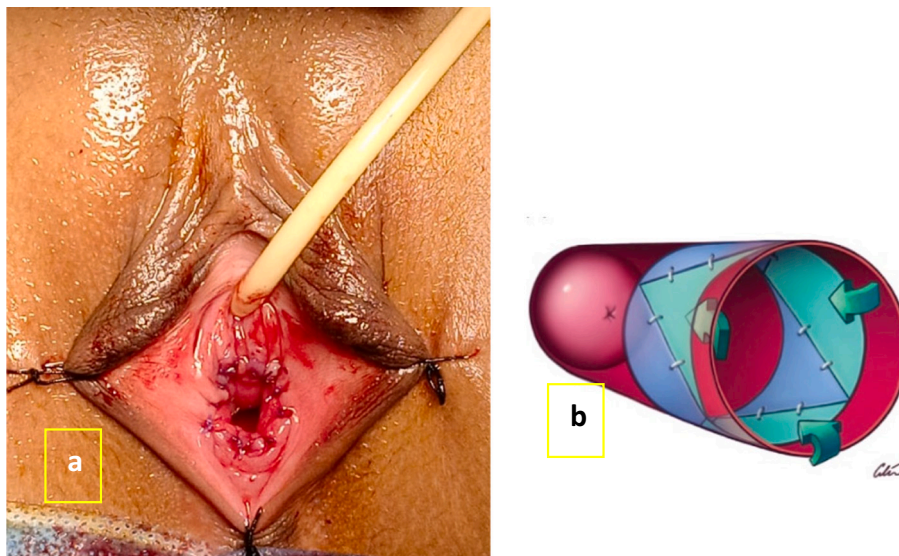


Fig. 10. Final view of the first case, a. after distal flap and proximal flap has been stitch interdigitatingly. B. The illustration of final view, the green one is the distal flap, the blue one is the proximal flap [3]. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

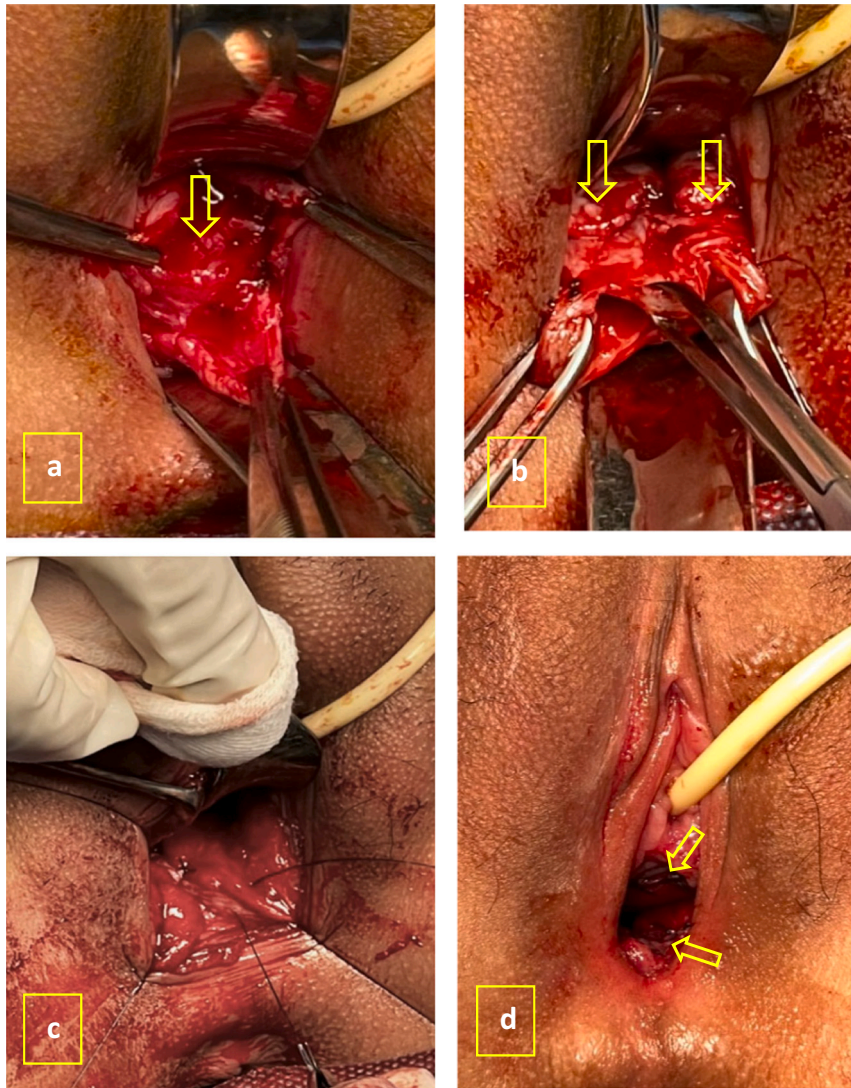


Fig. 11. Surgical procedure of second case. a. Three distal flaps developed, clamp with allis. The proximal part of vaginal septum is pointed by arrow. b. Three proximal flaps have been created, grasped by allis clamps. The two upper-distal flap pointed by arrow. c. Stitching the proximal flap into distal flap (interdigitate). Final view of the second case. The stitch pointed by arrow, in vaginal canal.

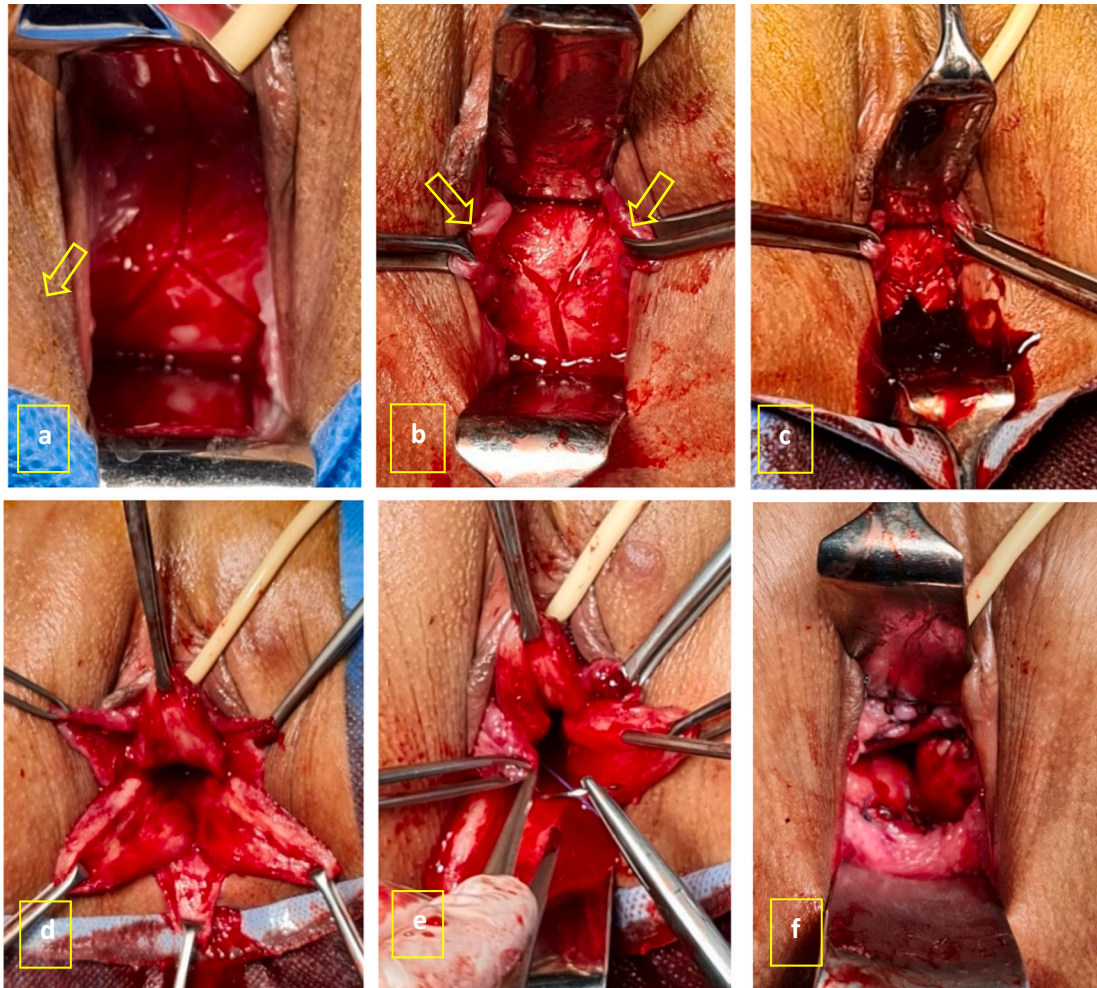


Fig. 12. Surgical procedure of third case. a. Inverted “Y” pattern on distal septum surface. b. Three distal flaps developed, clamp with allis. “Y” pattern on outer part of proximal vaginal septum has been made sharply. c. The lower arm of “Y” pattern has been perforated with chocolate fluid came out. d. Three distal flaps and three proximal flaps have been created, grasped by allis clamp. e. Stitching the distal flap into proximal flap (interdigitating). F. Final view of third case, stitches in vaginal canal seen.

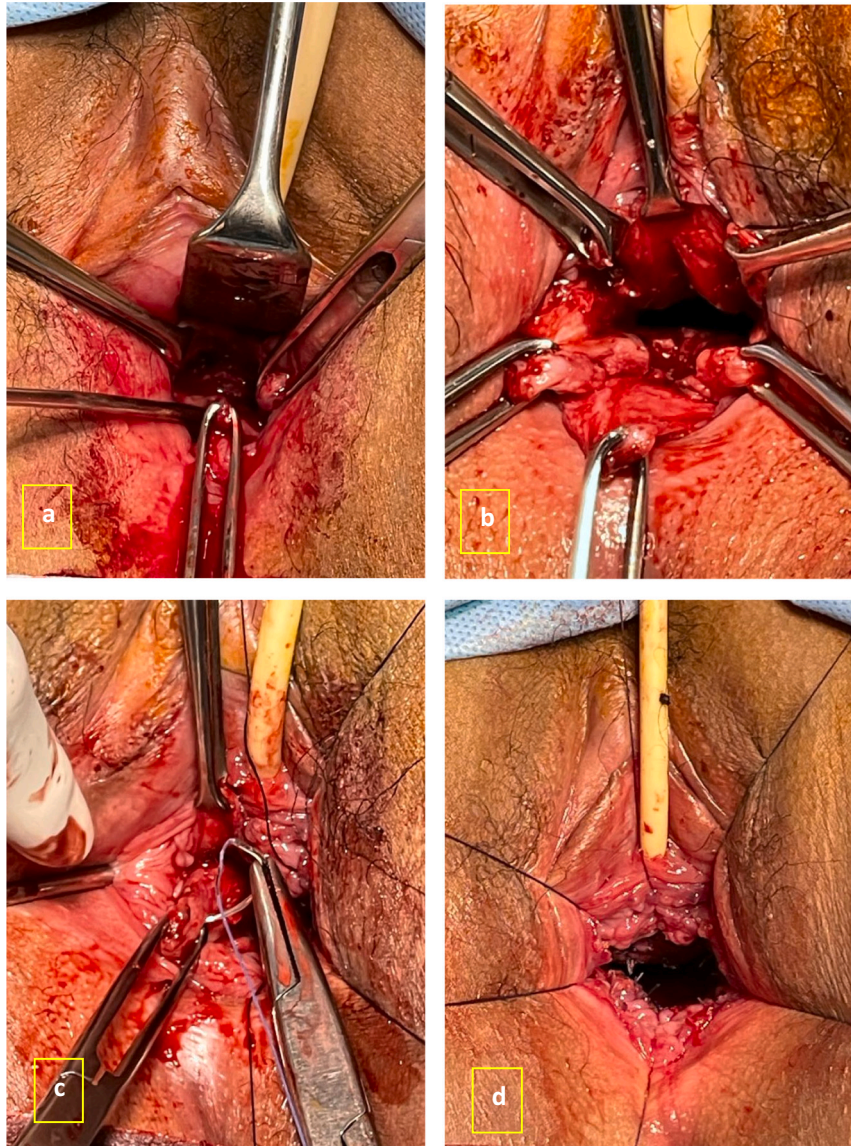


Fig. 13. Surgical procedure of fourth case. a. Three distal flaps developed, clamp with allis. b. The 3 distal flaps and 3 proximal flaps have been created, grasped by allis clamp. c. Stitching distal flap into proximal flap (interdigitating). d. Final view, seen interdigitated stitch in vaginal canal.

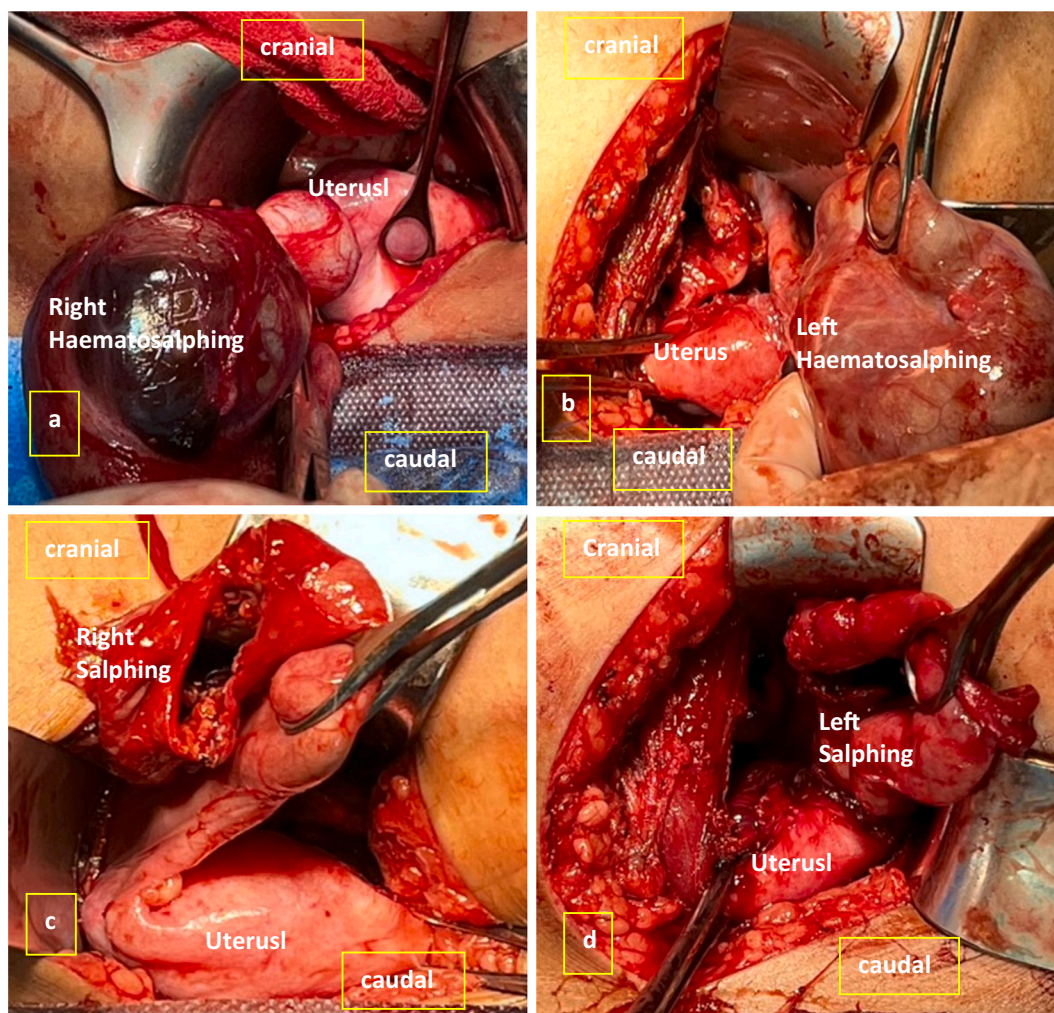


Fig. 14. Surgical procedure of fourth case. a. Right haematosalping was identified. b. Left haematosalping was identified. c. Right salping after salpingostomy and blood evacuation. D. Left salping after salpingostomy and blood evacuation.

flap pattern using PGA no 3.0 interrupted sutures. The total vaginal length was 7 cm and the uterine sound was 6 cm (Fig. 10).

Our second case underwent interdigitating Y-flap for transverse vaginal septum correction. We evacuated 150 cm³ brownish fluid. The total vaginal length was 10 cm (Fig. 11).

Our third case was also managed by interdigitating Y flap and we evacuated 150 cm³ chocolate fluid. The total vaginal length was 8 cm (Fig. 12).

Our fourth case underwent interdigitating Y flap procedure, we evacuated 200 cm³ brownish fluid (Fig. 13).

We also did laparotomy and found bilateral haematosalplings (right was size 7 × 6 × 4 cm and left was 5 × 4 × 3 cm). The patient asked to keep her fallopian tubes, then we did bilateral salpingostomy and 150 cm³ brownish-thick fluid evacuation (Fig. 14).

6. Follow up and outcome

The first case was being sent home one day after surgery. At one

month evaluation she had no complain, the vaginal wound was in good healing. The ultrasound evaluation found that the haematosalping has been resolved. Ten months after surgery evaluation also found no haematosalping with no vaginal stenosis (Fig. 15).

The second case was being sent home one day after surgery. At one month evaluation the patient had no complain, and the vaginal wound was in good condition.

The third case was also being sent home one day after surgery. At one month evaluation she had no complain and her vaginal wound was in good condition.

The fourth case was being sent home at second day after surgery (as she also had laparotomy). At 1 week after surgery evaluation, she declined lower abdominal pain. Her vaginal and abdominal wound was in good condition. Up to 11 months after surgery she admitted regular period, no lower abdominal pain. Her evaluation on nearby OBGYN found positive endometrial line with right adnexal mass 2.81 × 1.75 cm (suspected hydrosalping) and normal ovaries (Fig. 16).

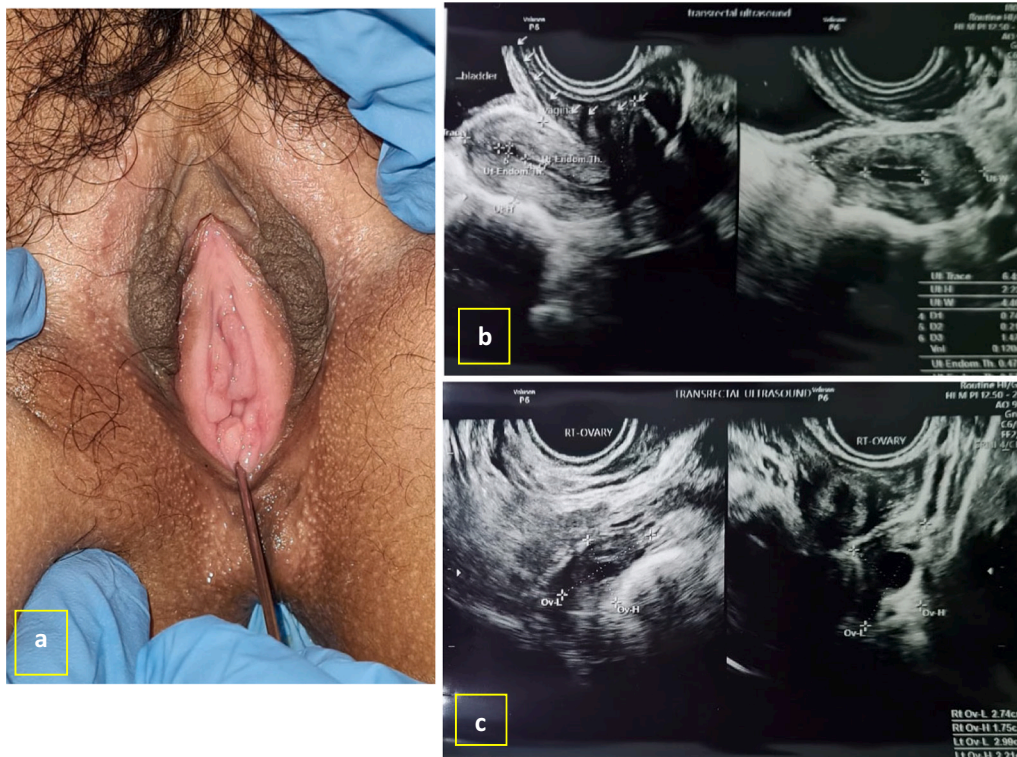


Fig. 15. First case's 10 months after surgery evaluation. A. sound could be inserted with no resistance. b. Ultrasound found no haematometra. c. Ultrasound found normal ovaries and no haematosalping.

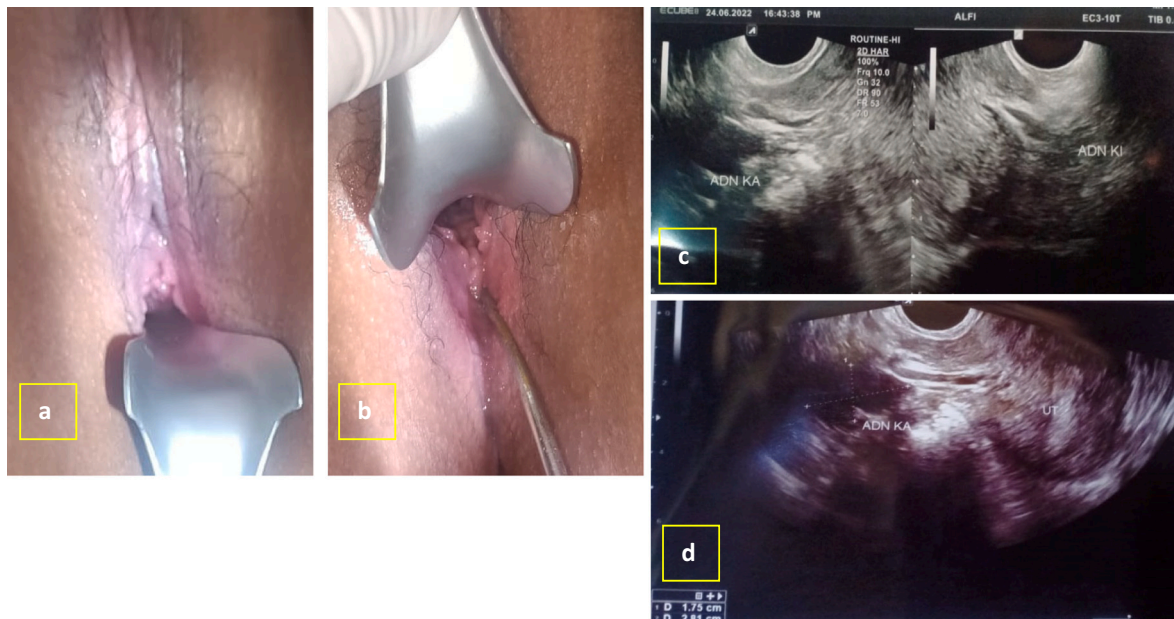


Fig. 16. Fourth case's 11 months after surgery evaluation. a and b. Speculum could be inserted with no resistance. c. Ultrasound found no normal ovaries. d. Ultrasound found no haematometra, with right hydrosalpingh.

Table 1
Summary of the cases

Character	Case no 1	Case no 2	Case no 3	Case no 4
Age	12 year-old	13 year-old	12 year-old	10 year-old
Chief complain	Lower abdominal pain	Periodic lower abdominal pain	Cyclic abdominal pain	Lower abdominal pain
Additional complain	Primary amenorrhea, voiding difficulty	Primary amenorrhea	Primary amenorrhea	Primary amenorrhea
Onset of symptom	2 months	Several months	One year	9 months
Tanner development	M2P3	M3P2	M3P2	M4P4
Septum location	Right behind hymenal opening	2 cm from hymen	5 cm from hymen	3 cm from hymen
Septum thickness	6.5 mm	8.7 mm	6.4 mm	4.9 mm
Marked clinical finding	Haematocolpos, both kidneys were normal	Haematocolpos, no haematometra, both kidneys were normal	Haematometra, haematocrachelos, haematocolpos, both kidneys were normal	Haematocolpos, haematometra, both kidneys were normal
Haematosalping	Mild bilateral haematosalplings	No haematosalping	No haematosalping	Bilateral haematosalplings
Retained blood evacuated volume	150 cm ³	150 cm ³	150 cm ³	200 cm ³ vaginally, 150 cm ³ abdominally
Haematosalping management	Close observation, resolved 1 and 10 months after surgery	N/A	N/A	Laparotomy bilateral salpingostomy
Intraoperative bleeding	<30 cm ³	<30 cm ³	<30 cm ³	<30 cm ³
Total vaginal length (TVL)	7 cm	10 cm	8 cm	7 cm
Post-operative hospitalisation	The oral medication were Mefenamic acid 3 × 250 mg, cefixime 2 × 150 mg for 7 days and azytromycin 1 × 750 mg single dose. Went home one day after	The oral medication were Cefixime 2 × 200 mg, mefenamic acid 3 × 500 mg for 7 days. Went home one day after	The oral medication were Cefixime 2 × 200 mg, mefenamic acid 3 × 500 mg for 7 days. Went home one day after	The oral medication were Cefixime 2 × 200 mg, Na diclovenac 2 × 50 mg for 7 days. Went home two days after
Post-operative evaluation	10 month evaluation: Good vaginal wound healing, normal menstrual blood flow, TVL 7 cm, No stenosis palpated by tubal sound, no haematosalping	1 month evaluation: Good vaginal wound healing, TVL 10 cm,	1 month evaluation: Good vaginal wound healing, TVL 8 cm,	11 months evaluation: Good vaginal and abdominal wound healing, TVL 7 cm, speculum could be inserted easily (no vaginal stenosis), right hydrosalping, no endometriosis cyst

7. Discussion

Clinical presentation of complete transverse vaginal septum in our cases was similar, adolescence with cyclic lower abdominal pain and primary amenorrhea as the main symptom. Cyclic pelvic pain in complete transverse vaginal septum commonly found in teenage [5]. The onset of pain varied from several month to one year. The septum location were low and middle (ranged from right behind the hymen to 5 cm proximal from the hymen) [2]. Some literature suggest MRI evaluation as the gold standard of vaginal septum [1], but MRI has some limits such as higher cost, and less availability. In our cases we did bedside ultrasound as supportive evaluation, and the imaging has confirmed the vaginal septum. One of our cases was planned for re-evaluation after surgery, to evaluate the non-visualized left adnexa. We might need to use MRI for such case.

For all these four cases we choose interdigitating “Y” flap as this technique offer better preservation in vaginal length and less constriction [3]. The flap technique is enable in septum management as the septum was relatively thick and composed of 2 embryonic origins with distal surface covered by squamous cell lining, with proximal surface covered by glandular cell lining, and fibroareoral structure between them [6]. This made dividing them into distal flaps and proximal flaps was possible. The low and middle location of those septum also favourable to perform this technique as optimal exposure for meticulous dissection is possible. Other alternative was excision technique, where the septum was being incised to evacuate the retained blood, then being fully excised and stitched circumferentially. Literature reported the use of vaginal estrogen tampon for one day to reduce the risk of vaginal stenosis [5].

Other alternative was simple flap vaginal technique in which the distal mucous of vaginal septum is incised vertically and dissected submucosally for two lateral flaps. Then the septum structure being

excised and the prepared flaps being stitched onto proximal vaginal mucous covering the post excised vaginal surface [7]. We consider the Y flap technique for our patients as no raw surface left in any edge (the Y flap technique has no raw edge in 6 and 12 o'clock as it covered interdigitating by the proximal layer flaps).

Another alternative was using double-cross-plasty technique. This technique was similar to interdigitating “Y” flap, but it has 4 distal flaps and 4 proximal flap compared to 3 distal flaps and 3 proximal flaps in “Y” flap technique [6]. Double cross plasty and “Y” flap technique offer good vaginal length preservation and reduce vaginal stenosis as the wound pattern created will spread the wound tension to all direction evenly. However, we prefer the “Y” flap over the double cross plasty as the flap number was less so that the size of each flap was relatively larger with better blood supply, and technically easier to be done [3].

Haematosalping found in two cases. First was the first case with relatively small haematosalping and has been resolved spontaneously after “Y” flap procedure, with no haematosalping recurrency nor endometriosis cyst formation 10 months after surgery. The spontaneous resolution of bilateral haematosalping might be allowed due to optimal drainage after the obstruction eliminated. Another case with larger haematosalping was the fourth case, who got laparotomy salpingostomy along with the Y flap procedure, and until 11 months after surgery she had no abdominal pain, no endometriosis cyst nor newly developed haematosalping. This support that adequate menstrual blood evacuation after surgery will prevent our patient from recurrent haematosalping. However longer-term evaluation would be beneficial.

All cases had minimal intraoperative bleeding, and had short hospital stay (only one day, except a case with concomitant laparotomy needed two days). The vaginal length was satisfying with no vaginal stenosis. But for the longer-term evaluation of vaginal length and constriction we still need further evaluation. But we could expect a well preserved vaginal length and minimal constriction from this

interdigitating “Y” flap technique [3]. Our cases have gained normal menstrual function after surgery. The sexual function was could not be evaluated as all cases were not married yet and not had any sexual activity yet.

Our four cases have shown that interdigitating “Y” flap surgical technique could provide sufficient vaginal length and no vaginal constriction. Regarding to the limited reports about surgical technique in managing vaginal septum, our report could enrich the scientific evidence. Clinicians searching for surgical technique with satisfying outcome in vaginal septum management with could consider this technique as safe and effective alternative surgical techniques.

8. Conclusion

Interdigitating “Y” Flap offers satisfying outcome besides short hospital stay, no need for postoperative vaginal dilatation, preserved vaginal length and vaginal caliber. Such technique could be an alternative technique also in managing distal vaginal agenesis.

Declaration of competing interest

This case series has no conflict of interest.

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Thank you dr Trestiwaty, OBGYN for the collaboration in long term evaluation of our case.

Funding

This case series has no sponsor.

Ethical approval

As this is case series (not a research), ethical approval was not required.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

CRedit authorship contribution statement

Tyas Priyatini: concept, operator, data analysis, final approval
 Fernandi Moegni : operator, data analysis
 Gita Nurul Hidayah: concept, operator, data collector, data analysis, manuscript development
 Suskhan : data analysis,
 Surahman Hakim: data analysis
 Alfa Putri Meutia: data analysis

Registration of research studies

Not applicable.

Guarantor

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 Alfa Putri Meutia

Provenance and peer review

Not commissioned, externally peer-reviewed.

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