

# VAGINOPLASTY WITH BILATERAL ISLANDED PUDENDAL THIGH FLAPS

Samira Ajmal, Kanwal Yusuf\*

Department of Plastic and Reconstructive Surgery, Hayatabad Medical Complex, Peshawar, \*Shifa International Hospital, Islamabad, Pakistan

**Background:** Vaginal agenesis is the most common congenital deformity of female pelvis and vaginal reconstruction remains a surgical challenge. There are various surgical and non-surgical techniques described for the reconstruction of neovagina. We have used pudendal thigh flaps raised on either side of the labia to reconstruct the vagina in 19 patients. This study is carried out in the Department of plastic and reconstructive surgery, Hayatabad medical complex Peshawar to evaluate the functional and aesthetic outcome of vaginoplasty with bilateral pudendal thigh flaps. **Methods:** Vaginal reconstruction was done with bilateral islanded pudendal thigh flaps, in 19 consecutive patients with vaginal atresia, during 5 years, from Aug 2004 to Aug 2009. The flaps were raised on either side of labia and sutured to each other in midline to form a vaginal tube. This neo-vagina was inserted into the space between the rectum and bladder and anchored to the deep pelvic tissues. **Results:** Out of 19, eleven patients (58%) were diagnosed with Mayer Rokitansky Kauser Hauser Syndrome and 8 (42%) with isolated vaginal atresia. The mean vaginal length and width was 9.2 and 4.3 cm respectively one year post operatively. **Conclusion:** This method of vaginoplasty is simple, safe, and reliable and has shown satisfactory functional and cosmetic results. The reconstructed vagina has a natural angle and is sensate in its lower part. No postoperative stenting or dilatation is required. The donor site in the groin can be closed primarily and the scar is well hidden in the groin crease.

**Keywords:** Vaginoplasty, vaginal reconstruction, vaginal atresia, pudendal thigh flaps

## INTRODUCTION

Vaginal agenesis is the most common congenital deformity of female pelvis, the incidence being 1 in 4000–5000 female live births.<sup>1-4</sup> It may present as an isolated anomaly, i.e., isolated vaginal atresia or as a part of more complex anomalies, the commonest being Mayer Rokitansky Kauser Hauser (MRKH) syndrome. MRKH syndrome is characterised by congenital aplasia of the uterus and the upper part (2/3) of the vagina in women showing normal development of secondary sexual characteristics and a normal 46, XX karyotype. MRKH has an estimated incidence of between 1 in 5,000 to 1 in 10,000 births of female infants.<sup>5,6</sup> Other less common disorders include androgen insensitivity syndrome and other inter-sex disorders. The normal length of the posterior (longest) vaginal wall in adult XX female is 9 to 11 cm. Vaginal agenesis typically results in a dimple or a small pouch approximately 1–4 cm in length in place of vagina with absence of uterus or cervix and normal appearing external genitalia. Functional ovaries are however usually present so that the affected woman experiences pubertal growth and development and ovulation. The patients with vaginal agenesis present either with primary amenorrhea, cyclical abdominal pain or inability to have intercourse. The condition causes confusion and anxiety in both the patient and her family regarding her femininity, reproductive function, and sexual life.

Vaginal reconstruction remains a surgical challenge since ancient times. The primary goals of vaginoplasty are to relieve the menstrual outflow

obstruction and the associated lower abdominal pain; to restore a normal sex life and to preserve the patient's reproductive potential if the patient has a functional uterus and ovaries. Successful vaginal reconstruction should preferably be a single stage, simple, safe and reliable procedure. The neo vagina should be located in the correct anatomical axis and its wall should have characteristics of softness, pliability, durability, extensibility and sensibility in the lower part. The morbidity at tissue donor sites should be minimal.<sup>2,7</sup> There are more than 100 different surgical and non-surgical techniques described for the formation of a neovagina,<sup>2</sup> e.g., Frank-pressure technique,<sup>8</sup> Mcindoe technique of split thickness skin graft,<sup>4,9</sup> Horton's vaginoplasty using full thickness skin graft,<sup>2,10</sup> fasciocutaneous flaps,<sup>10-12</sup> muscle flaps<sup>11</sup> and bowel flaps.<sup>4,13</sup> The benefits of using well-vascularised tissue in perineal reconstruction, such as the gracilis musculocutaneous flap and pudendal thigh flaps were recognised as early as 1976.<sup>14</sup>

Pudendal thigh flaps are fasciocutaneous flaps based on the posterior labial artery which is a branch of internal pudendal artery. The aim of this study was to evaluate the functional and aesthetic outcome of reconstruction of vagina using pudendal thigh flaps in patients with vaginal atresia.

## MATERIAL AND METHODS

This study was carried out in the department of Plastic and Reconstructive Surgery at Hayatabad Medical Complex and Plastic surgery unit at Said Anwar Medical Centre, Peshawar. Nineteen

consecutive patients with vaginal atresia were reconstructed with pudendal thigh flaps during 5 years from Aug 2004 to Aug 2009. All the patients were referred by gynaecologists. A detailed history was taken, complete physical examination carried out and findings recorded. Abdominal and pelvic ultrasound was carried out for all patients preoperatively. Karyotyping was done if there was any ambiguity in gender assignment. All patients had a preoperative EUA and the abnormalities recorded accurately. The patients with haematocolpos underwent two staged procedure: haematocolpos drained in the first stage followed by vaginoplasty after three weeks. Patients were admitted a day before surgery and enema given at night to clear the rectum. Pre-induction broad spectrum antibiotics were given.

### Operative technique

Under general anaesthesia patient was put in lithotomy position and catheterised. Lignocaine 2% with adrenaline 1:100,000 was injected in the space between the rectum and urethra. A finger was introduced in the rectum to avoid its injury and a cavity made in between the rectum and bladder. Pudendal thigh flaps were marked on both sides of labia keeping the groin creases in the centre. Each flap was triangular or horn shaped 15 cm in length and 6 cm in breadth (at the base of the flap which was in line with the posterior end of introitus). The flap tapered off gradually with the tip reaching the groin near the femoral triangle (Figure-1).

Incision began at the tip of the flap, deepened to the level of deep fascia on both sides of the flap except posteriorly. The flap was raised in the subfascial plane starting from the tip and including the epimysium of the adductor muscles with the fascia. A few vicryl sutures were used to anchor the deep fascia to the flap to prevent shearing and injury to the pedicle. The flap was elevated until the posterior margin was reached which was then incised to the level of subcutaneous tissue thus completely islanding the flap (Figure-2).

It was then undermined to tunnel the flap under the labia for transfer in the newly formed cavity at the introitus. When both the flaps were raised and tunnelled to the introitus they were sutured to each other in midline starting at the posterior edge first to form a vaginal tube by keeping the skin side on the inside (Figures 3–5).

About 2–3 cm of the flap tips were discarded to ensure viability of the distal ends and also to avoid narrowing of the tube at the cephalic end. This tube was then inserted into the space previously created by dissection in between the rectum and urinary bladder. Its upper end was anchored by 3–4 strong absorbable sutures to the

cervix or the pre rectal and perivesical tissues in case of absence of cervix, to maintain the length. We achieved this anchorage by passing sutures through the upper end of the neo vagina while the tube was still outside, then through the cervix, perivesical or perirectal tissues and kept the sutures long and untied. These anchoring sutures were tied one by one after inserting the tube in the neovaginal space. Finally the lower end of this neovaginal tube was sutured to the mucocutaneous junction at the introitus (Figure-6).

Good haemostasis was secured at the flap donor sites which were then closed in layers with strong sutures. A suction drain was placed behind the neovagina and brought out through a separate stab wound while one each was put at the flap donor site and brought out through the wound. The neovagina was packed with parafinated gauze impregnated with sulpham cream.

The vaginal pack was removed on the first postoperative day and the flaps examined. The patients were mobilised early to avoid pulmonary and DVT complications and allowed daily sitz baths followed by sulpham cream instillation. They were discharged on 3<sup>rd</sup> post operative day after removal of drains. Post-operatively the patients were seen weekly for one month, then at monthly intervals for 5 months followed by three monthly visits for another 6 months. Sexual intercourse was allowed after 3 months and any complaints noted. The patients were inquired about their monthly menstrual flow. The length and width of vagina was measured at each follow-up visit. The final vaginal length 1 year post operatively was measured by introducing a Hegar dilator, marking the level and measuring the length. The final width was measured with finger breadth and translated in centimetres. The donor site wound healing was noted and any complication like spreading, hypertrophy or keloid formation was recorded.

### RESULTS

Out of 19 patients with vaginal atresia, 11 (58%) were diagnosed as MRKH syndrome and 8 (42%) were diagnosed as cases of isolated vaginal atresia. The age range was between 14 and 25 years. Fourteen patients presented with primary amenorrhea and associated periodic abdominal pain. These patients showed haematocolpos on ultrasound of the pelvis. Two patients presented with minimal menstrual flow and recurrence of haematocolpos after having had their haematocolpos drained by the gynaecologists. Three patients presented with inability to have intercourse.

Reconstruction of vagina was done in these 19 patients with 38 pudendal thigh flaps. The mean

length of the flaps was 15 cm and the width was 6 cm. The mean neo vaginal length measured at the end of the procedure was about 12 cm and the width was 5 cm. The donor site could be primarily closed in all patients. The mean operative time was 3 hours. All flaps survived completely. Our mean follow up was for 1 year. The mean vaginal length after 1 year was 9.2 cm and mean width was 4.3 cm permitting three fingers. The patients did not require any stent or dilatation to maintain the width. The neovagina was soft, easily distensible and sensate in its lower part in all patients.

Patients with primary amenorrhea started having regular monthly menstrual blood flow and their abdominal pain disappeared after surgery. Ultrasound through a vaginal probe at 6 months did not show any residual collection above the neovagina. Intercourse was permitted after 3 months and all patients reported adequate penetration and satisfaction on both partners' part, 1 year post operatively. All patients reported a positive attitude towards life and a feeling of being 'normal'. The flap donor site scars healed well and were well hidden in the groin crease (Figure-7).



Figure-1

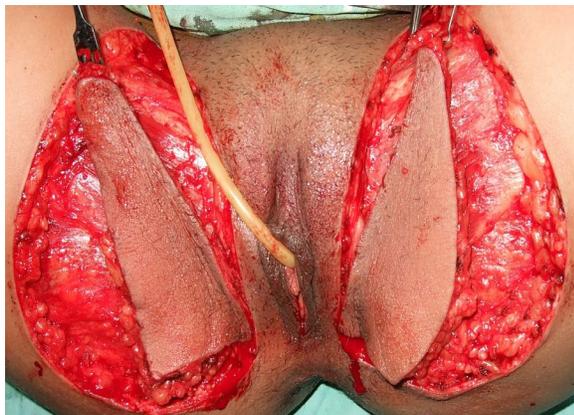


Figure-2



Figure-3



Figure-4

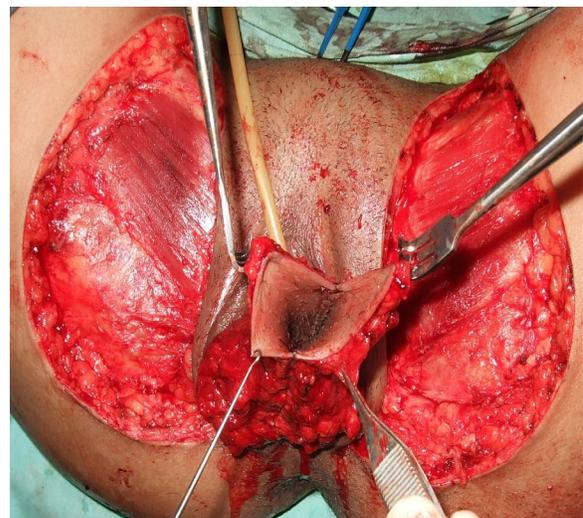


Figure-5



Figure-6



Figure-7

Two patients (10.5%) had infection at the neovaginal site, presenting late postoperatively. One occurred behind the neovagina, presenting as dyspareunia which was drained by removing a few stitches at the introitus and the patient put on metronidazole and ciprofloxacin for one week according to culture sensitivity. The symptoms settled with this treatment. The second patient had infection above the vagina and presented as vaginal discharge. This patient initially had a huge haematocolpos and two litres of chocolate brown fluid was drained. Vaginoplasty was delayed for three weeks to let the cavity shrink. In spite of regular menstrual flow post vaginoplasty, residual blood

collection occurred after every menstrual cycle. Vaginal ultrasound was done to locate the collection and after draining it through the vagina, a Foley's catheter was retained in the cavity and brought out of the vagina. Antibiotics were given according to culture sensitivity and the catheter was removed after ultrasound showed shrinkage of the cavity. She remained well after that. Hair growth was reported by all patients in the neovagina. Eight patients (42%) were bothered about this but were satisfied with the use of hair removing creams. Rest of the patients did not find the hair disturbing. Two patients showed limited dehiscence at the donor site. Secondary closure of the wound was done. Others showed uneventful recovery.

## DISCUSSION

Vaginal atresia and agenesis are congenital anomalies of the female genitourinary tract and can occur as an isolated developmental defect or as part of some syndromes. Examples of such syndromes include the Mayer Rokitansky Kauser Hauser Syndrome (MRKH) syndrome, Bardet-Biedl syndrome, Kaufman-McKusick syndrome, androgen insensitivity syndrome<sup>4</sup>, Fraser syndrome, and Winters Syndrome. MRKH syndrome is characterized by congenital aplasia or hypoplasia of uterus and upper third of vagina in women showing normal development of secondary sexual characteristics and normal 46XX karyotype. Patients with MRKH usually present with primary amenorrhea or inability to have intercourse. They have rudimentary uterus and incomplete or absent vagina. The fallopian tubes and ovaries are usually normal.<sup>1,2,4</sup> This condition is usually not recognized till puberty when primary amenorrhea becomes the concern. In a study in Caribbean population, MRKH syndrome represented 15% of cases of primary amenorrhea and was usually not suspected or diagnosed until adolescence.<sup>15</sup> Isolated vaginal atresia can be associated with other syndromes and vaginoplasty in these patients with normal uterus can permit pregnancy.<sup>4</sup> In our study, out of 19 patients with vaginal atresia, 11(58%) were diagnosed as MRKH Syndrome and 8 (42%) were diagnosed with isolated vaginal atresia.

The ideal vaginoplasty is one in which the reconstructed vagina has a natural and physiological angle and a correct anatomic axis to facilitate intercourse, ideally performed in one stage with the neo vagina having soft, elastic and distensible walls. It should be sensate and there should be no need for obturator or stent to maintain patency. The donor site morbidity should be minimal.<sup>2,7,16</sup>

Operative techniques that have been popular in the past include partial and full thickness skin grafts but they were plagued with post operative contraction and hence needed prolonged stenting to maintain the width and avoid stenosis of the vagina.<sup>2,17-19</sup> Several studies

have established that vaginal reconstruction with pudendal thigh flaps overcomes various disadvantages associated with graft vaginoplasty and numerous other techniques.<sup>16,20-22</sup>

Pudendal thigh flap is an axial pattern fasciocutaneous flap with reliable vascularity and sensation in its lower part. The flap was first described by Hagerty in 1988 and since then many authors have described this flap for patients with congenital vaginal atresia.<sup>23-25</sup> Bilateral flaps are raised to reconstruct the neo vagina on either side of the labia. The technique is simple, the neo vagina is sensate in the lower half and no stent or dilators are needed by the patient post operatively.<sup>20</sup> We have found the flaps to be very reliable in our study. All 38 flaps survived completely. Li S and Liu Y reported one flap necrosis, out of 24 flaps in a series of 12 patients.<sup>12</sup> Stan Monstrey (2001) reports raising 31 flaps for vaginoplasty with complete survival in all.<sup>26</sup>

The mean vaginal length and width in our patients, one year post operatively was 9.2 cm and 4.3 cm respectively. Loss of neovaginal length was observed in the first two cases of our study where we did not anchor the upper end of neo vagina to the cervix or perivesical or perirectal tissues. No significant postoperative loss of length was noticed in all the later cases when the neovagina was anchored to the deep pelvic tissues or cervix when present. Khazanchi in a study in 1997 concluded that there should be strong fixation of neovagina flaps at their apices to the deep pelvic structures, as to avoid the loss of vaginal depth.<sup>27</sup> Giraldo in his study elevated 40 flaps for 20 vaginoplasties. He reported the mean depth of neovagina as 9.5 cm and width as 3 cm and concluded that vaginoplasty with these flaps has multiple advantages and fewer inconveniences.<sup>16</sup> Ganatra in his study reconstructed five vaginas with pudendal thigh flaps. In his study the mean vaginal length was 7 cm and width was 2 fingers.<sup>28</sup> No patient in our study needed post operative dilatation and adequate vaginal width was maintained in all cases. Pudendal thigh flap vaginal reconstruction has the advantage over the graft vaginoplasty of no postoperative requirement for dilatation or stenting to avoid stenosis.<sup>16,25,29</sup> In vaginoplasties where skin grafts are used, the maintenance of neovaginal patency requires regular dilatation, until regular sexual intercourse occurs. This is confirmed by many studies which stress that stenosis of vagina can occur due to shrinkage and contraction of the graft if post operative stenting is not continued.<sup>2,17-19</sup> Moreover long term use of stent or dilators can traumatize the posterior vaginal wall and has a risk of neovaginal-rectal ulcers and fistulae that may require additional surgeries.<sup>30</sup> All patients in our study were mobilized on the first postoperative day. The

immobilization of 4-5 days needed for graft take was hence avoided.

In our study, four patients (10.5%) had infection and hair growth was a matter of concern to 8 patients (42%). Hair growth was reported by the patients as aesthetically displeasing and no functional problem was observed. A study from Florida shows vaginal discharge, hair growth and prolapse of flap as complications in their patients with pudendal thigh flap vaginoplasty.<sup>31</sup> Similarly in other studies hair growth has been found to be an aesthetic issue and not a functional problem.<sup>16</sup> Regular depilation of hair was advised to all of them. All of the patients in our study belonged to poor socioeconomic status and could not have preoperative laser hair removal as advised in literature.<sup>16</sup> Laser or electrical depilation of hairy vulval portion of flaps can be performed pre-operatively, in 5-7 sessions spaced 1-2 months apart. Giraldo also noted near complete hair atrophy in vaginal flaps, especially in posterior two third of vagina, in long term follow up.<sup>16</sup> Our follow up is not very long and the patients are being followed up for later hair atrophy.

The operative time in most of the studies on average was 2.5-3 hours.<sup>16,27</sup> Our mean operative time was 3 hours. The blood loss was minimal. All patients reported a positive attitude towards life after surgery and relief of anxiety associated with the feeling of being the odd one out.

The functional outcome was excellent in all patients, as noticed by the relief of menstrual flow blockade and abdominal pain, sexual and psychological satisfaction.

## CONCLUSION

This method of vaginoplasty is simple, safe, and reliable with no postoperative requirement for stenting or dilatation. The reconstructed vagina has a natural angle and is sensate. It has shown satisfactory functional and cosmetic results. The donor site in the groin can be closed primarily with an inconspicuous scar.

## REFERENCES

1. Friedman J. Reconstruction of perineum. In: Grab and Smith's Plastic Surgery. 6<sup>th</sup> ed. Philadelphia: Lippincott-Reven; 2007. p. 708-16.
2. Tahmeedullah, Khan TA, Obaidullah. Functional outcome of Horton's Vaginoplasty. J Coll Physicians Surg Pak 2003;13:596-9.
3. Oppelt P, Renner SP, Keller-Mann A, Brucker S, Hauser GA, Ludwig KS, *et al*. Clinical aspects of Mayer-Rokitansky-Kuester-Hauser syndrome: Recommendations for clinical diagnosis and staging. Hum Reprod 2006;21:792-7.
4. Morcel K, Camboriev L. Mayer-Rokitansky-Kauster-Hauser syndrome. Orphanet J Rare Dis 2007;2:13.
5. Folch M, Pigem I, Konje JC. Mullerian agenesis: etiology, diagnosis, and management. Obstet Gynecol Surv 2000;55:644-9.

6. Griffin JE, Edwards C, Madden JD, Harrod MJ, Wilson JD. Congenital absence of the vagina. The Mayer-Rokitansky-Kuster-Hauser syndrome. *Ann Intern Med* 1976;85:224-36.
7. Acien P, Acien M, Sanchez-Ferrer M. Complex malformations of the female genital tract. New types and revision of classification. *Hum Reprod* 2004;19:2377-84.
8. Frank RT. The formation of an artificial vagina without operation. *Am J Obstet Gynecol* 1938;35:1053-60.
9. Thompson JD, Warton LR, Te-Linde RW. Congenital absence of vagina: an analysis of 32 cases corrected by McIndoe operation. *Am J obstet Gynecol* 1957;74:397-84.
10. Lesavoy MA, Carter EJ. Reconstruction of female genital defects: Congenital. In: Methes SJ (Editor) *Plastic surgery*. 2<sup>nd</sup> ed. Philadelphia: Saunders; 2006. p.1281-92.
11. Tosun Z, Hosnuter M, Savaci N, Capar M, Senturk S. Experience with vaginoplasty. *Scand J Plast Reconstr Surg Hand Surg* 2004;38:27-31.
12. Li S, Liu Y, Li Y. Twelve cases of vaginal reconstruction using neurovascular pudendal thigh flaps. *Zhonghua Fu Chan Ke Za Zhi* 2000;35:216-8.
13. Emiroglu M, Gultan SM, Adanali G, Apaydin L, Yormu KE. Vaginal reconstruction with free jejunal flap. *Ann Plast Surg* 1996;36:316-20.
14. McCraw, JB, Massey, FM, Shanklin, KD, Horton CE. Vaginal reconstruction with gracilis myocutaneous flaps. *Plast. Reconstr. Surg* 1976;58:176-83.
15. Essien J, bardales J. Mayer Rokitansky-kuster-Hauser Syndrome in A caribbean population: A case report. *Internet J Gynecol Obstet* 2005;5:1.
16. Giraldo F. Follow up. Cutaneous neovaginoplasty using the Malaga Flap (Vuloperineal Fasciocutaneous flap): A 12 years follow-up. *Plast Reconstr Surg* 2003;111:1249-55.
17. Buss JG, Lee RA. Mcindoe procedure for vaginal agenesis; results and complication. *Mayo clin proc* 1989;64:758-61.
18. Namba Y, Suqyama N, Yamashita S, Hasegawa K, Kimata Y, Nakatsuka M. Vaginoplasty with Pudendal high flap in intersexuals. *Acta Med Okayama* 2008; 62:415-9.
19. Baytekin C, Menderes A, Mola F, Balik O, Tayfur V, Vayvada H. Total vaginal reconstruction with combined "split Labia minora flaps" and full thickness skin graft. *J Obstet Gynecol Res* 2007;33:524-8.
20. Li GZ, Cheng XD, Zhao TL, Xu J, Ge SX, Wang HG, Li XW. Experience of vaginal reconstruction by using a pudendal-thigh island flap. *Zhonghua Zheng Xing Wai Ke Za Zhi* 2003;19:183-5.
21. He Q, Lin Z, Liu Q. One-stage vagina reconstruction using the pudendal-thigh skin flap. *Zhonghua Zheng Xing Shao Shang Wai Ke Za Zhi* 1998;14:3-5.
22. Goldwyn RM. History of attempts to from vagina. *Plast Reconstr Surg* 1977;59:319.
23. Wee JTK, Joseph VT. A new technique of vaginal reconstruction using neurovascular Pudendal thigh flap: A preliminary report. *Plast Reconstr Surg* 1989;83:701-9.
24. Hagarty RC, Vaughn TR, Lutz MH. The Perineal artery axial flap in reconstruction of the vagina. *Plast Reconstr Surg* 1988;82:344-5.
25. Giraldo F, Gonzalez C. The versatility of Pudendal thigh fasciocutaneous flap used as an island flap. *Plast Reconstr Surg* 2001;108:2172-4.
26. Stan M, Phillip B, Koenraad VL, Alexis V, Patrick T, Guido M. The versatility of pudendal thigh flap used as an island flap. *Plast Reconstr Surg* 2001;107:719-24.
27. Khanzanchi RK, Takkar D. Vaginal depth following reconstruction with Pudendal high flaps in congenital vaginal atresia. *Plast.Reconstr. Surg* 1997;99:592-3.
28. Ganatra MA, Ansari NU. Pudendal thigh flap for congenital absence of vagina. *Pak Med Assoc* 2005;55:143-5.
29. Davies MC, Creighton SM, Woodhouse CRJ. The pitfalls of vaginal reconstruction. *BJU International* 2005;95:1293-8.
30. Schult M, Wolters HH, Lelle RJ, Winde G, Senninger N. Outcome of surgical intervention for rectoneovaginal fistulas in Mayer-Rokitansky-Kuester-Hauser syndrome. *World J Surg* 2001;25:438-40.
31. Gleeson NC, Bailew, Robert WS, Hoffman MS, Fiorica JV, Finan MA, *et al.* Pudendal thigh fasciocutaneous flaps for vaginal reconstruction in gynecologic oncology. *Gynecol Oncol* 1994;54:269-74.

### Address for Correspondence:

**Dr. Samira Ajmal**, C/O Lt Col Azam Ajmal, D2 Brigadiers' Flats, Parade Lane, Peshawar Road, Rawalpindi, Pakistan. **Tel:** +92-321-5560578  
**Email:** samiraajmal@yahoo.com