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Outcome of Surgical Repair of Vesicovaginal Fistula-A Comparative Study between Transabdominal and Transvaginal Route

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Abstract **Original Research Article**

Background: The management of VVF involves a multi-modal technique. Surgical repair remains the treatment of choice for VVF. The repair could be undertaken through the transabdominal or transvaginal route. Although the vaginal route was the commonest route employed in the repair of VVF, it is clearly associated with post-operative incontinence, high recurrence and low success rate. ***Objectives:*** To compare the outcomes of surgical repair of vesicovaginal fistula between transabdominal and transvaginal Route. ***Methods:*** This prospective comparative study intended to compare the outcomes between surgical repair of vesicovaginal fistula- between transabdominal and transvaginal route. A total of 50 cases of VVF patient planned for surgical repair of VVF in Dhaka Medical College Hospital from April 2017 to September 2018, included in this study according to the inclusion and exclusion criteria. Cases were randomly allocated to group A (Transabdominal repair of VVF) and group B (Transvaginal repair of VVF). Each group consisted of 25 patients. The outcome variables were success rate of operation, post-operative complication, post-operative pain, post-operative hospital stay and recurrence. Data were analyzed and compared by statistical tests. ***Results:*** No significant differences were found regarding age (p=0.3921), etiology (p=1.000), fistula number (p=0.4174), haematuria (p=0.667), vaginal bleeding (p=1.000), wound infection (p=0.4174) and hospital stay (p=0.4828) between two groups. Post-operative incontinence (p<0.0448) was less in group A than group B cases. Success rate is higher in group A in comparison to group B (p<0.0223). ***Conclusions:*** Trans-abdominal route is better than trans-vaginal route in VVF repair. It significantly reduces post-operative incontinence and recurrence of VVF. Success rate is also high in trans-abdominal route than trans-vaginal route. So, VVF repair by trans-abdominal route is safe and effective.

Keywords: Vesicovaginal Fistula, VVF repair, Multi-modal technique, Transabdominal and transvaginal Route.

INTRODUCTION

Vesicovaginal fistula or VVF, is an abnormal fistulous tract extending between the bladder (vesica) and the vagina that allows the continuous involuntary discharge of urine into the vaginal vault [1, 2]. In addition to the medical sequelae from these fistulas, they often have a profound effect on the patient's emotional wellbeing [2, 3]. Eighty to ninety percent vesicovaginal fistulas result from obstetric injury [4]. The best known and most common of these injuries are from obstructed labor which is about 80%. When obstructed labor is unrelieved, the presenting fetal part is impacted in the pelvis which compresses soft tissue between the fetal head and pubic bone. As a result, widespread ischemic vascular injury develops in the

bladder and vaginal wall result in tissue necrosis and subsequent vesicovaginal fistula formation [5]. The pattern of problems subsequent from obstructed labor is not limited to VVF. It has been termed the "obstructed labor injury complex" and includes varying degrees of each of the following: renal failure, rectovaginal fistula, cervical destruction rectal atresia, urethral loss, vaginal stenosis, osteitis pubis, stress incontinence, hydroureteronephrosis, anal sphincter incompetence, amenorrhea, pelvic inflammatory disease, secondary infertility, and foot drop. Other causes of VVF are Caesarean section, Hysterectomy, urological and gastrointestinal surgery, criminal abortion, female genital mutilation, vulvo-vaginal trauma [6]. In the setting of hysterectomy, surgical injury to the lower urinary tract most commonly occurs. The frequency of iatrogenic bladder injury during abdominal hysterectomy is estimated to be between 0.5% and 1.0%. The prevalence of fistula after hysterectomy is estimated to be approximately 0.1% to 0.2% [7]. Post-hysterectomy VVF is thought to result most commonly from an incidental unrecognized iatrogenic urinary bladder injury near the vaginal cuff. Other prospective mechanisms for post-hysterectomy VVF include tissue necrosis from cautery. During closure of the vaginal cuff, or an attempt to control pelvic bleeding by suture ligature, a suture placed through both the bladder and vaginal wall [7]. The effects of uncontrolled passage of urine are devastating to the sufferer. Women not only find themselves having to manage a constantly wet body but also face social rejection. The magnitude of the problem worldwide is not fully known but it is estimated to be more than 2 million with 50,000 to 100,000 new cases every year [8]. The first successful management of VVF was achieved by John Fatio in 1675, while Sims, the father of surgery, performed VVF repair successfully in 1849 with silver wire sutures. The management of VVF remains controversial as regard to time and surgical approach [9, 10]. Repair of genitourinary fistula remains a major challenge to surgeons worldwide with many acceptable surgical techniques. Treatment options include repair by the vaginal or abdominal route, electrocautery, fibrin glue, electrocautery and endoscopic approach, laparoscopic repair, interposition grafts or flaps [11]. Surgical repair has success rates of up to 95% while open surgical repa [13, 14]. There are few studies on factors affecting outcome of surgical repair. The current study reviews factors influencing surgical repair. The results of this study would generate useful baseline database which would help the surgeons to manage these fistulae and their related complications properly.

OBJECTIVES

General Objective

The general objective of the study was to evaluate the outcomes of the transabdominal route in comparison to the transvaginal route in VVF repair.

Specific Objectives:

- To compare postoperative pain of the open transabdominal and transvaginal repair of vesicovaginal fistula.
- To compare postoperative complications or transabdominal and transvaginal repair of vesicovaginal fistula.
- To compare hospitalization time after transabdominal and transvaginal repair of vesicovaginal fistula.
- To compare of post-operative incontinence after transabdominal and transvaginal repair of vesico vaginal fistula.

METHODOLOGY

This study was a Quasi experimental study by using purposive sampling method, conducted from April 2017 to September 2018. Patients with vesicovaginal fistula resulting from obstetric cause and post-surgical cause who were admitted and underwent surgical treatment in Dhaka Medical College Hospital (DMCH) Dhaka, Bangladesh. Sample size was 50, 25 in each group.

Inclusion criteria:

- Patients with obstetric VVF
- Post-surgical VVF
- Preoperative negative urine culture
- Patients of age 16 years and above who willingly give informed consent to take part in this study

Exclusion criteria

- VVFs as a complication of malignant diseases.
- VVFs as a complication of radiotherapy.
- All genitourinary fistulae other than VVF like vesicouterine, vesicocolic, vesicocutaneous, or ureterovaginal.
- Critically ill & mental retard patient

Study procedure

This study was carried out among the patients with VVF in Department of Urology and VVF center, Dhaka Medical College Hospital, Dhaka, during the period of April 2017 to September 2018. Cases were enrolled by purposive sampling according to the inclusion and exclusion criteria. All VVF patient according to inclusion criteria a decision for surgical repair via transabdominal or transvaginal route had taken, the whole procedure of present study explained to each patient and then asked for consent. Those patients who gave consent considered as case of the present study and those who had not given consent excluded from the study. By this way 50 patients selected as cases. All admitted odd numbered cases allocated for Group - A (transabdominal approach) and the even numbered cases allocated for Group - B (transvaginal approach). The first admitted patient

allocated to Group - A (transabdominal) and the next patient allocated to Group - B (transvaginal). For any preoperative complication, cases excluded from the study and the same allocation replaced by the successive consecutive cases.

Statistical analysis of data

All the collected data were compiled and percentages calculated to find out proportion of the findings. Further statistical analyses of the results obtained by using Microsoft Xcel, 2010 and SPSS version 20.0. Quantitative data expressed as mean and standard deviation and comparison had done by student "t" test. Qualitative data will be expressed as frequency and percentage and comparisons carried by Fisher's exact test. A probability value (p) of less than 0.05 considered to indicate statistical significance. The summarized findings presented in form of tables and graphs.

Ethical considerations

This study approved by the Ethical Review Committee, Dhaka Medical College, Dhaka**.** It was assured that all information and records would be kept confidential and the procedure would be helpful for both attending surgeon and patients in making decision.

RESULTS

The study was intended to compare the outcome between transabdominal and transvaginal route in VVF repair. A total of 50 cases of vesico vaginal fistula that were planned for operation according to the inclusion and exclusion criteria. Cases were allocated to group A (transabdominal) and group B (transvaginal). The outcome variables were post-operative pain, Haematuria, vaginal bleeding, wound infection, postoperative incontinence after removal of catheter, post-operative hospital stay and success of operation. The findings derived from data analysis were presented below.

Table I: Distribution of patients according to age between two groups pie, (N=50)

Age	Group		p value
	Group A (Transabdominal route) (n=25)	Group B (Transvaginal route) (n=25)	
Mean ± SD	32.08±9.78	34.88±12.93	0.3921

Table I showed the mean age of group A was 32.08 (±9.78) years and that of group B was 34.88 (±12.93) years. The age differences between two groups were not statistically significant. (p = 0.3921).

Table II: Comparison of fistula number between two groups, (N=50)

Fistula number	Group		p value
	Group A (Transabdominal route) (n=25)	Group B (Transvaginal route) (n=25)	
Present	5	2	0.4174
Absent	20	23	

Table II showed the, in group-A 5 patient present with multiple fistula and 20 patient present with single fistula. In Group-B 2 patient present with multiple fistula and 23 patient present with single fistula. There was no significant difference of fistula number in between two groups (p =0.4174).

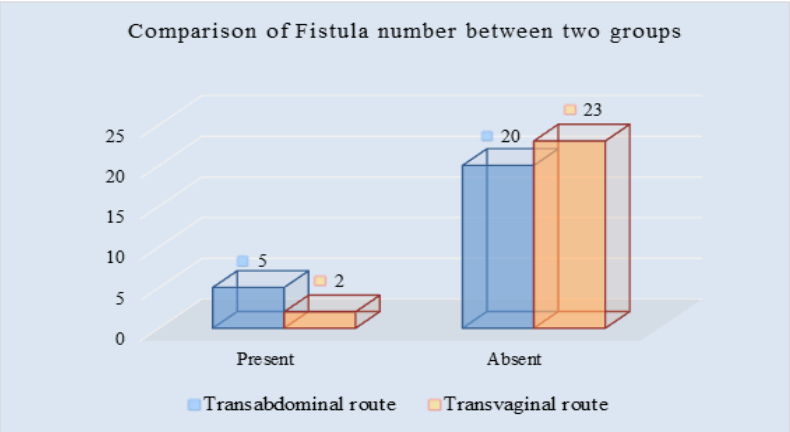


Figure 1: Bar chart showed group wise comparison of fistula number (N=50)

Table III: Comparison of postoperative pain between two groups, (N=50)

Post-operative pain Visual Analog Scale (mm)	Group		p value
	Group A (Transabdominal route) (n=25)	Group B (Transvaginal route) (n=25)	
Mean ±SD	6.36±1.11	6.36±0.76	1.000

Table III showed the, post-operative pain was compared by Visual Analog Scale (VAS). The mean pain intensity of group A was 6.36±1.11 and that of group B was 6.36±0.76. There was no significant difference of pain intensity in between two groups (p =1.000).

Table IV: Comparison of postoperative haematuria between two groups. (N=50)

Haematuria	Group		p value
	Group A (Transabdominal route) (n=25)	Group B (Transvaginal route) (n=25)	
Present	4	2	0.667
Absent	21	23	

Table IV showed the, in group-A 4 patient developed post-operative Haematuria and Group-B 2 patient developed post-operative Haematuria. Other patients (44) of both groups not developed Haematuria. The difference of post-operative haematuria between two groups was not statistically significant (p <0.667).

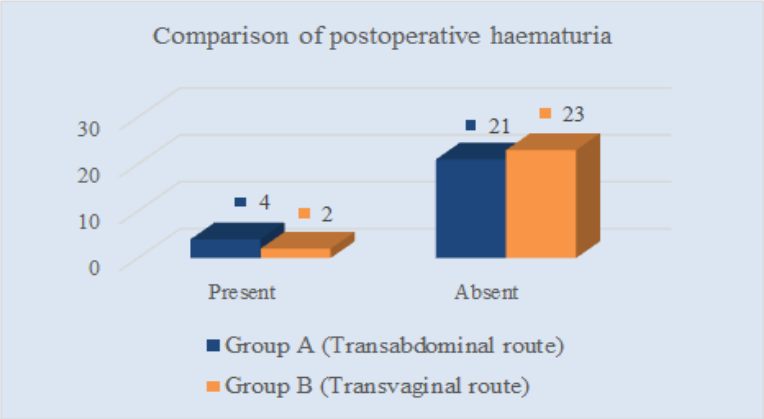


Figure 2: Bar chart showed group wise comparison of postoperative haematuria, (N=50)

Table V: Comparison of postoperative vaginal bleeding between two groups, (N=50)

Post-operative vaginal bleeding	Group		p value
	Group A (Transabdominal route) (n=25)	Group B (Transvaginal route) (n=25)	
Present	2	3	1.00
Absent	23	22	

Table V showed the, in group-A 2 patient developed vaginal bleeding and Group-B 3 patient developed vaginal bleeding. The postoperative vaginal bleeding in transabdominal was almost similar with transvaginal group (p =1.000).

Table VI: Comparison of wound infection between two groups, (N=50)

Wound infection	Group		p value
	Group A (Transabdominal route) (n=25)	Group B (Transvaginal route) (n=25)	
Present	5	2	0.4174
Absent	20	23	

Table VI showed the, transabdominal group 5 patient developed wound infection and in transvaginal group 2 patient developed wound infection. Wound infection in transabdominal and transvaginal was not statically not significant (p =0.4174).

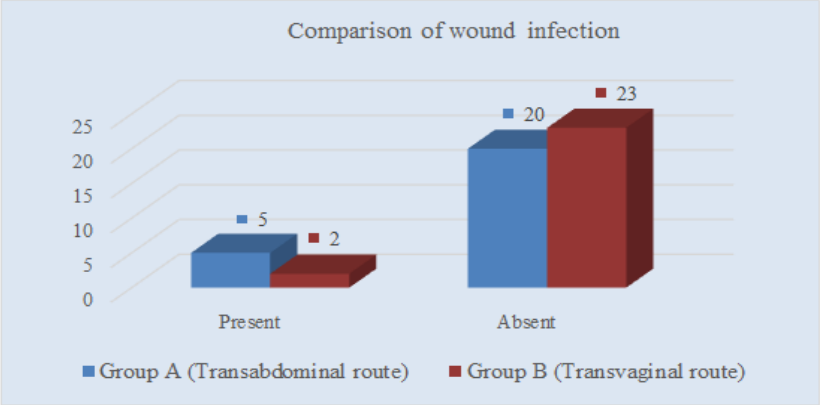


Figure 3: Bar chart showed group wise comparison of wound infection, (N=50)

Table VII: Comparison of postoperative hospital stay between two groups, (N=50)

Postoperative hospital stay (day)	Group		p value
	Group A (Transabdominal route) (n=25)	Group B (Transvaginal route) (n=25)	
Mean ± SD	9.04±2.26	7.48±3.25	0.4828

Table VII showed, the mean duration of post-operative hospital stay in group A was 9.04±2.26 days and in group B was 7.48±3.25 days. The postoperative hospital stay in Transabdominal group was almost similar to transvaginal group (p <0.4828).

Table VIII: Comparison of incontinence after catheter removal between two groups, (N=50)

Incontinence after catheter removal	Group		p value
	Group A (Transabdominal route) (n=25)	Group B (Transvaginal route) (n=25)	
Present	1	7	0.0448
Absent	24	18	

Table VIII showed the, incontinence after catheter removal in group A was in 1 patient and in group B was 7 patients. Incontinence after catheter removal is less in group-A (Transabdominal route) than group B (Transvaginal group) which is statistically significant, (p <0.0448).

Table IX: Comparison of success rate of operation between two groups, (N=50)

Success of operation	Group		p value
	Group A (Transabdominal route) (n=25)	Group B (Transvaginal route) (n=25)	
Present	25	19	0.0223
Absent	0	6	

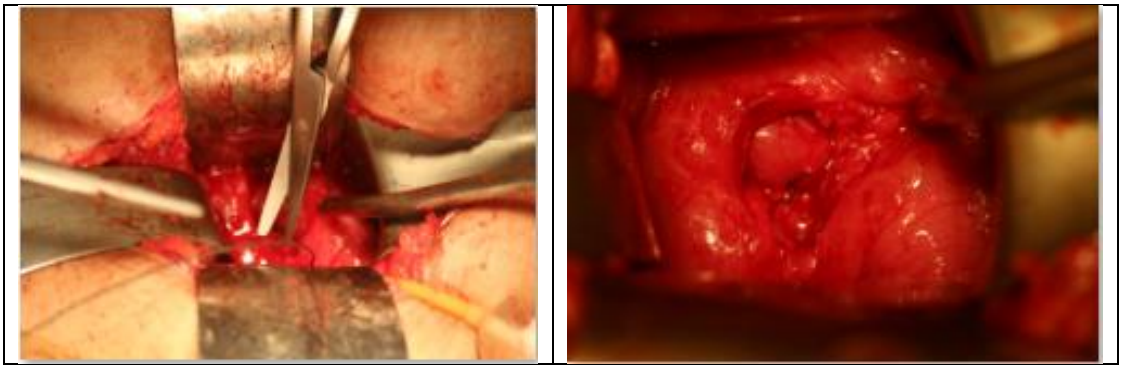
Table IX showed the, success rate in group A is 25(100%) and group B is 19(76 %). So, success rate is higher in group-A than group B which is statically significant (p <0.0223).

OPERATIVE PROCEDURE

Transabdominal Repair:

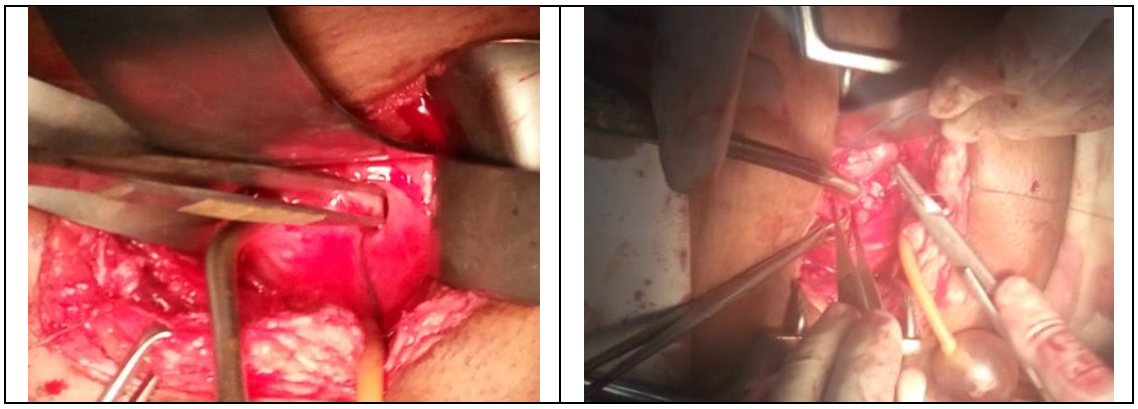
Transvesical extraperitoneal method of vesicovaginal repair was employed. The patients operated on in the supine position under spinal anesthesia. Access to the bladder achieved through an infra-umbilical incision, and the bladder incised to

expose the fistulous orifice. A guide wire introduces through fistula tract.

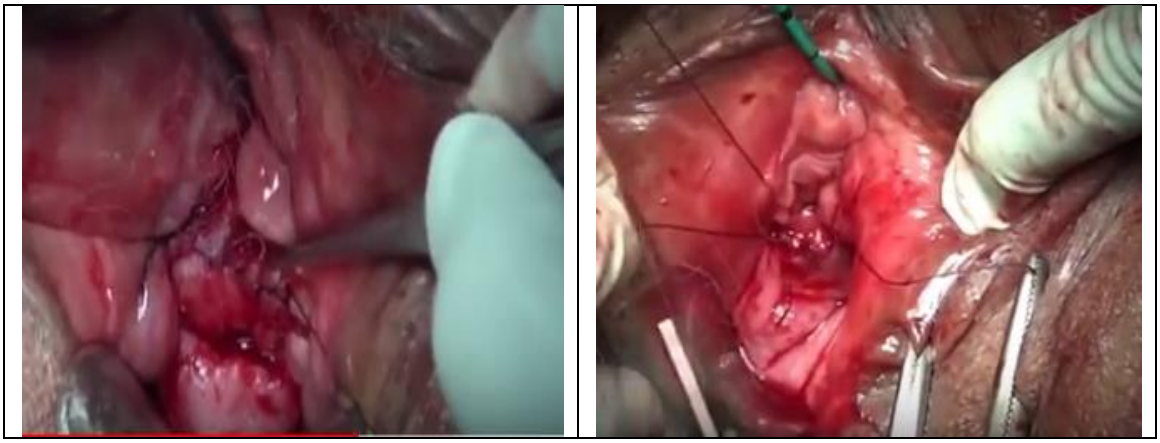


Photograph 1: Dissection of UB wall from vaginal wall and repair of vaginal wall

Photograph 1 Showed The fistulous orifice was carefully dissected from surrounding structure. Adding stay sutures to each side of the fistula. Then the fistula track was fully excise. First, we closed the anterior vaginal wall with Vicryl 2-0. The bladder wall closed in two layers: the mucosa and muscle layers will be closed with 2-0 and 4-0 Vicryl sutures, respectively. Before closure, a 14F Foley will be replaced as the suprapubic catheter and a 16F Foley used as a urethral catheter. We inserted a povidone-iodine soaked sponge in the vagina and removed it on the following day. We removed the cystostomy on the 14th postoperative day and discharged the patient after the drainage will stop from the cystostomy tract and called the patients back to by the 21th postoperative day to remove the urethral catheter. We stopped the anticholinergics one day prior to the catheter removal.



Photograph 2: Access to fistula by a sagittal incision in UB (Lt) and repair of UB (Rt.)



Photograph 3: Repair of UB wall and repair of vaginal wall

Photograph 3 Showed Hence 25 patients treated by transabdominal approach in group A and rest 25 patients treated by transvaginal approach in group B.

DISCUSSION

Surgical repair is the only definitive treatment of VVF with a success rate as high as 85% to 95% with first surgical repair [12]. Though transvaginal approach is effective, abdominal approach should be adopted as a primary method of VVF repair because of its higher success rate as compared to vaginal route. The present study has been designed to compare the outcome of repair of VVF in transabdominal and transvaginal route. Cases were selected by inclusion and exclusion criteria. Patients with VVF planned for operation were divided into 2 group. Patients belonging group A were operated by transabdominal route and patients belonging group B were operated by transvaginal route. Results of treatment of both groups were compiled and analyzed. Age, etiology, fistula number, post-operative pain, Haematuria, vaginal bleeding, wound infection, hospital stay, incontinence after catheter removal, and success rate were compared between two groups. Age range of the patients in this study was between 18 years and 60 years. The mean age of the patients of group A and group B were 32.08±9.78 years and 34.88±12.93 years respectively. Study done by Abdullah Gedik et al., (2015) on Vesicovaginal Fistulas Repair where the age range more or less comparable with the present study. [13] In this study in group A, 16(64%) patient was having iatrogenic fistula. Out of this 12(48%) had transabdominal hysterectomy and 4(16%) had caesarean section. Other 9(36%) patient developed VVF due to obstructed labor. In group B 16(64%) patient developed due to iatrogenic cause, out of them 40% due to trans abdominal hysterectomy and other 24% due to caesarean section. 36% patient developed VVF due to obstructed labor. The causative factors are performance of hysterectomies in periphery by non-qualified persons, leading to increased number of post hysterectomy VVF patients. A study done by Sheikh Rehman et al., (2011) on repair of vesicovaginal fistula where etiology more or less comparable with this study. [14] Another study done by A Javed, (2015) also comparable to this study. In group A 5 patient present with multiple fistula and 20 patient present with single fistula [15]. In group B 2 patient present with multiple fistula and 23 patient present with single fistula. There was no significant difference of fistula number in between two group (p=0.2214). A Study by Bassem S. Wadie and Mohamed M. Kamal (2011) showed there was no significant difference of fistula number in transabdominal and transvaginal repair. [16] (p =0.77). The mean pain intensity of group A was 6.36±1.11 and that of group B was 6.36±0.76. There was no significant difference of pain intensity in between two group (p=1.000) In group A 4 patient developed post-operative Haematuria and group B 2 patient developed post-operative Haematuria. Other 46 patients of both groups not developed Haematuria. The difference of post-operative haematuria between two groups was not statistically significant (p=0.667). Study done by Abdullah Gedik *et al*., (2015) on which surgical technique should be preferred to repair benign, primary vesicovaginal fistulas shows similar result (p=1.000) to this study [13]. In our study in group A 2 patient developed vaginal bleeding and group B 3 patient developed vaginal bleeding. The postoperative vaginal bleeding in transabdominal was almost similar with transvaginal group (p =1.000. The mean duration of post-operative hospital stay in group A was 9.04±2.26 days and in group B was 7.48±3.25 days. The postoperative hospital stay in Tranabdominal group was almost similar to transvaginal group (p<0.4828). Study done by Abdullah Gedik *et al*., (2015) on which surgical technique should be preferred to repair benign, primary vesicovaginal fistulas shows mean hospital stay in transabdominal group 4.89±2.46 and transvaginal group is 1.12± 0.43 [13]. The hospital stays of both group is prolonging in both group in this study. Due to patient came from remote area and proper post-operative management the post-operative hospital stay is prolong in this study. Incontinence after catheter removal in group A was in 1 patient and in group B was 7 patients. Incontinence after catheter removal is less in group A (Transabdominal route) than group B (Transvaginal group) (p<0.0416). A study done by Homaira and Khatun, (2011) in different surgical methods used for repair of vesicovaginal fistulas in Dhaka Medical College Hospital showed 10% patient developed incontinence after VVF repair by transvaginal route [17]. Another study by Kelly J. 1992 showed incontinence 9.1% after VVF repair [18]. These studies are almost similar to our study. The success rate in group A is 25(100%) and group B is 19(76%). So, success rate is higher in group-A than group B which is statically significant (p<0.0223). Study by Bassem S. Wadie and Mohamed M. Kamal, (2011) 91% (49 out of 54) transabdominal repair where 70% (14 out of 20) transvaginal repair [16]. Which is more or less comparable with the present study. Another study by Rana Muhammad Mubeen *et al*., (2007), 24(100%) success in transabdominal repair of VVF and 80% (4 out of 5) success in transvaginal repair of VVF [19]. This is also similar to the present study.

LIMITATIONS OF THE STUDY

This was a single center study with relative small sample size. Heterogeneity of surgeon. As well as short follow up time.

RECOMMENDATIONS

According to the findings of the present study it can be said that VVF repair by trans-abdominal route can be practiced in the management of obstetric, post-surgical and recurrent VVF.

CONCLUSIONS

The most common cause of vesicovaginal fistulae in this study was iatrogenic (64%) as a result of intraoperative injury during hysterectomy or Caesarean section. The transabdominal approach using omental flap interposition is more effective for the treatment of fistula; the transvaginal approach is also effective. But the abdominal approach should be adopted as a primary method of VVF repair because of its higher success rate as compared to vaginal route. Surgeons involved in fistula repair should be skilled in both abdominal and vaginal approaches. Despite the good results of surgical repair, attempt should be focused on the prevention of VVF.

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