

# Will Modified O'Connor Technique Suffice for All Types of Vesicovaginal Fistula?: Postobstetric and Gynecological Procedure

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## ABSTRACT

**Aim:** Aim of our study is to demonstrate that modified O'Connor's technique is possible and feasible for all types of postobstetric and gynecological procedures vesicovaginal fistula (VVF).

**Materials and methods:** The study of 38 patients includes 34 primary and four recurrent (operated primarily elsewhere) type of VVF treated by modified O'Connor technique with omental flap interposition between January 2009 to June 2016 by a single surgeon. Patients were followed postoperatively at 3 weeks, 3 months for 6 months and later depending on symptoms.

**Results:** Common age group in our study between 30 years and 40 years (50%). Twenty-eight patients had simple fistula while 10 had a complex fistula. Fistula size ranges from 5 mm to 4 cm with the most common size ranges between 1 cm and 3 cm (28 patients). Thirty-three patients had a single fistula and 5 had two fistulae includes one patient of asymptomatic vesicoperitoneal fistula. The most common cause of fistula was posthysterectomy, for benign diseases (25 cases). the most common site was supratrigonal (28 cases) and in 10 cases involving either trigone or infratrigonal area. All patients were dry following catheter removal. The success rate of the technique was 100%. There was no perioperative complication except one patient had mild stress urinary incontinence (SUI), one had recurrent urinary tract infection and three had storage lower urinary tract symptoms (LUTS).

**Conclusion:** Modified O'Connor repair is safe and gives excellent functional results in postobstetrics and gynecological procedures related to VVF. Selection of technique should depend on experience and preference of surgeon which gives maximum success rate.

**Keywords:** Obstetric fistula, O'Connor repair, Omental flap, Posthysterectomy fistula, Vesicoperitoneal fistula, Vesicovaginal fistula.

**Summary:** Is one approach sufficient for all types of VVF following postobstetric and gynecological cause?

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## INTRODUCTION

Patients with surgical complication are commonly distraught, as a routine procedure has resulted in a problem that is worse than the original problem as happens in cases of VVF.<sup>1</sup> The true incidence of VVF is unknown, but it has been reported to be 0.3–2%.<sup>2</sup> Though obstetrical fistula is not uncommon in third world countries, there is an increasing trend of postsurgical fistulas in recent years. VVF repair is traditionally accomplished with a procedure using vaginal, abdominal or combined approach.<sup>3</sup> The O'Connor technique is generally considered the gold standard for transabdominal VVF repair.<sup>4</sup> We present a series of patients with various types of VVF to demonstrate that it is possible to repair all types of fistulae with excellent results using modified O'Connor technique.

## MATERIALS AND METHODS

Between 2009 to 2016, 38 consecutive females with various types of VVF were managed with modified O'Connor technique by a single surgeon. Primary VVF repair was defined as cases that did not have any prior attempts of open or endoscopic management. All patients presented with a passage of urine vaginally. VVF is classified as simple and complicated. Complicated fistulae are fistulae size greater than 3 cm, those recurring after prior attempts of closure, associated with the history of radiation or with malignancy, and those involving trigone, bladder neck and/or urethra. Postradiation and malignant VVF were excluded from the study. The interval between the onset of leakage and definitive surgery ranges between 3 months to 12 years.

All patients had a preoperative evaluation by detail history and clinical examination, basic biochemical tests to assess the renal function, complete blood count, urine microscopy, ultrasound abdomen and pelvis and voiding cystography (VCUG). Intravenous pyelography (IVP) or

contrast-enhanced computed tomography (CECT) with reconstruction was done to rule out ureterovaginal fistula (UVF) (Fig. 1). Cystoscopy was done in all cases to note the size, site, number of fistulae and their proximity to the ureteric orifice. The vaginal assessment was done to inspect and palpate the vaginal opening of fistulae.

**Ethical Review Board**

This is a retrospective analysis of various types of VVF treated by a single approach, and at the time of surgery, consent was taken from every patient regarding the use of data and clinical photographs for academic purpose and publications.

**Surgical Technique**

All VVF were operated after a minimum period of 3 months from the occurrence of fistula under general anesthesia by modified O’ Connor transabdominal repair using omentum. On cystoscopy, If fistula was very close to the ureteric orifice, unilateral or bilateral ureteric catheter or double J stent was placed (Fig. 2). The guide wire or ureteric catheter was placed across the fistula. Peritoneal cavity accessed through infraumbilical midline or Pfannenstiel incision with excision of the previous operative scar. Limited cystotomy was done along the sagittal plane (anterior wall not opened). As dissection progresses towards fistula, stay sutures were taken along the edges of cystotomy at mirror images location which helps in lifting the posterior wall and in hemostasis too. The bladder was separated from the vagina by sharp dissection at least 1 cm distal to the fistula site with care to maintain good viability of both vaginal and vesical layer (Fig. 3). The fistula tract is not excised in any of the cases. Vaginal closure done with Vicryl 2-0 in a continuous interlocking fashion. Live omental patch is interposed between the anterior vaginal and bladder wall and anchored to the anterior wall of the vagina (Fig. 4). Bladder closed in a single layer with Vicryl 3-0 in continuous interlocking fashion after placement of suprapubic cystostomy (SPC) and perurethral catheter for drainage. SPC retroperitonealized and abdomen closed in layer after placement of a pelvic drain.

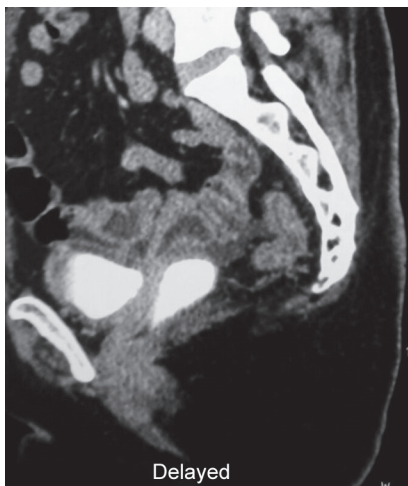


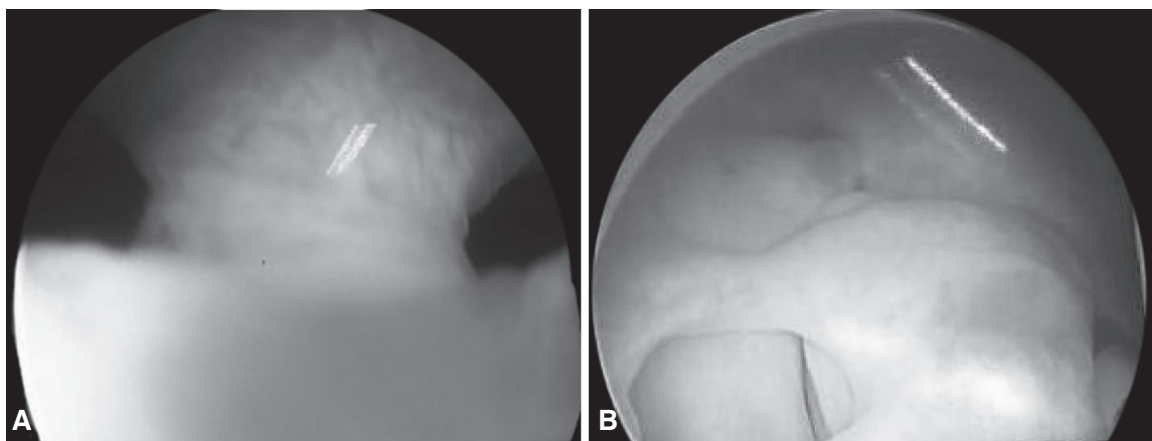
Fig. 1: CT image showing contrast in vagina

Parenteral antibiotics were given for 7 days followed by oral antibiotics till catheter removal. The antimuscarinic agent was given until catheter removal in all cases. Perurethralfoley’s catheter was removed after two weeks. At 3 weeks cystogram was done to assess the leak (Fig. 5), and if no leak found then SPC was removed. All patients were discharged on the 7th postoperative day.

The patients were followed up at 3 weeks, 3 monthly twice and then depending on symptoms postoperatively with special attention to any complaints regarding voiding and continence. The patients were advised 3-month sexual abstinence and void with frequent interval to prevent overdistension of the bladder. Patients desiring future pregnancy were advised strict antenatal follow-up.

**RESULTS**

Age of 38 patients suffering from VVF ranges from 28 to 60 years and the common age group is between 30



Figs 2A and B: Cystoscopic images showing two large fistulae

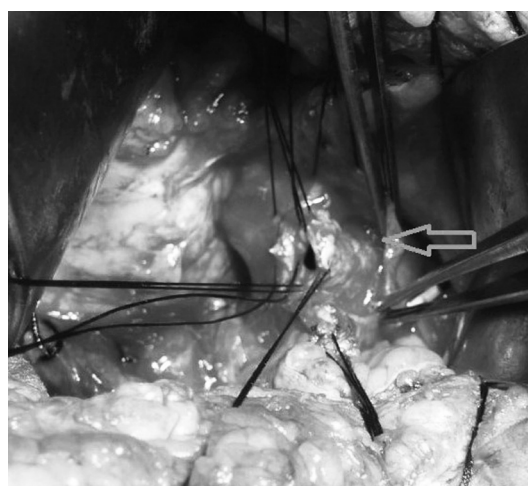


Fig. 3: Image showing dissection 1 cm distal to fistula

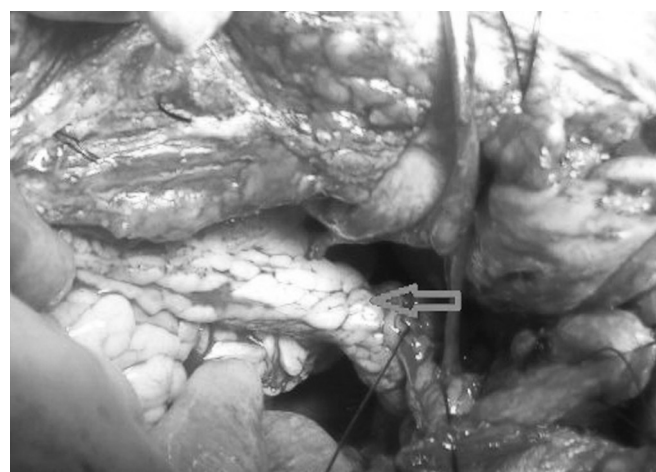


Fig. 4: Omental pedicle interposition graft

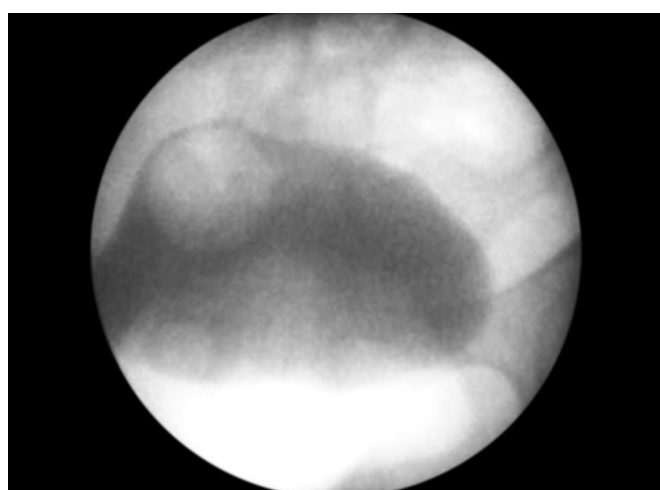


Fig. 5: Follow-up MCUG showing no leak into vagina

years and 40 years (50%). Twenty-eight cases (73.68 %) had simple fistulae and 10 (26.32 %) were suffering from complex fistula (Table 1).

Thirty-four patients (89.5%) had primary fistulae, and 4 (10.5%) had recurrent VVF operated outside includes 2 postvaginal repairs, 1 post abdominal, and 1 post-endoscopic fulguration.

Twenty-five cases (65.78%) were posthysterectomy for benign diseases includes 20 abdominal, three vaginal and 2 cases postlaparoscopic hysterectomy. Ten cases (26.31%)

were postlower segment cesarean section (LSCS) and 3 (7.8%) due to obstructed labor (Table 2).

Twenty-eight cases (73.68%) had fistulae of size ranging between 1–3 cm, 7 cases (18.42%) had fistulae of size less than 1 cm and 3 (7.8%) had more than 3 cm sized fistula. Thirty-three patients (86.84%) had a single fistula and five (13.15%) had more than 1 fistula which includes 4 patients having VVF, and 1 patient had VVF associated with asymptomatic vesicoperitoneal fistula which was located supratrigonally near the dome.

Twenty-eight patients (73.68%) had supratrigonal fistulae, five patients (13.16%) had mixed, four patients (10.52%) had trigonal fistula and 1 patient (2.63%) had infratrigonal fistula. Six patients had fistulous opening close to ureteric orifice needed double J (DJ) stenting which includes three unilateral and three bilateral. DJ stent was removed after 6 weeks (Table 3).

No patient required intra- or postoperative blood transfusion due to insignificant blood loss. Average operative time was between 70 minutes and 120 minutes. No patients had intra- or postoperative major complications. All patients were dry after removal of SPC except one had mild stress urinary incontinence (SUI), one had recurrent urinary tract infection (UTI), and three patients

Table 1: Characteristics of VVF

Variables		No.	Percentage
Type	Primary	34	89.47
	Recurrent	04	10.53
Nature	Simple	28	73.68
	Complex	10	26.32
No. of fistula	01	33	86.84
	02	05	13.16
Size of fistula	<1 cm	07	18.42
	1–3 cm	28	73.68
	>3 cm	03	7.89

Table 2: Location and etiology of VVF

Variables	No.	Percentage	
Location	Supratrigonal	28	73.68
	Mixed	05	13.16
	Trigonal	04	10.53
	Infratrigonal	01	2.63
Etiology	Posthysterectomy	25	65.78
	Abdominal <sup>20</sup>		
	Vaginal <sup>3</sup>		
	Laparoscopy <sup>2</sup>		
	Post-LSCS	10	26.31
Obstructed labor	03	7.89	



**Table 3:** Outcome of repair

Variables		No.	Percentage
Recurrent fistula–primary repair	Postabdominal repair	01	10.53
	Postvaginal repair	02	
	Postfulgration	01	
Complication	SUI	01	13.15
	Storage symptoms	03	
	Recurrent UTI	01	
DJ stent placement	Unilateral	03	15.78
	Bilateral	03	

had storage LUTS which was resolved with conservative management. The overall complication rate was 13.15%.

After a minimum follow-up of 6 months and a maximum follow-up of 6 years, all patients were asymptomatic. The success rate of transabdominal O'Connor VVF repair with omental interposition for primary and recurrent VVF is 100% irrespective of size and site of the fistulae.

## DISCUSSION

Vesicovaginal fistula is a distressing disease with social, hygienic, urological and psychosocial consequences. It may not be life-threatening, but women may face social boycott, divorce or separation.<sup>5,6</sup> The goal of treatment of VVF repair is a rapid cessation of urine leakage with the return of normal and complete urinary and genital function.<sup>7</sup> When planning VVF repair, it is important to evaluate the local condition,<sup>8</sup> and surgery should be postponed until the problems like acute inflammation, edema and necrosis are resolved.<sup>9</sup> Diagnosis is evident as the main complaint is passing urine per vaginally and confirmed by VCUG, CT IVP, 3 pad test, cystoscopy and vaginoscopy as needed.<sup>1,4,9,10</sup> Voiding cystourethrogram will confirm the diagnosis but may not give detail anatomical relationship so a delayed phase CT scan will show associated UVF and will suggest the relationship of the ureter to pelvic organ and fistula.<sup>1</sup> Cystoscopy may be helpful to pass ureteric catheter or guide wire through suspected small fistula to determine if it enters into the vagina.<sup>9</sup>

Fistula is classified in various types like simple or complicated or as per site as supratrighonal, trighonal, mixed or infratrighonal.<sup>9</sup> In the study of Alam et al. of 32 cases of VVF, 61.5% were simple and 38.5% patients had a complex fistula.<sup>11</sup> In Rajamahswari study of 132 cases of urinary fistula, 54% were simple and supratrighonal.<sup>12</sup> In our study, the incidence of simple and supratrighonal fistulae were 73.68% and the complex was 26.32% which was in correlation with the above-mentioned studies. Majority of supratrighonal VVF was seen following abdominal hysterectomy for benign pathology as in these cases dissection is essentially confined to supratrighonal region of the bladder during a hysterectomy.<sup>12</sup>

Four patients (10.52%) in our study had one primary intervention elsewhere, after reviewing records, we assume that probable cause of failure was not using interposing layer in any of these cases and one case, the repair was done within 2 weeks of diagnosis. Multiple fistulae, size >1 cm, complex fistula, UTI, obstetric etiology constitute a risk factor for recurrence.<sup>9,13</sup> Wadie in the analysis of 50 cases found 19% (15 cases) patients had a previous history of failed VVF repair elsewhere and out of 15 cases 11 had one prior repair.<sup>14</sup>

In our study, 28 cases had a size between 1–3 cm, which is comparable to other reported series. In a study of Dalela of 26 cases, fistula size ranges from 1 to 3.7 cm.<sup>6</sup> Wadie analyzed data from 80 patients of VVF and found 9 cases had multiple openings on pan-endoscopy.<sup>14</sup> In our study, 5 patients had more than 1 fistula which includes one case of asymptomatic vesicoperitoneal fistula at dome along with VVF of size >3 cm at trigone. Belgian review of 3190 laparoscopic hysterectomies revealed only one case of VPF.<sup>15</sup> VPF is an extremely rare condition and occurs as an early complication of obstetric or gynecological intervention.<sup>16</sup> In our case, on cystoscopy large VVF was evident along with small opening at the right side of the dome through which guide wire went straight superiorly. Intraoperatively we confirmed its communication between peritoneum to the bladder. This patient had a history of laparoscopic hysterectomy for uterine fibroid 3 months before.

Though obstetrical fistula is not uncommon in third world countries, there is an increasing trend of post-surgical fistula in recent years. With the development of medical sciences, there has been a shift in the etiology from obstetric to gynecological causes.<sup>5,8,17</sup>

In our study, 65.78% (25 cases) patients had a prior hysterectomy for a benign disease which was abdominal in 20 cases, vaginal in three and laparoscopic in two cases. Ten cases of VVF were post-LSCS and three had a history of obstructed labor. So the majority of cases were post-hysterectomy for benign disease. In modern urological practice, 90% of cases are caused by inadvertent injury to the bladder during surgery with the gynecological procedure being the most common culprit.<sup>2</sup> Hadzi-Djokic study of 38 patients of VVF, hysterectomy for benign diseases was leading cause in 60.5%.<sup>18</sup>

The most controversial aspect of VVF repair is the timing of repair and surgical approach. Some authors prefer delayed closure while other states that early closure is safe.<sup>19</sup> But the classical strategy is delayed repair performed after 3–6 months to allow resolution of any inflammation and edema.<sup>9,20</sup> With 3 months of the waiting period, excellent results have been reported by several surgeons with a success rate of 84 to 100%.<sup>4</sup> In our study, all cases repaired after a waiting period of 3 months.

In contemporary series from Nigeria, they recommended that repair should be done within 72 hours when fistula was identified during the immediate perioperative period or at 3 months but not in between.<sup>4</sup>

VVF repair can be approached transvaginally, abdominally or combined if necessary. Recently repair can be done by laparoscopic or robot-assisted laparoscopy. However, there is no preferred approach for fistula repair.<sup>2</sup> Selection of vaginal or abdominal approach depends on several factors such as surgeon's experience, fistula size, location, ureteral involvement, local vaginal condition and available tissue for interposition.<sup>8</sup> Traditionally gynecologists adopted a vaginal approach and urologists preferred abdominal approach for fistula repair.<sup>2,12</sup> For small fistula, all attempts to fulgurate the area is advisable with reported success rate 7–12.5%. In patients with a thin vesicovaginal septum, large VVF or those with significant inflammation around tract, fulguration risks failure and the possibility of enlargement of fistula.<sup>9,20</sup> In our study, one case had a history of failed electrofulguration done elsewhere.

Principles of VVF repair are adequate exposure, tension-free repair, a watertight approximation of fistula edges, nonoverlapping suture lines, the interposition of vascularized tissue, good hemostasis, adequate postoperative drainage and freedom from infection.<sup>1</sup> Transperitoneal approach offers an opportunity for wide exploration and the use of peritoneal omental graft in the majority of fistula. However, vaginal approach achieves success rate comparable to abdominal approach, but it can be associated with vaginal shortening and formation of dead space where infection or inflammation may develop.<sup>9</sup> Recently modification of O'Connor technique has been described that employ a small cystotomy and rotation flap.<sup>4</sup> In our study transabdominal modified O'Connor repair was done in all type of VVF with 100% success rate irrespective of vaginal condition, size, rate and number of fistula. We preferred the transabdominal approach for all VVF repair considering our inadequate experience of repair by vaginal route.

The first operation has the highest success rate in the repair of VVF. The selected route of repair depends mostly on the training and experience of the surgeon, and the best approach is one in which the surgeon is most experienced.<sup>20</sup> Most frequently used approach nowadays is O'Connor bivalve technique and in expert hands results of VVF repair are equivalent using either abdominal or vaginal approach.<sup>2,21</sup> We used a single technique in all type of fistula with an excellent success rate so we feel that one should select the approach in which the surgeon is familiar with and got maximum success rate.

It is necessary to offer better training in fistula repair rather than creating new approaches with extensive

material. A newer technique involving laparoscopy, robot-assisted laparoscopy may reduce some morbidity of open surgery but require further evaluation and longer follow up period.<sup>4,8</sup> Laparoscopic VVF repair is feasible and effective with successful outcome however challenging task of forehand intracorporeal suturing, cost and stiff learning curve are a hindrance for selecting the laparoscopic approach.<sup>9,20</sup> Robot-assisted VVF repair offers a technical advantage during complex laparoscopic repair of VVF. However, the cost of procuring system, consumables, availability, and need of experience is the main hindrance.<sup>20</sup> So the main tenet for VVF repair is that the best opportunity for successful closure is during the first attempt and most experts agree that optimal method of repair depends on the approach to which surgeon has most familiarity.<sup>22</sup>

We also have used shorter cystotomy starting from the dome and extending posteriorly till the fistula and found no compromise in the vision, similarly experienced by Dalela et al.<sup>6</sup> We have dissected fistula without tract excision at least 1 cm distal to tract so that omentum can be interposed on to vagina and sutured 1 cm beyond the closed vaginal incision. We prefer not to excise the fistulous tract as excision causes enlargement of fistula and bleeding. Electrocautery to control the bleeding can lead to tissue necrosis and excision of tract close to ureteral orifice may require ureteric reimplantation.<sup>2</sup>

Omentum acts as a vascular graft, replacement tissue and a mechanism for absorption of debris thus increasing the chance of success of the repair. After healing, the omentum retains its suppleness and maintains plane of separation if re-exploration is needed.<sup>20</sup>

Tissue flaps are especially helpful in the setting of a complex fistula.<sup>2</sup>

Other flaps can be used like pedicle flap of lateral parietal pelvic peritoneum and pedicle rectus abdominis myocutaneous flap. Other flaps lack unique properties of the omental flap.<sup>4</sup> So nowadays all repairs are mandatory to be strengthened with routine use of retroperitoneal flap and omentum is undoubtedly versatile. We have interposed omental flap in all the VVF repairs as in our study most of the patients had poor nutritional status, complex fistula and previously failed cases.

We have used perurethral and suprapubic catheter in all cases.<sup>9,23</sup> Temporary urinary diversion may be accomplished by suprapubic and/or transurethral catheter and most authors recommend a period of 10 days to 2 weeks.<sup>2</sup> The optimal way to drain the bladder using catheter following VVF repair is controversial.<sup>24</sup> Hadzi-Djokic used both suprapubic and perurethral catheter in 38 cases of VVF repair.<sup>18</sup>

Zambon et al. in his study of 76 patients of VVF repair found no major intraoperative or postoperative

complications. Thirteen percent patients developed urgency, and 4% developed SUI, but his study contains only 6 cases of abdominal repair<sup>8</sup> SUI is recognized complication of VVF repair most likely occurs in obstetric fistula patients when probable cause is an injury to the sphincteric mechanism.<sup>9</sup> In our study, the overall complication rate is 13.15% which includes 3 cases of storage symptoms, one patient had UTI, and one had SUI which was treated conservatively. All patients were totally dry after SPC removal. So in our study, the success rate of repair with omental flap is 100%. In a study of Hadzi-Djokic of 38 patients, all were continent following catheter removal with transperitoneal surgical repair and success rate of omentum flap was 100%.<sup>18</sup> Nesrallah et al. reported a 100% success rate with transperitoneal O'Connor repair and described it as a gold standard for supratrigonal fistula.<sup>17</sup> The reported failure rate of other techniques ranges from 4 to 35%.<sup>22</sup> We successfully repaired all types of fistulae following post-obstetric and gynecological procedure with Modified O'Connor transabdominal repair with 100% success rate and all patients were dry on periodic follow-up. But it is still doubtful whether the single procedure will emerge as optimal surgery for all patients with VVF, given the variability in nature of the condition, patient on whom it occurs and experience of the individual surgeon.<sup>9</sup>

## CONCLUSION

The optimal approach to the VVF repair usually the one that is most successful in individual surgeon's hand as VVF is a distressing urogenital condition for patients and demands meticulous skilled surgical attention. All repairs should be strengthened with flap interposition preferably omentum to increase the success rate.

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