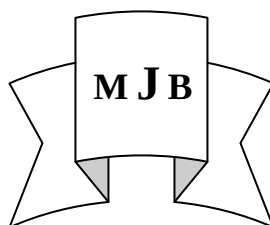


The Role of Omentum Flap in Success of Vesicovaginal Fistula Repair

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Abstract

Purpose: The higher recurrence rate of vesicovaginal fistulae, need new modalities of repair, we evaluate the use of omental flap interposition in preventing recurrence, in comparing the repair without flap.

Materials and Methods: A prospective study on 39 patients underwent vesicovaginal fistula repair in AL-Zahra teaching hospital from May 2005 until May 2010.

16(41%) were omental flap interposition used, 10(62%) need pedicled "J" omentum flap and 6(38%) with complete omentum flap. while in 23 (59%), repair done without flap. All patients were treated from 3-6 months after fistula diagnosis.

Results: From 39 patients, 20(51%) due to obstetrical causes, 6(15%) patients following prolonged obstructed labour, 8(21%) patients following emergency cesarean section, and 6(15%) patients following emergency hysterectomy, as a consequence of rupture gravid uterus, and 19 (49%) following elective hysterectomy due to gynecological causes which includes, 3(8%) uterine fibroid, 15(38%) dysfunctional menstrual bleeding and 1(3%) uterine prolapsed. The mean age of patients 37 years (20-55years).

In 16(41%) patients were omentum flap interposition used, all of them(100%) were cured, While in 23(59%) patients, repair done without flap, 4(17%) of them are failed and 19(83%) cured. Two patients from 4 patients failed were diabetic and 2 patients underwent recurrent cesarean section (CS).

Conclusion: We conclude that omentum interposition have good result in preventing recurrence of vesicovaginal fistulae, which is simple and easily done.

Keywords: vesico-vaginal fistula, omentum flap, cesarean section.

الخلاصة

الخلفية والغرض: أهمية استخدام الثرب في زيادة نسب نجاح عمليات الناسور البولي المهبطي مقارنة في العمليات التي لم تستخدم الثرب. **الطريقة:** دراسة أجريت في مستشفى الزهراء التعليمي في الكوت من شهر أيار لعام ٢٠٠٥ حتى شهر أيار لعام ٢٠١٠، على ٣٩ مريضه كانت تعاني من ناسور بولي تناسلي، حيث استخدم الثرب في ١٦ (٤١%) مريضه. أما المرضى ٢٣ (٥٩%) الباقين لم يتم استخدام الثرب في عملية التصليح.

النتائج: نجحت العملية في كل المرضى الذين تم استخدام الثرب في عمليات التصليح والبالغ عددهم ١٦ مريض بنسبة ١٠٠%، أما في المرضى الذين لم يتم استخدام الثرب والبالغ عددهم ٢٣ مريضاً فقد فشلت العملية في أربعة منهم بنسبة نجاح ٨٣%.

الاستنتاجات: استخدام الثرب في عمليات تصليح الناسور البولي المهبطي يرفع من نسب نجاح العملية ويقلل من نسب الرجوع.

Introduction

Genitourinary fistulae is an abnormal communicating tract extending between the bladder and vagina, uterus, or cervix, that allows

the continues involuntary discharge of urine into the vagina [1]. It's a devastating consequences of prolonged labour in developing countries and pelvic surgery in developed countries.

The estimated prevalence of vesicovaginal fistula in sub-saharas Africa is over 2 million women, with the an annual incidence of 50,000-100,000. Other causes of vesicovaginal fistula includes trauma, foreign body, infection, anti-incontinence producer and malignancy (cervical, endometrial and vaginal carcinoma), account for 5% of vesicovaginal fistula in the developed world [2]. Genito-urinary fistulae were identified in ancient Egyptian and Homeric medicine. The Ebers papyrus represents the first documented medical reference to vesicovaginal fistulae, with an admonition to avoid intervention (presumably owing to the almost certain probability of surgical failure). Archaeologic studies have identified fistulae in well-preserved mummified members of the Royal Egyptian Court [3]. However, not until 950 AD did Avicenna correlate the combination of pregnancy at a young age and difficult labour with the formation of a vesicovaginal communication [4].

Surgical treatment for obstetric fistulas first was attempted in Europe, with universal failure [3]. The first successful surgical management of a fistula was performed in Switzerland by Fatio in the late 1600s using techniques described by Van Ronnhuyse. However, until the dawn of the modern era, almost all genitourinary fistulas were managed with expectant means only [4].

James Marion Sims published his famous discourse on the treatment of VVF in 1852, using leaden or silver wire had done successfully. This groundbreaking work provided the initial foundation for subsequent new development surgical approaches were improved by Trendelenburg in 1890 (Trans-abdominal approach) and Leguen in 1914 (transvesical dissection)

(Zacharin, 1988) [6].

Additionally, numerous surgeons are credited for the development of various flaps for interposition between the bladder and vaginal walls to minimize the failure of vesicovaginal fistula repairs. The list includes Garlock in 1928 (pedicled gracilis muscle flap), Martius in 1928 (pedicled bulbocavernosus flap), Ingelman-Sundberg in 1960 (pubococcygeus, bulbocavernosus, rectus abdominis, and gracilis), and Kiricuta and Goldstein in 1972 (pedicled omental flaps) [7].

Vesicovaginal fistula repair recently Is traditionally accomplished with the procedure using vaginal or abdominal approach. Controversy exist however about the type and timing of the procedure and the need for local flap for additional support [8].

Vesicovaginal fistula is rare and its main impact lies in the social distress that result from the persistent leakage of urine. Two major issues predominate in any discussion of vesicovaginal fistula namely, the timing of repair and the surgical approach used [9,10].

Patients and Methods

A total 39 patients were referred to the hospital for management of vesicovaginal fistula from May 2005 to May 2010.

There were a variety of investigations carried out in the diagnosis of vesicovaginal fistula, in our cohort the commonest was cystoscopy which picked up all of them, the other includes, the three swabs test, formal cystogram, speculum examination and an intravenous urogram (IVU).

Preoperative Preparation:

Full investigation include, hemoglobin level, Blood urea nitrogen test, blood glucose test, urinalysis and

culture, two of our patients were diabetic, controlled by insulin and 5 of them have positive culture, treated with appropriate antibiotic management.

Antibiotic therapy is important to ensure a sterile environment, vaginal douches with antiseptic agents at the evening before and the morning of surgery, and prophylactic therapy with parenteral broad-spectrum antibiotics (third generation cephalosporin one gram twice daily) administered over the peri-operative period (48 hours).

Surgical Approaches:

All 39 patients are operated on through abdominal approach (Pfannenstiel incision), this technique preceded by placement of ureteral catheters to localize the ureteral orifices. An abdominal incision is then performed, followed by bisection of the bladder to the level of the fistula, the bladder and vagina are mobilized and separated from each other by dissecting along the vesicovaginal septum. A complete excision of the fistula tract is completed, separate closure of the vagina and bladder is performed using absorbable sutures (polydioxanone or catgut suture materials). This technique is done in 23 patients, other 16 patients omental flap was interposed between the bladder and the vagina.

The omentum is used for reconstruction of intra-abdominal wounds because of its high vascularity and immunological

properties. In approximately one third of patients, the omentum has sufficient length to extend to the pelvis without tension 6(38%), the omentum interposed between the bladder and vagina without pulling on stomach. The remaining 10 patients (62%) require mobilization from the right or left gastroepiploic artery to form a pedicle of sufficient length. The design of the flap prior to transecting the omentum is essential. A centimeter ruler is helpful in determining the appropriate length needed for the flap to reach the pelvis without tension. A check of the vascular arcades should be made to ensure that an ample blood supply is entering the base of the flap. Generally, the transaction of the omentum is started at the hepatic flexure of the colon and proceeds from the patient's right to her left, so an omental "J" flap will be obtained (as shown in figure 1) provides a vascular pedicle flap to cover a vesicovaginal fistula repairs to form a lid on the inlet of the true pelvis and to form a cylinder for a neovagina.

The purpose of this operation is to create a flap from the omentum by transecting the omentum from its attachments to the stomach, leaving enough branches of the left gastroepiploic vessels to provide an adequate blood supply for the flap. Operation accomplished with the bladder drainage by urethral catheter, suprapubic cystostomy and intraperitoneal drain.

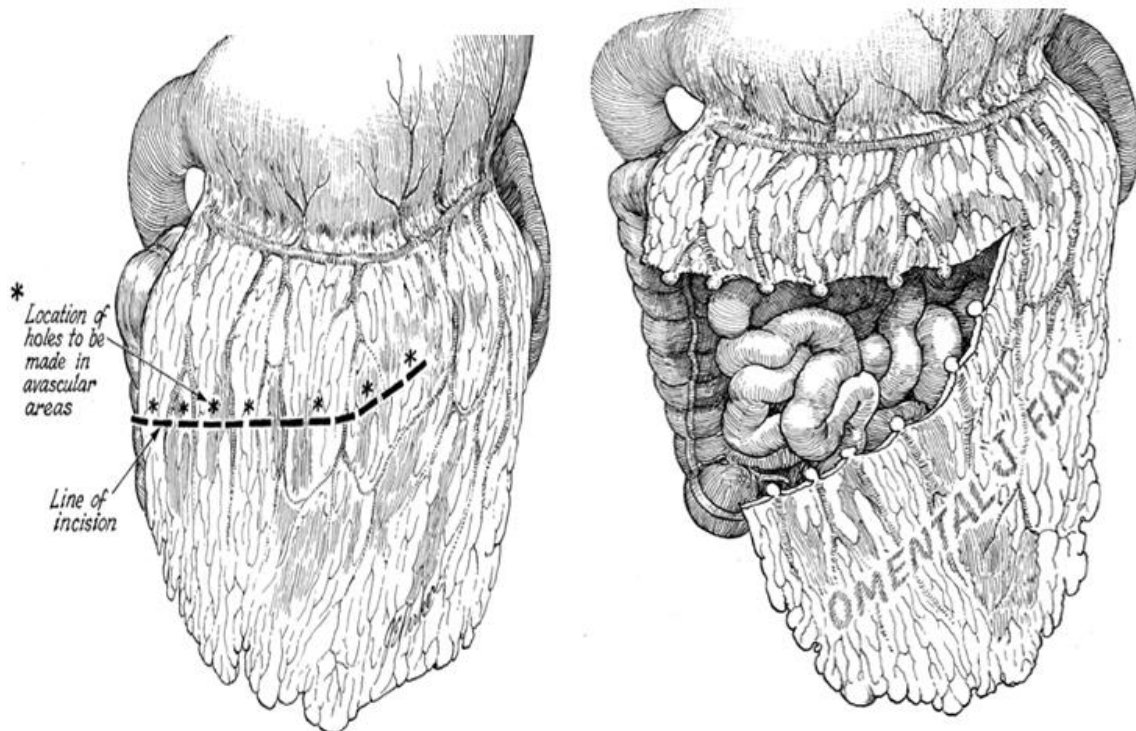


Figure 1 Pedicled Omental Flap)[7]

Post-operative care:

patient management after abdominal approach with large urethral and supabupic catheter . parenteral broad-spectrum antibiotics(third generation cephalosporin one gram twice daily) administered for one week then oral antibiotic(cifixim 200mg twice daily) while catheter drainage is continue for 10-14 days. Vaginal manipulation should be avoided for the first two months post-operatively.

Results

In our series 20 patients (51%) due to obstetric complications, and 19 patients (49%) due to gynecological surgery (figure 2) and still the obstetric causes in our area is more than gynecological causes due to low health care and social education with the frequent midwife intervention.

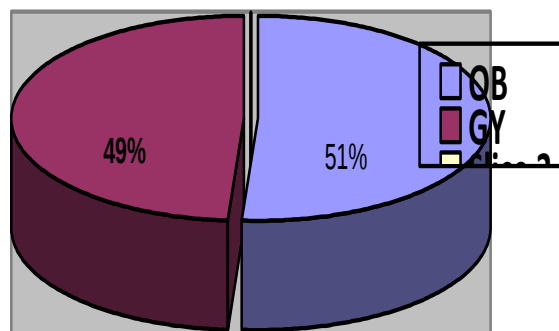


Figure 2 Distribution of cases according to the etiology.

From those 20(51%) patient's due to obstetrical causes, (6 patients following prolonged obstructed labour, 8 patients following emergency cesarean section, and 6 patients following emergency hysterectomy, as a consequence of

rupture gravid uterus), and the other 19 (49%) patient's following elective hysterectomy due to gynecological causes which includes, (3 uterine fibroid, 15 dysfunctional menstrual bleeding and 1 uterine prolapsed).

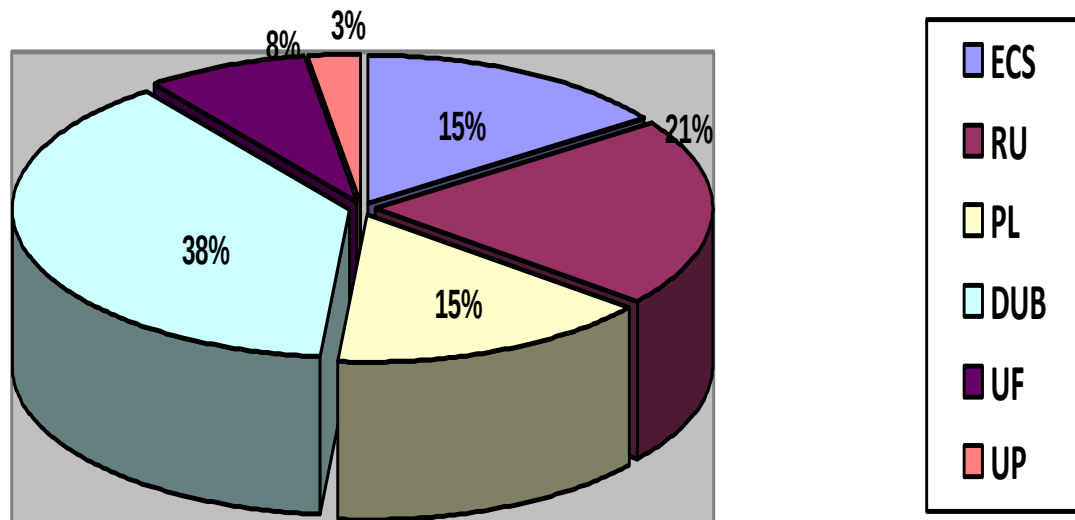


Figure 3 Distribution of the cases according to the specific etiology.

ECS: Emergency cesarean section. **RU:** Rupture uterus. **PL:** prolonged labour.

DUB: Dysfunctional uterine bleeding. **UF:** Uterine fibroid. **UP:** Uterine prolapsed.

All 39 patients underwent abdominal approach for repair of vesico-vaginal fistula. 16(41%) of them omentum flap interposition were used, all of them (100%) were cured (**figure4**). 10(62%) need pedicled "J" omental flap and 6(38%) with complete omental flap,

while in 23 (59%), repair done without flap, 4(17%) of them were failed and 19(83%) cured. Two patients from 4 patients failed, were diabetic and two patients had previous recurrent cesarean section (CS). The mean age of our cohort was 37years (range: 20-55years).

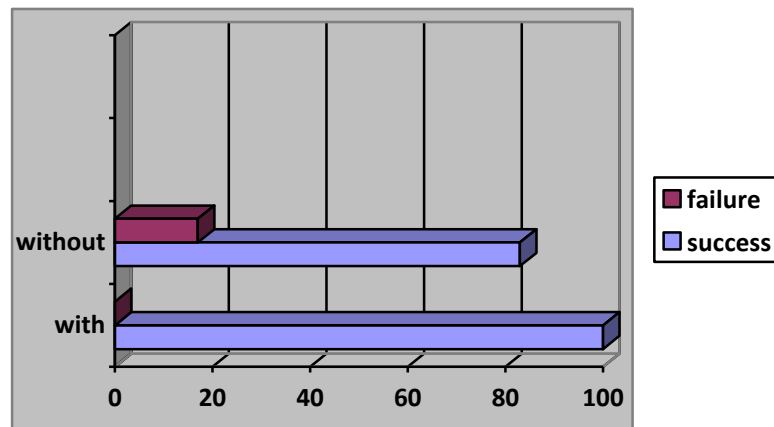


Figure4 The omentum interposition VS success rate.

Discussion

Vesicovaginal fistulae continues to be a social and surgical condition that affect relatively a younger age women. Obstetric vesico-vaginal fistula remains a problem in underdeveloped countries, whereas abdominal hysterectomy is the most common cause of vesico-vaginal fistula in developed countries [9]. In developing countries, the predominant cause (97%) of VVF is prolonged obstructed labor [10]. In contrast to developing countries, countries that practice modern obstetrics have a low

rate of uro-genital fistula, but still the gynecological procedure is the major cause (figure 5). The incidence of fistula after hysterectomy is generally accepted to be 0.1%- 0.2% [11].

With regards to etiology, our series presented here compares with others in the literature, Goodwin [12], reported that 75% of his cases were of gynecological origin, and Lee [13], reported 82% resulted from such gynecological surgery and only 8% from obstetric complications.

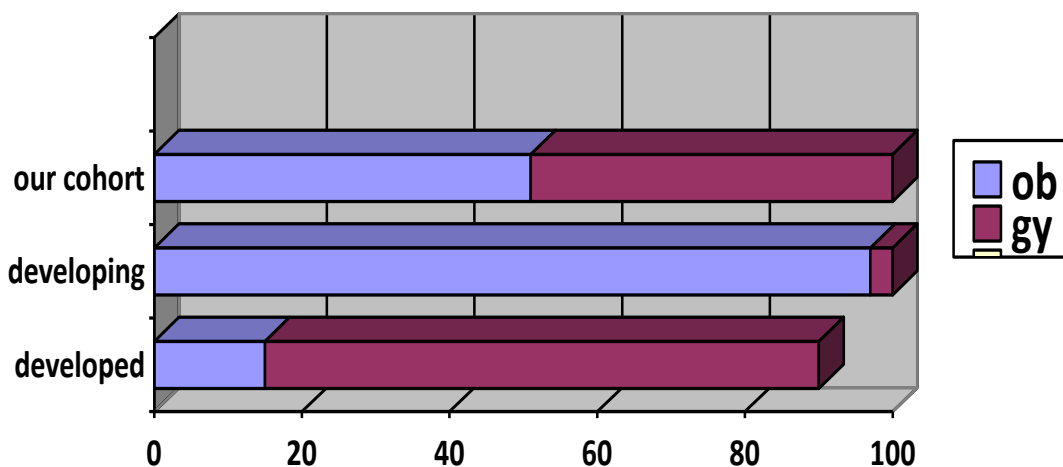


Figure 5 The causes of vvf in developed and developing countreis

Risk factors that predispose to Vesicovaginal fistulae and its recurrence include prior pelvic or vaginal surgery, previous pelvic inflammatory diseases, ischemia, diabetes, arteriosclerosis, carcinoma, endometriosis, anatomic distortion by uterine myomas, and infection, particularly postoperative cuff abscess [1]. In our study 9 (23%) patients have prior cesarean delivery, 2 (5%) patients were diabetic, 5 (13%) patients have positive culture for infection (mostly *Escherichia coli*) and 23 (59%) patients with no apparent risk factors.

Tancer found 29% of his series of 110 cases were associated with prior cesarean delivery and 67% with absence of any risk factors [14]. Two patients from 4 patients failed in our study were diabetic and two patients had previous recurrent cesarean section.

The timing of surgery remains a controversial issue. Presence of infection of the vaginal cuff or pelvic infection requires a prolonged antibiotic therapy before any attempt at repair. The classical opinion on timing the surgery is to wait for 3-6 months to allow the surgical inflammatory reaction to subside, shortening the waiting period to undergo vesicovaginal fistula repair surgery is socially and psychologically important in these already distressed patients. However these reasons should be carefully weighed against the risk of a compromised success [8,15]. In our series, the time of surgical repair was 3-6 months.

Surgical approaches used for vesicovaginal fistulas include combined abdomino- vaginal, vaginal, or abdominal approaches which are used in our patients. The approach chosen is contingent on several factors, including location of fistula (position related to

apex), quality of tissue, and surgical experience [3,5]. There was no observable difference in outcome when compared between the various surgical approaches, however the abdominal approach has its strengths in the optimal exposure of the fistula as well as intra-operative assessment of complex fistulae and easily manipulation of the omentum [8,16,17]. Recently laparoscopic transvesical vesicovaginal fistula repair appears to be safe and effective with decreasing morbidity and improving cosmesis, continued follow up is required to determine its long term efficacy compared with accepted open transabdominal and transvesical approach [18].

The most important determinants of a successful repair are, optimal tissue condition (adequate vascular supply and freedom from infection, inflammation, necrosis and malignancy), option of complete excision of fistulous tract, a tension-free, water-tight, multi-layered closure with avoidance of overlapping suture lines, interposition of healthy vascularised tissue between the bladder and vaginal suture lines and continuous post-operative bladder drainage [19].

The use of inter-positional grafts is likely to contribute towards better outcome. These grafts include omental flaps [16,17,21], peritoneal flaps [20] and Martius

labial fat pads [22].

By applying a vascular omental pedicled flap, we attempt to reverse some of the ischemia present in the scarred tissue by promoting capillary and arterial ingrowth from the pedicle flap's blood supply, the omentum has a copious blood supply, therefore it is an excellent recipient of a skin graft for a neovagina [21]. In approximately one third of patients, the omentum has

sufficient length to extend to the pelvis without tension, 6 patients (38%) in our study and The remaining 10 patients (62%) require mobilization from the right or left gastroepiploic artery to form a pedicle of sufficient length.

In our study, all 16 patients with interpositional omental flaps had no recurrence,

while from 23 patients were repaired in two layers without interpositional flaps, four of them, fistula recurrent, two of whom underwent a successful second

repair with omentum pedicled flap, not enter in our study and the other two had lost their follow up, Figure (6).

In vaginal approach a Martius labial interposition graft can be used a lateral incision in the labia majora has been performed, exposing well-vascularized labial fat, the graft is based in this case on external pudendal circulation, the graft is tunneled under the vaginal epithelium to cover the the bladder epithelium, several authors have used this graft with excellent results [22].

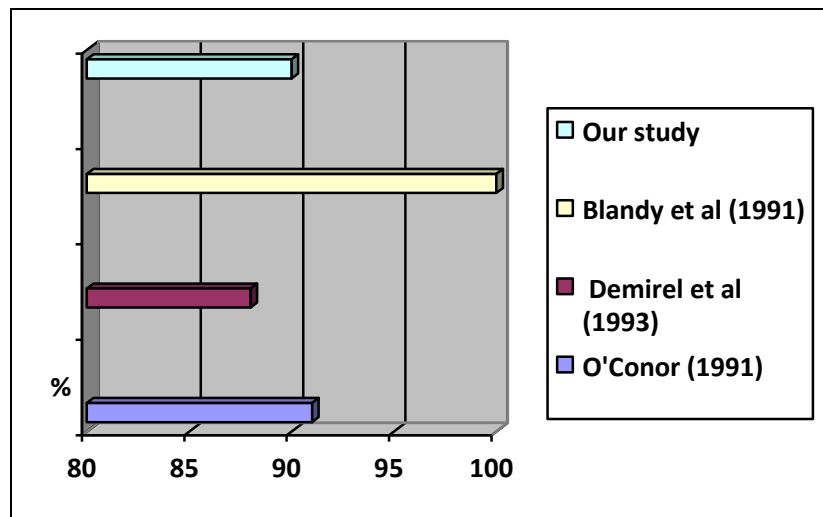


Figure 6 Comparison of our study with other study.

Conclusion

The cause of vesicovaginal fistulae still remains largely iatrogenic. Patients thus afflicted with a very socially distressing condition at a relatively younger age.

The higher recurrence rate need new modalities of repair, so we conclude that omentum interposition have good result in preventing recurrence, which is simple and easily done.

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