Colporrhaphy Mesh Repair and Extrusion

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ABSTRACT:

The objective of the study is to determine the risk of erosion and extrusion after using type I polypropylene mesh (Allograft) as an overlap graft for repair of vaginal wall prolapse with and without bridge repair. Erosion and extrusion are usually easily treatable but sometimes may be troublesome to manage. Bridge repair is a vaginal flap putted over mesh below site of incision to enforce it. 80 patients with vaginal wall prolepses operated over 20 months (September 2013 – May 2015) using Type I mesh in four Libyan hospitals and clinics , 35% (28 p) with anterior mesh repair for cystocele, 30% (24 p) with posterior mesh repair for reconcile and 35% (28 p) with cystorectocele. In 40% of the patients, repair of defect is associated with other vaginal operations. Half of the patients (40 p) had bridge repair along with mesh in repair of the defect. Extrusion of the mesh occurred in 9 patients (11%), all of them are mesh repair without bridge enforcement, three patients with anterior mesh repair and six patients with posterior mesh repair. No erosion seen in all 80 patients. Bridge enforcement along with mesh in repair of genital prolepses can reduce the risk of extrusion almost to 0%.

KEYWORDS

Erosion, Anterior mesh repair (AMR), Posterior mesh repair (PMR), Bridge repair (BR), Anterior bridge repair (ABR), Posterior bridge repair (PBR).

INTRODUCTION

The use of graft materials in pelvic floor reconstruction is now a common practice to support any anatomical defect in the body or when the surgeon wishes to avoid an additional facial harvesting procedure or to use materials that are stronger than the patient's own facial tissue. The decision to use a graft in the repair of the pelvic floor is based on a number of factors including the tissue quality of the patient, history of previous repairs and concomitant procedures to be performed. The ideal material should be strong, sterile, permanent, no allergenic, inert, free of risk of infection [1]. Graft materials may be categorized as biologic or synthetic. Biologic materials include antilogous grafts, allograft and engrafts. Autonomous grafts that are commonly harvested for repairs are rectus fascia and fascia late. Because of the potential morbidity associated with harvesting autonomous fascia, the use of allograft tissue can be a desirable alternative, most commonly used materials are cadaveric fascia late and dermis after passing different processing techniques. Disadvantages to using these materials include availability, cost and high recurrence rate [2]. Engrafts such as porcine dermis and small intestinal sub mucosa provide other biography alternatives. These materials offer potential advantages over allograft in that they are more readily available and there is no theoretical risk of human viral transmission. Synthetic materials (like mesh) may have some advantages over biologic materials in terms of disease transmission,

durability, tensile strength and availability [3]. Mesh act by producing a tense inflammatory reaction and dense underlying unorganized scar formation that act as scaffold on which the connective tissues grows and re-enforce the graft. Much of the initial data on synthetic mesh were derived from general surgery researches for repair of abdominal wall hernias since 1950 [4,5,6]. The types of mesh are categorized based up on pore size and fiber type [7,8]. Table 1

Table 1, different types of Mesh

Type I	Type II	Type III	Type IV
e.g. . Marlex . Prolene . Atrium	Polytetrafluroethylene (PTFE) e.g. Teflon	. Expanded PTFE e.g. Gore-Tex .Polyethyleneterephthalate e.g. Mersilene	. Polyglycolic acid e.g. Dexon . Polyglactin 910 e.g. Vicryl
Monofilament	Multifilament	Multifilament	Multifilament
Nonabsorbable	Nonabsorbable	Nonabsorbable	Absorbable
Pore size > 75 mm	Microporous < 10 mm	Macro and microporous components	Submicroporous < 1 mm

*mm: micrometer

Type I mesh (macro porous) allow access for leukocytes and macrophages as well as ingrowth of fibroblast, collagen and revascularization [9,10]. Type II and III meshes (small pore size) allow only passage of histiocytes, there is therefore minimal incorporation into the host tissue. Type IV mesh has pore sizes too small to allow for fibroblast and leukocyte infiltration, therefore not used in pelvic reconstructive surgery, one exception is the polyethylene terephthalate fabric coated with silicone that has large pores with some submicron components as well [8]. The size and shape of pores are related to the tissue bonding. Generally, Prolene form is most common used mesh. While the advantages of using synthetics for vaginal surgery are evident, there are specific concerns regarding their use. This includes complications associated with the surgical procedure itself such as bleeding, hematoma formation, bladder and bowel injury, adhesions, obstructive ileus and complications from the material itself, including infection, urinary tract erosion and vaginal extrusion, fistula, abscess formation, urgency and dyspareunia [11,12]. Mesh erosion defined as the presence of graft material in the lumen of the urinary tract or rectum and "extrusion" as the presence of exposed graft material in the vagina. Erosion or extrusion of the mesh is thought to be associated with the type of synthetic material used. Patients who present with vaginal extrusion or urinary tract erosion may demonstrate a variety of symptoms, but they may be completely asymptomatic. Usual presenting symptoms include vaginal discharge, pain, dyspareunia, complaints of pain from the partner during intercourse, *de novo* stress urinary incontinence, urgency, hematuria, urinary tract infection or obstruction. It is importance to evaluate the urinary tract with cystourethro scopy to rule out erosion of material into the bladder or urethra, particularly if the patient presents with hematuria,

recurrent urinary tract infections, irritating or obstructive symptoms, *de novo* urgency or bladder stones. Management is based on the type of material, presence of infection and location of erosion or extrusion. Extrusion of Type I mesh into the vagina may be managed conservatively or surgically by removal of the excision of extruded part of the mesh. Erosion into the bladder is rare and mandates us flap [14]. Newer techniques have been described in the treatment of mesh extrusion and erosion. Laparoscopic excision of mesh associated with bladder erosion and transvaginal endoscopic complete removal of mesh regardless of mesh type (trans vesicle approach). Patients often present with hematuria, irritative voiding symptoms, urinary tract infection or retention. Cystoscopic resection of intravesical materials has been reported [13]. Urethral erosions require urethrolysis with graft explantation. Urethral debridement followed by primary repair and multilayer closer with a Marti removal of mesh after sacrocolpopexy have been described [15].

PATIENTS AND METHODS:

The study design was a prospective multicenter trial in different Libyan hospitals and clinics. The main aim was to determine the risk of erosion after using Type I polypropylene mesh for repair of vaginal wall prolapses with and without bridge repair. Bridge repair is a vaginal flap putted over the mesh at site of incision to enforce it, anterior bridge repair (ABR) for cystocele and posterior bridge repair (PBR) for rectocele. Over 20 months (September 2013 – May 2015), 80 patients with vaginal wall prolapses underwent vaginal reconstruction using Type I mesh. 50% of them had also an additional vaginal bridge repair. Treatment with local vaginal oestrogen cream pre-operatively was necessary for all postmenopausal women and should continue with this therapy post-operatively even if they receive systemic hormonal replacement therapy. All patients were informed about the procedure and gave their informed consent. The postoperative evaluation includes the collection of data regarding age of patient, parity, use of hormonal replacement therapy, type of operation, additional gynaecological procedures performed, intr- and postoperative complications and analysis of outcomes. The mean age of 80 patients was 56 years, 92 % of them (72 patients) were postmenopausal at time of surgery. The mean parity was four. 12 patients (15%) had undergone a previous gynaecological operation (.e.g. hysterectomy, myomectomy, laparoscopy), 4 patients of them (5 %) had conventional colporrhaphy. 28 patients (35%) of the patients operated with anterior mesh repair for cystocele, only 3 patients of them (3.7%) had also anterior bridge repair. 24 patients (30%) operated with posterior mesh repair for rectocele, only in 14 patients (17.5%) the mesh is enforced with posterior vaginal bridge. 28 patients (35%) operated with both anterior and posterior mesh repair because the vaginal defect involve both anterior as well as the posterior wall (C – R – cele), 23 patients (28.7%) of them had also anterior and posterior bridge repair. Figure 1

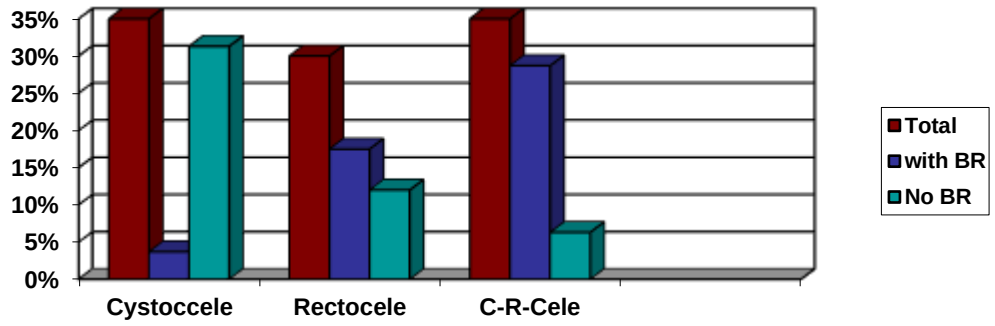

Figure 1, type of operation

40 % (32 patients) repair is associated with other vaginal operations like vaginal hysterectomy (11 patients), Intravaginal sling for stress urinary incontinence (19 patients) and sacrospinous ligament fixation (2 patients) Table 2.

Table 2, Operative procedures combined with mesh repair

Procedure	No. of patients (%)
Intravaginal sling	19 p (23.7%)
Vaginal hysterectomy	11 p (13.7%)
Sacrospinous fixation	2 P (2.6%)

In 28.7% (23 patients) operations done under spinal analgesia. Before discharge of the patients, gynaecological examination and ultrasound for both kidneys & residual urine were done. The patients were seen and examined for 6 months after operation where follow-up visit were scheduled at 2, 6 and 13 weeks for first three months, then monthly for next three months where a complete history, gynaecological and ultrasound examination were performed.

RESULT:

The mean hospital stay was 2 day for simple vaginal mesh repair and 4 days for those with other vaginal operations. Noted complications of Mesh used in reconstruction of female pelvic floor included: infection, extrusion, rejection of mesh and urge incontinence. Table 3

Table 3, complications of mesh

NO	Complications	No. of patients (%)	Therapy
1.	Infection	12 p (22.8%)	Treated with antibiotic according to culture and sensitivity.
2.	Rejection of tape	0 p (0%)	
3.	Erosion of tape	9 p (11%)	. Conservative management. . Surgical excision.
4.	Urge incontinence	4 p (5%)	. Treatment of infection. . Anticholinergic drugs.

No erosion happened in all 80 patients. Nine patients (11%), all of them without bridge repair, develop mesh extrusion, three of them with anterior mesh repair and six patients with posterior mesh repair. Five patients were

known cases of diabetes mellitus on Insulin therapy. No extrusion seen in those patients with bridge enforcement. Figure 2.

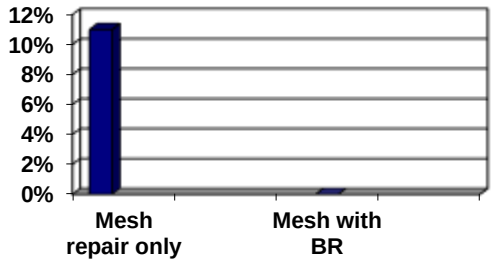

Figure 2, risk of Extrusion

Extrusion occurred at site of incision towards the vagina. Most of the patients presented with vaginal discharge, dyspareunia and pain from partner during intercourse. Physical exam finding identify extrusion of mesh components on pelvic examination. However, in one case extrusion was highly suspicious and visualized during operation under general anaesthesia.

All of these patients treated unsuccessfully with conservative management and surgical excision of exposed part of mesh was necessary (refinement of mesh).

DISCUSSION :

Synthetic mesh has become a popular option for pelvic reconstruction with its advantages and disadvantages. It may provide a safe and cost-effective alternative for pelvic reconstructive surgery. Complications of mesh repair are variant and depend up on many factors like type of operation, type of the mesh used in operation & its flexibility, pstient tissue intrgrity conservative approaches such as observation with or without local estrogen administration. Removal of the mesh is indicated if conservative management is failed and doesn't mean recurrence of the prolapse or urinary incontinence [16,17]. *Huang KH 2005* and *Reisenauer C 2006*, found that the recurrence rates following mesh removal have been variable and often dependent on the amount of dissection performed and presence of infection. [18]. In our study, 9 patients (11%) developed mesh extrusion, all these patients operated without bridge enforcement. In all of these and finally on the surgeon's experience. The most common risk of the use of mesh at the top of the vagina is vaginal mesh extrusion through the vaginal skin and urinary tract erosion, which are typically a minor complications. In addition, viable management options for vaginal extrusion include

patients conservative treatment was unsuccessfully and surgical excision of exposed part of mesh was necessary (refinement of mesh). Recurrence rate for these patients was 0% after excision of the mesh. However, review of short and intermediate term data from the literature has shown that amongst synthetic grafts, type I mesh provides durable results with the fewest rates of erosion and extrusion. *Drutz HP, et al 1990*, type IV mesh has pore sizes too small to allow for fibroblast and leukocyte infiltration. They tend to induce pseudocapsules that may harbor infection. High rates of erosion,

extrusion and other complications were noted and subsequently, Type IV mesh is rarely used in pelvic reconstructive surgery [19]. Extrusion and erosion rates for Type I and II is less than type III and IV meshes [20]. In addition, *Timmons MC 1992*, noted that type I mesh promotes tissue incorporation into the host, produce more inflammatory reaction and thus denser underlying disorganized scar formation with less risk of recurrences and removal rate [10]. *Morgan JE 1970*, Such complications are less common with monofilament than multifilament mesh, this may related to the rigidity of mesh and its propensity for injury to adjacent tissues [21]. Because of that reason, our operations are completely done with type I monofilament mesh. *Drutz HP, et al 1990*, the risk of mesh erosion and extrusion is around 8.5% [19], in our study 11% develop erosion which higher than his study. *Begley JS, et al 2005*, had significantly higher rates of extrusion ranging from 10-20% [22], both *Amundsen CL, 2003* and *Achtari C, 2005* had the same results and that is more higher than our results [14, 23]. However in their recent study, *Sand PK, et al 2001*, reported an overall extrusion rate of only 1.2%, which is lower than most other reports in the literature [24]. *Sand PK, et al*, mention also that patient factors such as poorly controlled diabetes mellitus, tobacco use, prior history of pelvic irradiation, repeat procedures and vaginal estrogen status may also contribute to poor wound healing and subsequent infection, erosion or extrusion , this is proved also by *Reisenauer C, 2006* [25]. We found five patients out of nine patients who developed extrusion were known cases of diabetes mellitus which may not well controlled after surgery. Surgical techniques such as hysterectomy, excessive tension and unrecognized urethral or vesical injury may be an additional risk factor for extrusion of mesh [19] . In addition, rolling of the tape during placement or vaginal suturing may produce a narrow band that can result in pressure necrosis and erosion [16]. In our study, 40 % (32 patients) repair is accompanied with other vaginal operations like vaginal hysterectomy, Intravaginal sling and sacrospinous ligament fixation. Finally we did not found in the literature of genital prolapse surgery any previous study about bridge repair and its efficacy to prevent extrusion and erosion when it enforce the mesh repair. But we can see from our study how this combination reduces that risk almost to 0% comparing to those patients without bridge repair.

CONCLUSION:

Risk of erosion is one of the most commonest complications of mesh repair which is sometimes troublesome complication that may be managed successfully either conservatively (observation, local hormone therapy, treatment of infection and transvaginal debridement) or with surgical exploration and mesh excision or refinement depend up on the location of the mesh and mesh type. Mesh refinement is not always an easy procedure. To reduce risk of extrusion & erosion, good pre-operative & postoperative therapy with local estrogen vaginal cream and controlling of existing diabetes mellitus. Antibiotic prophylaxis, using of round needle are some measurements to reduce complications. Because erosion occur mostly at site of incision, bridge repair over mesh and below site of incision can reduce risk of extrusion almost to 0%.

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