Journal of Science and Applications:
BioMedicine
Clinical Research

The analysis of 42 mesh erosion cases in 1036 cases of pelvic reconstructive surgery by mesh-replacement materials

Yan Li *, Jichun Li

General Hospital of Ningxia Medical University, Yinchuan, Ningxia, China; 750004.

* **Corresponding author**: *liyan9922431@gmail.com.*

Abstract: The objective of this study is to analyze the 42 cases of mesh erosion in total 1036 female pelvic flood dysfunction (FPFD) patients who accepted the Pelvic Reconstructive Surgery by mesh-replacement materials. 1036 patients who received pelvic organ reconstructive surgery from June, 2006 to Jan, 2015 were reviewed, including general condition, surgery records, in-patient conditions and follow up. The follow up time ranged from 3 to106 months, with the average time of 45.8±2.9 months. The erosion rate was 4.05 % (42/1036). The erosion took place from 1 to 48 months after surgery. The mean time of erosion took placed was 11.4±2.8 months. There were no significant differences in patients' age, times of pregnancy, whether menopause, whether replacement therapy (RT) and the stage of POP and SUI, however the rate of erosion is slightly higher in patients with ages ranging from 50s to 60s. No erosion case was found in the simple TVT-O group. There was no significant difference between TVH altogether and no TVH (P>0.05). There was no significant difference with or without TVT-O together (P>0.05), but the rate in total pelvic reconstruction is obviously higher than anterior pelvic construction surgery (P<0.05). In total 42 cases, 71.4% (30/42) happened in anterior vaginal wall, 21.4% (9/42) happened in posterior vaginal wall, 4.8% (2/42) happened in both anterior and posterior vaginal wall. 2.4% (1/42) happened in the puncture path of the two thigh root. The erosion rate in anterior vaginal wall is obviously higher than posterior wall (P<0.05). There were no erosion happened in bladder or rectum. In all 42 erosion cases, 80.9% (34/42) had vaginitis (include acute and chronic). In conclusion, most erosion happened in the vaginal wall, especially the anterior vaginal wall. The best therapy for mesh erosion is to remove the mesh by surgery. Infection is the main cause of erosion post operatively.

Published by www.inter-use.com. Available online Oct. 5, 2015, Vol. 3 Iss. 6, Page 83-87.

Keywords: Mesh erosion, Female pelvic floor dysfunction, Pelvic reconstruction surgery, Replacement of mesh

1. Introduction

Female pelvic floor dysfunction (FPFD), which contains stress urinary incontinence (SUI) and pelvic organ prolapse (POP), is a common disease in women [1]. FPFD severely affects the living quality of women and it is even called social cancer. The prevalence of FPFD was reported as 50% to 75% [2, 3]. Previous research showed that the prevalence of SUI in Ningxia, Yinchuan, China was 34.91% [4]. Recently, the use of replacement materials like Gynemesh, Prolift, Aveta for POP and SUI improved the cure rate and decreased the recurrence rate obviously [5]. At the same time, the complications from the use of mesh has been brought to the forefront, such as infection, rejection, dysperunia, and erosion [6]. The erosion is a special complication of mesh. The incidence of mesh erosion varies from 0 to 13.4% in different research [9]. This article retrospectively analyzed 42 cases mesh erosion in 1046 patients with FPFD who accepted pelvic reconstruction surgery by replacement materials like Gynemesh, Prolift and Aveta, TVT-O, aiming to explore its clinical characteristic, treatment and prevention methods.

2. Materials and Methods

2.1. Research Object

We reviewed the information from 1036 patients who received pelvic organ reconstructive surgery (PORS) by replacement materials (including Gynemesh, Prolift and Aveta) from June 2006 to Jan 2015, including general condition, surgery records, impatient conditions and follow up.

2.2. Methods

Patients were evaluated comprehensively from histories, physical examination and assisted examination preoperatively. The stage of POP will be valued by POP-Q system which ICS (International Continence Society) recommends, and the stage of SUI will be valued by the chief complaint, one hour pad test

and urodynamics studied. The surgery will be used for >POP II or SUI Stage II or both. Contraindications were excluded preoperatively. If vaginitis, should be cured preoperatively.

All the patients were given routine preoperative preparations, and 1:5000 potassium permanganate bath for 3 days, twice a day. All the pelvic reconstructive surgery was done by an experienced archiater and two assistants. Replacement materials include Gynemesh and Prolift which from Johnson and Johnson Company and Avelta which from Budd Company. Gynemesh was used for only POP less than Stage III, Prolift and Avelta were for Stage III and IV. All of them were used randomly. Materials were used tension freely. Antibiotics were used 48-120 hours unequally and iodopha vaginal scrub for one month postoperatively. All the patients were asked not to take a tub bath for one month; no coitus for 3 months and no heavy physical labor for 6 months.

2.3. Follow up

Patients were asked to finish outpatient review at 1、3、6 and 12 months, and every 6 months until 5 years postoperatively. Contents of the follow-up include general situation, history collecting, physical examination and assisted examination necessary. History includes: toilet cases, whether had painless or uncomfortable situation of vagina and sexual life. Physical examination includes pelvic examination and POP-Q stage again.

2.4. Diagnostic standard and treatment

The ensured diagnosis of erosion is depending on the partial symptom and pelvic examination. If the patient had vaginitis or vaginal partial symptoms like leukorrhagia, antibiotics and estrogen ointment can be given firstly. If the patient had suture reaction accompanied, sutures should be expelled. The indication of the surgery for erosion should be that conservative therapy is invalid or mesh can be seen from vagina.

2.5. Statistics

Analysis was performed using SPSS 16.0.

3. Results

3.1. Baseline Characteristics

The follow up time ranged from 3 months to106 months, with the average time of all 1036 cases was 45.8±2.9 months. 42 cases underwent erosion out of a total 1036 patients, the erosion rate was 4.05%. There were no significant differences between with or without erosion in patients' age, times of pregnancy, whether menopause, whether replacement therapy (RT) and the stage of POP and SUI, but the erosion rate is obviously higher in women ages from 50s to 60s than other groups and the differences were significantly different ($P<0.05$). The erosion rate in Stage II is obviously higher than Stage III and IV ($P<0.05$) (Table 1).

Table 1 Baseline Characteristics

Characteristic	No erosion cases (n=994)	Erosion cases (n=42)
Age(years)		
45~55 (n)	475	26*
Without 45~55 (n)	519	16
Times of delivery < 2	94	9
Times of delivery ⩾2	900	33
POP-Q II (%)	27.2%(271/994)	45.2%(19/42)*
POP-Q III (%)	36.0%(358/994)	23.8%(10/42)
POP-Q IV（%）	36.7%(365/994)	31.0%(13/42)
Menopause (%)	61.7%(613/994)	69.0%(29/42)
RT (%)	27.8%(276/994)	38.1%(16/42)

Note: * indicated a significant difference.

3.2. Clinical Characteristics

The first 3 main symptoms of erosion were vaginal discharge, pain and dysperiunia. Pelvic examination was done for all the patients, and all the patients were diagnosed by pelvic examination. The follow up time ranged from 3 months to 106 months, with the average time of totally 1036 cases was 45.8±2.9 months. The erosion took place ranged from 1 month to 48 months after surgery. The mean time of erosion took placed was 11.4±2.8 months.

3.3. Surgical Procedures

The erosion rate in total pelvic mesh reconstruction (including mesh, Prolift-T and Avelta) was 4.24% (5/118); The erosion rate in transvaginal hysterectomy (TVH) and total pelvic mesh reconstruction was 5.79% (4/69); The erosion rate in TVT-O+TVH+ total pelvic mesh reconstruction was 10.34% (3/29); The erosion rate in total pelvic mesh reconstruction +TVT-O was 9.68%(3/31); The erosion rate in anterior pelvic

reconstruction surgery was 2.42% (9/372); The erosion rate in anterior pelvic reconstruction + TVT-O was 8.47%(10/118); The erosion rate in TVH + anterior pelvic reconstruction + TVT-O was 7.14%(7/98); The was no erosion in only TVT-O (Table 2).

There was no significant difference between TVH altogether and no TVH (P>0.05). There was no significant difference between with and without TVT-O together (P>0.05), but the rate in total pelvic reconstruction is obviously higher than anterior pelvic construction surgery (P<0.05).

Table 2 Surgical Procedures of Erosion

Surgical Procedure	Total cases (n)	Erosion case (n)	Rate (%)
TPR	118	5	4.24
TPR +TVH	69	4	5.79
TPR + TVH+TVT-O	29	2	6.90
TPR+TVT-O	31	3	9.68
APR	331	9	2.71
PPR	41	2	4.88
APR+TVT-O	118	10	8.47
APR+TVH+TVT-O	98	7	7.14
TVT-O	201	0	0

TPR: total pelvic reconstruction; TVH: transvaginal hysterectomy; APR: anterior pelvic reconstruction; TVT-O: tension free transobturator tape.

3.4. Erosion Position

In a total of 42 cases, 71.4% (30/42) happened in anterior vaginal wall, 21.4% (9/42) happened in posterior vaginal wall, 4.8% (2/42) happened in both anterior and posterior vaginal wall. 2.4% (1/42) happened in the puncture path of the two thigh root. The erosion rate in the anterior vaginal wall is obviously higher than posterior wall (P<0.05). There were no erosion happened in bladder or rectum. 2.4% (1/42) happened in the puncture path of the two thigh root (Table 3), the symptom of which is the pain and delayed healing of the two thigh root, until the mesh can be seen from the skin and after surgery, it was cured until the eroded mesh was expelled by surgery.

3.5. Inflammation

In all 42 erosion cases, 80.9% (34/42) had been diagnosed with vaginitis (including acute and chronic) by leucorrhea routine examination at the follow up time when erosion has been diagnosed.

Table 3 Erosion Position

Position	Erosion cases(n)	Rate (%)	P
Anterior Vagina wall	30	71.4	0.017
Posterior Vagina wall	9	21.4	0.068
A and P	2	4.8	0.057
Bladder or Rectum	0	0	0.142
Puncture Path	1	2.4	0.156

4. Discussion

For female pelvic floor dysfunction caused by the defects of pelvic floor tissues, and the dysfunction of pelvic, surgery is the main treatment. Traditional surgery has a downside of big hurt and easy to relapse, the use of replacement of materials in last decades can decrease the recurrence rate obviously. Meanwhile, doctors are paying much more attention to the complication of replacement materials. Erosion is the most common and special complication of the use of replacement materials, how to treat and prevent erosion is really a big problem.

4.1. The incidence of erosion

So far, the incidence of the erosion of the material is different from 0.7% to 12% [7-8]. The incidence is different from different surgery procedure, Visco reported that the incidence of mesh erosion transsacrospina is 3.2%; and that transvagina is 40% [9].The incidence of our article is 4.05%. The incidence of erosion of TVT-O reported by Delency is 23%, but in our research, it is 0. The different incidence maybe caused by the surgery skills, the choice of surgery, whether follow up and the time of follow up.

4.2. The features of erosion

Since the high strength and the mechanical phonograph of the substitute materials, which can rebuild the defective tissues of the pelvis, the pelvic reconstructive surgery with replacement materials became more and more popular. The indication of such surgery is to enhance the defect of the pelvis, the persistence pressure of pelvis like chronic cough, constipation, COPD and obesity. The characteristic of an ideal mesh should be physically and chemically inert, not carcinogenic, no immunity, easy mechanical fixation, antiinfectious and low price. If we typed the replacement materials by the diameters of the hole which mesh is, the prolene mesh we used is type I (big

hole type), the diameter > 75μm; the big hole can prevent infection.

4.3. The clinical characteristics of erosion

Firstly, the cause of erosion is unknown until now, most scholars agree that it may be caused by the reasons listed below. 1. Infection, especially asymptomatic subclinical infection, can lead to delayed union of the incision and erosion can be caused at last. All the 42 biopsy results of erosion showed chronic inflammations, and more vaginal discharge can be observed than in no erosion patients, it may be caused by suture reactions postsurgery, or no vaginal scrub outpatient. 2. Tension is much stronger after surgery. Our research showed that, vaginal mesh, especially anterior vaginal mesh, is more easy to erode than others, but there is no erosion in TVT-O, it may be caused by the huge area which mesh had then sling, so the erosion rate that mesh had is more higher than others, and the skills for mesh is more requested than slings, the high pressure of tension can infect the circulation of vagina, the tightly mesh rubbed, and the partial tissue damaged, recovered and repeatedly again and again, with the stimulate of chronic inflammation, erosion happened at last [9].

Secondly, the occurrence time of erosion reported by Deffieux [10] showed that in 27 cases of erosion, 59% occurred in one year postoperatively, 41% occurred longer than one year. Our research showed that erosion took place ranging from 1 to 48 months after surgery. The mean time of erosion took placed was 11.4±2.8 months. In total 42 cases, 66.67% (28/42) of erosion cases occurred in one year and in the early time postoperatively. But accompanied with the deep research, the forward complications of erosion may be more. So we suggest the follow up time should be persistent at least for one year.

4.4. The risk factors of erosion

Achtari reported that age was an independent risk factor for erosion in 2005 [11]. Deffieux reported that age >70 years was an independent risk factor [10]. All their research didn't show that there is a relationship between the type of mesh and the occurrence of mesh erosion. Thampson reported that a hysterectomy with the pelvic reconstructive surgery synchronously lead a high mesh erosion rate [12]. Our research showed that hysterectomy was not one of the factors of mesh erosion. Also, we analyzed the risk factors including times of labor, age and whether menopause, and we didn't find any risk factors that could lead mesh erosion. However, we found that the erosion rate in age 45-55 was obviously higher than other age ranges, which may be caused by most women in this age are undergoing menopause, estrogen level is waving, estrogen receptor (ER) is widely spread in body, tissues, muscles and ligament, and the expression of estrogen is related with ER, low estrogen level can lead atrophy and defect of pelvic muscles and tissues [13].

4.5. The treatment and prevention of erosion

Since the erosion can infect the quality of women's life severely, the prevention of erosion is very important. Bako found that more fixation of mesh and the reduction of movement can prevent erosion [14]. Secondly, strictly sterilization, stop bleeding and tenderness tissue separation can reduce the formation of hematomas. Thirdly, the purse string suture of vagina wall after the place of mesh can reinforce the pelvic floor support organization.

Deffieux [10] showed that 15 patients accepted another surgery to remove the mesh while 12 patients accepted conservative treatment in all the 27 erosion cases altogether. In our research, for 35 patients whose erosion once diagnosed and removal surgery was given and then Ornidazole suppository was given transvaginal for 7 to 10 days accompanied with estiol ointment together, all the patients were cured. For the other 7 cases, we give conservative treatment like Ornidazole suppository and estiol ointment together, but it played no use, and surgical treatment to remove the eroded mesh was given at last. Therefore, our experience for the treatment of mesh erosion is that once erosion was diagnosed, the eroded part of mesh removal surgery should be given as quickly as possible, no matter how big or small the erosion area is, and accompanied with Ornidazole suppository and estiol ointment together. All the 42 erosion cases in our research had got a good treatment and cured, no recurrence case again.

In conclusion, the pelvic reconstructive surgery with replacement materials is becoming more and more popular due to its high cure rate and low recurrence rate. The problem of complication especially erosion is also notable [15]. A strict chosen preoperatively, tenderness operation, tension free, strict stop bleeding and sterilization, no more removal of vaginal tissue while operating, antibiotics using and iodopha vaginal scrub postoperatively can prevent mesh erosion. A strict follow up is also needed postoperatively. Mesh erosion

once diagnosed, surgery should be given to the patients to remove the bareness mesh as soon as possible. The effective is good after positive treatment.

References

[1] Handel LN, Frenl TL, Kim YH. Results of eystocele repair: a comparison of traditional anterior colporrhaphy, poly propylene mesh and porcine dermis. J Urol, 2007;178:153-156.

[2] Olsen AL, Smith VJ, Bergstrom JO, Colling JC, Clark AL. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. Obstetrics and gynecology. 1997;89:501-6.

[3] Nitti VW. The prevalence of urinary incontinence. Rev Urol. 2001; 3 Suppl: S2-6

[4] Li Yan. Li JC. The analysis on incidences and the pathogenesis risk ractors in female stress incontinence. Ningxia Medical Journal. 2009;1:26-68.

[5] Nygaard IE, McCreery R, Brubaker I, et al. Abdominal sacrocolpopexy: a comprehensive review. Obstet Gynecol. 2004;104:805-823.

[6] Shah HN, Badlani GH. Mesh complications in female pelvic floor reconstructive surgery and their management: A systematic review. Indian journal of urology: IJU: journal of the Urological Society of India. 2012;28:129-53.

[7] Mistrangelo E, Mancuso S, Nadalini C, et al. Rising use of synthetic mesh in transvaginal pelvic reconstructive surgery: a review of the risk of vaginal erosion. J Minim Invasive Gynecol. 2007;114:564-569.

[8] DeSouza R, Shapiro A, Westney OL. Adductor brevis my ositis following transobturator tape procedure: a case report and review of the literature. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:817-820.

[9] Chen HY, Ho M, Hung YC, et al. Analysis of risk factors associated with vaginal erosion after synthetic sling procedures for stress urinary incontinence. Int Urogynecol J Pelvic Floor Dysfunct. 2008;19:117-121.

[10] Deffieux X, de Tayrac R, Huel C, et al. Vaginal mesh erosion after transvaginal repair of cystocele using Gynemesh or Gynemesh-Soft in 138 women: a comparative study. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18: 73-79.

[11] Achtari C, Hiscock R, O'reily BA, et al. Risk factors for mesh erosion after transvaginal surgery using polypropylene (A trium) or composite polypropylene / polyglactin 910 (Vypro II) mesh. Int Urogynecol J Pelvic Floor Dysfunct. 2005;16:389-394.

[12] Thampson PK, Pugnire JE, Sang IH aghpeykar H. Abdominal sacrocolpopexy utilizing Gortex-Tex in genital prolapse. J Pelvic Med Surg. 2004;10:311-317

[13] Fekorkow DM, Kalbfleisch RE. Total abdominal hysterectomy at abdominal sacrovaginopexy: a comparative study. Am J Obstet Gynecol. 1993;69:641-643.

[14] Bako A, Dhar R. Review of synthetic mesh-related complications in pelvic floor reconstructive surgery. Int Urogynecol J Pelvic Floor Dysfunct. 2009;20:103-111.

[15] Wu MP. The use of prostheses in pelvic reconstructive surgery: joy or toy. Taiwan J Obstect Gynecol. 2008;47:151-156.