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Transvaginal mesh procedures for prolapse, analyzing its outcome rates and complications-literature review

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Abstract

Objective of the study: To know the efficacy of transvaginal mesh repair augmented by synthetic polypropylene mesh for pelvic organ prolapse with objective and subjective result of the procedure.

Material and methods: Evidence was gathered mostly about transvaginal synthetic polypropylene mesh using the search terms Transvaginal mesh, urinary incontinence, Mesh -complication, anterior prolapse, posterior prolapse, pelvic organ prolapse, vault prolapse, and mesh erosion-From April 2008 to March 2013. Online search range: Pub Med, Medline, RCT, Embase, database, Retrospective study and prospective study.

Result: In vaginal Prolapse surgery, graft or mesh is used more frequently than traditional repairs, which has high failure rates. Vaginal approach of mesh placement and suspension of the upper part of the vagina is seen to be more appropriate and successful, showing effects similar to that of the invasive abdominal approach. Because of its lower failure rates it is recently supported by Cochrane review as well. To make such kinds of surgeries easier, more standard and least invasive vaginal kits are being upgraded. It is said that every surgeon can perform the procedure with mesh kits easily, but it is not so. It needs advance pelvic surgery skills, a lot to understand and the limitations of the technique as well. This current paper focuses the needs for the development of the kit, how to use it, results and complications till date and the techniques how to overcome the complications. Before recommending the technique for general use in all Prolapse patients, a lot of things like investigation on proper patient selection, continue research on graft composition, techniques that minimize complications of needle passes or mesh placement should be understood thoroughly. Apart from these we still should have more surgical skills to perform the procedures, to reduce complications and increase better results.

Conclusion: Transvaginal repair using a synthetic polypropylene transvaginal mesh is a feasible and efficient procedure for the treatment of pelvic organ prolapse with less significant complications. Monofilament macro porous synthetic polypropylene mesh is effective, due to its low risk of infection and foreign body reaction. Proper patient selection is the best way to avoid unnecessary complications.

Keywords: Pelvic organ prolapse, transvaginal mesh, synthetic polypropylene mesh, mesh complication

Introduction

Pelvic organ Prolapse (POP) is a most common disease among women which refers as the protrusion of the pelvic organ down into its actual position throughout the vagina. There are many factors associated with Prolapse; several genes have been suggested to be yoked to the defect of vaginal wall itself or its supporting structures such as ligaments, fasciae or muscle injury. When intra abdominal pressure increases resulting in genital support defective this is chronically subjective with pelvic organ prolapsed [1]. The prevalence of POP increases with age and is approximately 31% across all age brackets. Required surgical repair by age 80 is 11% and operation within 3 years is 29 to 40%. Past literature shows that POP affects half of women aged 50-79 years, it is thought to be increased by 45% in future over 30 years as the general population is increase simultaneously [2]. Recent published data shows that 30-50% of women at risk of developing Prolapse during their lifetime [3]. The main clinical manifestations are visible bulge, symptom of pressure, urinary symptom, bowel symptom and sexual discomfort which is more commonly seen with POP patients [4]. Pathogenesis of POP are not clearly mentioned in past literature however trauma during child birth, congenital weakness of ligament and collagen metabolism thought to be the main risk factor of POP [3]. Population studies have shown

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that Prolapse is more common in whites, less common in Asians, and uncommon in blacks suggest congenital and cultural factors. Genetics may also have a role in those women who have collagen or connective tissue diseases contributing to the development of prolapsed [5,6]. Some women under stress develop pelvic floor dysfunction, including Prolapse, urinary and fecal incontinence [16]. Postoperative-poor attention at the time of hysterectomy leads to prolapsed in some cases [7]. Women with connective tissue disorders may be more likely to develop POP. In a small case series study, one third of women with Marfan syndrome and three fourths of women with Ehlers-Danlos syndrome reported a history of POP [8]. De Lancey has described the suspension of the vagina in terms of levels of support [9]. The support of the upper third of the vagina to the pelvic sidewalls (level I) is via vertical fibers of the paracolpium, which is a continuation of the cardinal ligament. The middle third of the vagina (level II) is attached to the paracolpium and laterally to the Arcus tendons and fascia of the Levator ani muscles. Level III support of the lower third of the vagina is via fusion with the perineal membrane, Levator ani muscles and perineal body. Disruption or dysfunction of any of these levels of support can lead to loss of support and subsequent Prolapse. Difficult vaginal delivery cause both direct Levator ani muscle trauma and neuropathic injury to these muscles, thus contributes significantly to the development of POP [10,11]. In addition, injury to the pelvic connective tissues has been associated with POP; disruption or stretching of these tissues can occur during vaginal delivery, hysterectomy, chronic straining or with normal aging [12]. The majority of treatment is justified through traditional practice rather than scientific evidence. Most of the women that have undergone surgical repair for genital Prolapse, found to have a high recurrence rate of Prolapse, too many technical modifications have been developed to get improve the results [13]. Various types of surgical procedure were introduced previously among them transvaginal mesh repair is the new tradition and the most common procedure across all age groups which method is famous among woman these days [14]. Many techniques were used previously for modification; recent studies are incredible showing minimum complication with the high anatomic cure rate if handled properly. Synthetic implants, a macroporus net made of a wide mesh of knitted polypropylene monofilaments is currently the method of choice for surgery in patients with Prolapse. This process provides additional stability to traditional repair, decreasing the recurrence rate areas. It compromised 75% of all Prolapse mesh surgeries [15]. However, a complication unique to mesh is also mentioned in most of the patients among them mesh erosion or extrusion which seems to be most common even develop several years after the procedure [16-18]. Future research should therefore concentrate on the surgeon's experience as a possible risk factor for failure and might give insight into learning curve aspects of vaginal mesh surgery. This review presents with a large number of transvaginal mesh procedure and determination of statistical method to investigate the effect of the procedure. The review data shows there has been controversy whether transvaginal mesh procedures are best for Prolapse because of its complications; however this method is more effective than other surgical approach.

Materials and methods

A Pub MED, Dynamed, Medline, randomized control trials, was searched for keywords Transvaginal mesh, urinary incontinence, Mesh -complication, anterior prolapse, posterior prolapse, pelvic organ prolapse, vault prolapse, mesh erosion-From April 2008 to March 2013. Searches were updated on a regular basis and also incorporated with recent guidelines. Most of the articles were considered in the process; on the basis of subject relevance. Our specific objectives were to estimate the anatomic cure rate, the risk, benefits and complications, Report adverse event rates associated the mesh/graft use in pop. For review total of 44 articles were include which was previously published between years 2008 to 2012. This paper will review outcome results of these modalities.

Inclusion and exclusion criteria

The inclusion criteria were evidence based original study, randomized control trials, retrospective study, prospective study, the control group and test group. Incidence of the complications was the primary and secondary standards. Follow-up of three months to 38 months were included. Exclusion criteria were Controlled trial or a control group other than transvaginal repair of pop.

Data analysis

(**Table 1**)Altman and Falconaer *et al.,* evaluated safety in a study that involved 248 patients they reported complications as bladder perforation 5, rectal perforation 5 and bleeding more than 1000cc in one patient. In another study by the same author reported outcome of 3 month follow up of anterior, posterior and both compartments repaired with success rate of 87% and 91%respectively. Van Raalte *et al.,* conducted 46 pt. With 10 months of follow-up there were no extrusion was reported however 15% prolapse was occurring in untreated compartment. Migliarie *et al.,* showed that 12 women having POP have undergone transvaginal mesh repair during 20.5 weeks follow-up, it was observed that there was 100% success rate rather than mesh related complication. In the same way, some other studies like De Tayrac *et al.,* And Nieminen *et al.,* Reported that 84 POP repair with 24 weeks of follow-up and 105 POP repair cases with 36 weeks follow-up observation showed 91.6% anatomical cure rate with 8.3% mesh erosion and 87% anatomical cure rate with 1.7% stress urinary incontinence respectively. Scott serela *et al.,* uses solyx (Boston scientific) reported in 63 patients (30-87year older) with 6.5 months of follow up 95% of patients were dry on the basis of subjective and objective assessment. 2 patients were seen with urinary

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Table 1. Transvaginal mesh procedure for pelvic organ prolapse surgery with synthetic polypropylene mesh.

Author/Study	Mesh Type	Follow up a month	Anatomic cure rate %
Julian case control study [19]	Marlex	24	100%
Fatton *et al.,* [20]	Polypropylene	6	96.7
Altman *et al.,* [21]	Polypropylene, prolift	3	87%anterior, 91%posteriory
Sola *et al.,*[22]	Gynecare prolift	7	91%
Van raalte *et al.,*[23]	Gynecare prolift	19	86.6%, 96.5% apical
Hinoul *et al.,* [24]	Gynecare prolift	6	95.8%
Iglesia *et al.,* (RCT)[25]	Gynecare	9.7	40.6%
Cosson *et al.,* [26]	Autologous vaginal patch	3	94%
Kdous *et al.,* [27]	Gynecare	24	93%
Luisa A *et al.,* [28]	Gynecare	12	87 anterior, 91 posterior, 88 both
Laurent de Landshree *et al.,* [29]	Gynecare prolift	38	88%
The Nordic TVM group [30]	Gynecare	2	87%
m.abdel Fattah *et al.,*[31]	polypropylene	4 to 22 months	89%
De tayrac et al[32]	Polypropylene	37	89.1%
Milani *et al.,* [33]	Polypropylene	17	94%
Hiltunen (RCT) [34]	Low weight polypropylene	12	93%
Maher *et al.,* (RCT) 2011[35]	Gynemesh	24 months	94%
Withagen *et al.,* (RCT) 2011 [36]	Gynemesh	12 months	87%
Nieminen *et al.,* (RCT)[37]	Gynemesh	36	87%
Eva m. de. Cuyper [38]	Gynemesh	6 and 12 months	85.7% and 88.9%
Handel *et al.,* [39]	Polypropylene	13.5	86%
Vincent letouzey et al 2010 France [40]	Polypropylene	37-79	94%
Yan *et al.,* [41]	Polypropylene	6.7	90%
Von Theobald & lube. (Retrospective study, France) [42]	Polypropylene	6	98%
Young Suk Lee [43]	Gynemesh	12	79.4%
Migliarie *et al.,*[44]	Polypropylene	20.5	100%
Dwyer and o'reilly [45]	Polypropylene Atrium	24	100%
Bai *et al.,* (prospective cohort)[46]	Gynemesh	12	100%
Fikret faith onol *et al.,*[47]	Gynemesh	33.4-41.2 month	86.4% and 81.1%
Salvatoe *et al.,* 2002 [48]	Prolene	-	87%
Mercer jones *et al.,*[49]	Polypropylene	12	75%
Palma *et al.,* 2008 [50]	Polypropylene	12	88%
Watson *et al.,* [51]	Polypropylene	29	89%
Montironi *et al.,* Italy[52]	Polypropylene	4.6	-
Scott serels et al[53]	Boston solyx	9.5	95%
Smith ARB *et al.,* [54]	Boston solyx	9	83.4%
Petros pe *et al.,* [55]	Boston solyx	36	80%
Moore RD *et al.,* [56]	Boston solyx (TVT)	12	91.4%
Alinsod R *et al.,* [57]	Boston solyx (TVT)	21 weeks	97%
Meschia M *et al.,*[58]	Prolene AC	6-12	78-81%
Beer and Kuhn [59]	Pinnacle	NA	-
Karen l *et al.,*[60]	Lynx(boston scientific)	12	90%
A. Ranganathan *et al.,* [61]	Advantage	6	92%

retention and resolved spontaneously, urge incontinence in 18 (29%); no complication of the procedure was reported. Smith ARB *et al.,* in 36 patients with stress urinary incontinence with 9 months of follow up reported 83.4% of cure rate, the same group reported long term outcome at 3 years of 80% in 31.

In 1958 the first polypropylene mesh was introduced as Marlex by Julian with a 100 % cure rate [19]. In recent years the role of synthetic polypropylene mesh implants has rapidly increased and popular in surgery for pelvic organ prolapse. The incidence of early complication such as hematoma, bladder injury, late complication infection, pain and tape erosion was seen very few. However secondary included urinary tract infection, voiding difficulty, retention and post operative anatomic cure rate objective and subjective. (**Table 2**) shows that complication regarding transvaginal mesh surgery was mesh erosion and extrusion even with minimum and maximum follow-up months. However anatomical cure rate was satisfactory with most of the studies. It also suggested that incidence of secondary outcome was similar with most of the studies. Cosson *et al.,* Surgeons in France who worked on developing the Prolift System, and initially reported on a group of 684 women who underwent transvaginal mesh placement, Cure rate at 1 year was noted to be 82% (18% failure rate). The vaginal mesh extrusion rate was 6.7%, with risk of

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Table 2. Outcome and complication of the transvaginal mesh procedure for pelvic organ prolapse surgery with synthetic polypropylene mesh.

Author/Study	Number of patients	Complications	Comments
Julian case control study [19]	24	25%mesh erosion and infection	Safe and effective
Fatton *et al.*,[20]	110	4.7% mesh erosion, 2.8%granuloma	Procedure effective and safe
Altman *et al.*, [21]	123	10% bladder perforation, 5% rectal perforation, 1% bleeds>1000cc	Secondary outcome reported inconsistently
Sola *et al.*,[22]	41	3.2% injury, 3 bladder injury and 1 rectal injury	Secondary outcome reported inconsistent
Van raalte *et al.*,[23]	46\anterior, 80posterior, 23both	1% mesh extrusion, 1% perirectal hematoma	Less complication
Hinoul *et al.*, [24]	48 anterior	10.5% extrusion, 15% prolapse in untreated compartment	No mesh erosion
Iglesia *et al.*, (RCT)[25]	24	10.5% extrusion, 15% dyspareunia	Mesh extrusion reported earlier
Cosson *et al.*, [26]	687	15.6% mesh erosion, 12.5%- reoperation	Number needed to treat
Kdous *et al.*, [27]	45		-
Luisa A *et al.*, [28]	68	2 dyspareunia, 1 mesh exposure, 4 vaginal discharge, 3 granulation, 6 tenderness over graft	-
Laurent de Landshree *et al.*, [29]	48-anterior, 103-posterior, 373both compartment	3 bladder perforation, 1 rectal injury, 3 urinary incontinence, 19 mesh erosion, 14 mesh exposure,	48-anterior, 103-posterior, 373both compartment
The Nordic TVM group [30]	123	2 mesh exposure, 3 bladder injury, 1 rectal injury	Overall minimal complication
m.abdel Fattah *et al.*,[31]	70-anterior, 70 posterior, 70-both compartment	14 urinary stress incontinence, 23 prolapsed in another compartment, 3 bladder injury, 2 rectal injury, 6 blood loss>400ml., 30 vaginal erosion, 3 vaginal adhesion	Secondary outcome report inconsistent
De tayrac *et al.*,[32]	32	9.1% mesh erosion, 5.5% mesh related pain	Number needed to treat 4
Milani *et al.*, [33]	32	13% mesh erosion	-
Hiltunen (RCT) [34]	19	-	effective
Maher *et al.*, (RCT) 2011[35]	55	9%	-
Withagen *et al.*, (RCT) 2011 [36]	93	16.9%	Elderly pt. rise risk of UTI and urgency
Nieminen *et al.*, (RCT)[37]	105	Stress urinary incontinence, 1.7%, dyspareunia, 19% mesh erosion	
Eva m. de. Cuyper [38]	64	4 dyspareunia, 3 mesh erosion, 4 urgency,	Less complication seen
Handel *et al.*, [39]	25	-	100% success
Vincent letouzey et al 2010 France [40]	63	2 dyspareunia, 8 stress urinary incontinence, 10 urgency, 9 mesh erosion, 1 fecal incontinence	Primary outcome measure inconsistent
Yan *et al.*, [41]	30	1 post operative urinary retention, 5 dyspareunia, 2 incontinence, 1 mesh erosion	Less postoperative complication
Von Theobald & lube. (Retrospective study, France) [42]	92	1 hematoma, 3 vaginal erosion	effective
Young Suk Lee [43]	49	1 vaginal erosion, 2 posterior vaginal prolapsed	effective
Migliarie *et al.*,[44]	12	No mesh related complication	100%success
Dwyer and o'reilly [45]	50	12%-mesh erosion, 1 rectovaginal fistula	High rate of mesh erosion
Bai *et al.*, (prospective cohort)[46]	28	Undefined	-
Fikret faith onol *et al.*,[47]	118	8 stress urinary incontinence, 10 dyspareunia, 10 mesh extrusion, 11 vaginal erosion	Megsh erosion and extrusion average
Salvatoe *et al.*, 2002 [48]	31	6 dyspareunia, 3 infections,	effective
Mercer jones *et al.*,l[49]	22	2 rectal perforation, 13% mesh erosion	Inadequate method
Palma *et al.*, 2008[50]	18	UTI	Safe and effective
Watson *et al.*, [51]	9	No mesh related complication	100% success, but less data
Montironi *et al.*,, Italy[52]	35	1 vaginal erosion	Safe and effective
Scott serels *et al.*,[53]	63	18 urge incontinence	Infection moreover
Smith ARB *et al.*, [54]	36	2 mesh erosion	success
Petros pe *et al.*, [55]	36	-	-
Moore RD *et al.*,l [56]	61	7% urinary retention	Postoperative care inadequate
Alinsod R *et al.*, [57]	76	4 Voiding difficulty	Most effective
Meschia M *et al.*,[58]	91	Recurrent UTI, dyspareunia	Infection other than mesh related
Beer and Kuhn [59]	55	2.3%hematoma, 2.9% urological problem, 0.8% damage to pelvic wall, 1.8% damage to nerve	Operative skill
Karen l *et al.*,[60]	102	4 bladder perforation, 5-mesh erosion, 2 recurrent incontinence, 6 de Novo urge loss, 10 failure	Less complication
A. Ranganathan *et al.*, [61]	81	4 persistent urinary incontinence, 2 de Novo overactive bladder	Less complication

mesh extrusion increased. De Novo dyspareunia was noted to be 4.9%. Fatton *et al.,* Published one of the first retrospective, multicenter series that reported on initial operative and short-term follow-up data on 106 patients who underwent the procedure. All patients had a Stage III or Stage IV. Total mesh was used in 59 patients (53.6%), an isolated anterior

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mesh in 22 patients (20%), and an isolated posterior mesh in 29 patients (26.4%). One bladder injury was reported that was sutured at surgery and two hematomas reportedly required secondary surgical management. In 3 months, all 106 patients were available for follow-up. Mesh exposure occurred in five patients (4.7%), two of them requiring surgical management. Granuloma without exposure occurred in three patients (2.8%). Failure rate (recurrent prolapse, even asymptomatic or low-grade symptomatic prolapse) was 4.7%. No sexual function data were reported due to the short follow-up. The Nordic TVM group published the first prospective study to date on the short-term outcomes of transvaginal repair of prolapse using Polypropylene. They are conducting a 3-year prospective multicenter trial in 28 centers and have published on the initial safety and early efficacy of the procedure with 3 month follow-up of 123 cases. There were injuries reported in 3.2% of the cases (three bladder injuries and one rectal injury) and only two mesh exposures reported at 3-month follow up. Postoperative cure (POP-Q Stage 0 or I) was 87% after anterior Prolift, 91% after posterior Prolift, and 88% after total Prolift. They also did a macroscopic assessment of the vaginal epithelium and noted an increase of mild moderate granuloma formation in the operated areas, but no cases of serious adverse tissue reactions related to the mesh. All quality of life scores improved at the 3-month visit. There were no serious adverse events attributed to the polypropylene mesh.

Van Raalte *et al.,* recently reported on 97 patients who underwent the prolift procedure with a median follow-up of 19 months [**68**]. Prolift procedures included 46 anterior, 26 posterior, and 23 total (both anterior and posterior). Intraoperative complications included four cystotomies (8.6%) and one urethral obstruction. Overall cure rate at 1 year or greater was 86.6% for all compartments. Failure in the same site that mesh had been placed was lower at 10%; however, they did find that prolapse occurred in 15.5% in an untreated compartment. Apical cure was 96.5% and reoperation rate for prolapse was low at 4.3%, which they stated is comparable to abdominal sacralcolpopexy at 4.4%. They reported no long-term complications and no mesh extrusions. Dyspareunia rates were not reported. They concluded that the potential for improved surgical outcomes will be achieved only through modifications of techniques, longer-term follow-up, and proper patient selection.

Sola *et al.,* and Hinoul *et al.,* have the only other published series in the literature regarding the Prolift procedure. Sola *et al.,* retrospectively reported on 41 patients who underwent the Prolift procedure, with an average of 7 months follow-up (range: 2–12 months). One perirectal hematoma occurred postoperatively. Four failures were observed with a cure rate of 91.3%. Only one mesh extrusion occurred (2.4%). Hinoul *et al.,* most recently prospectively reported on 48 patients who underwent anterior Prolift. They reported a 95.8% cure rate with a 10.4 % rate of mesh extrusion. In nine of 29 (31%) sexually active patients, dyspareunia due to prolapse was present prior to surgery and disappeared in all. De Novo dyspareunia, however, did occur in 15% of patients.

Altman recently evaluated perioperative morbidity from placement of Prolift transvaginal mesh in 248 patients. 1 Visceral injury occurred in 4.0%, bleeding greater than 1000 cc. At 0.4%, urinary tract infections in 6.5%, urinary retention in 1.6%, postoperative fever in 1.6%, and groin pain in 0.8% of patients. Unfortunately, there are even fewer data on long-term complications, such as mesh erosions, chronic pain, and defecatory dysfunction.

Discussion

Recent studies on monofilament synthetic polypropylene mesh impants have shown that the anatomical recurrence rate is very lower after the use of mesh material as compared to classical prolapse repair without mesh [**62**]. Mono filament macro porous (pore size > 75 μ m) polypropylene mesh is preferred for transvaginal surgery for POP or stress incontinence because of the low risk of infection and foreign body reactions [**64**]. The short-and medium-term follow- up effects of vaginal repairs for prolapsed using synthetic polypropylene mesh are promising. However, since this technique was introduced, there have been concerns about vaginal erosion. According to several surveys, the rate of vaginal erosion after vaginal wall repair ranges from 3.8% to 20% [**65**,**66**], although the definition of erosion in these studies has been usually absent or confusing. One year was considered a minimum adequate period of time to assess the efficacy of prolapsed repair. However, even one year outcomes are too early to judge whether prolapsed surgery is successful in the long term. The mean time to first re-operation is reported in the literature as 12-years [**66**] and therefore, failure at one year should not be regarded as an adequate representation of efficacy. Prospective studies would require extended follow-up to assess meaningful mesh/graft failure.

Interestingly though, there have been several recent reports that have shown that the overall risk of dyspareunia, when carefully studied and when the procedure is done by experts, is actually lower than traditional surgery for prolapse. Lowman *et al.,* showed the overall risk of Dyspareunia for the Prolift procedure to be 16.7% [**26**]. Although, at first glance, this rate does seem high, they compared it to historical control studies and found that even with traditional vaginal or abdominal repair for prolapse, dyspareunia rates are in the range of 14.5–36.1%. Thus, they reasoned that the Prolift procedure has comparable rates of dyspareunia.

Overall all studies suggest that the anatomical cure rate is >90% with the utilization of these meshes and beneficial for the patients and surgeons because of less operative time, blood loss and gentle technique. However the risk of complication is still there during and after the procedure, but it shows in low percentage, hence we can say that this technique is more beneficial than other procedures for patients. Still need to improve the technique in the future to minimize

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the complication rate. Most of the patient with prolapsed complains of urinary incontinence, fecal incontinence, pelvic pain, back pain, sexual dysfunction. So it is very important to evaluate the patient's symptoms in relation to the existing prolapsed. The mesh procedures themselves are done quickly and easily through the same incision. One of the advantages of using mesh kits in repairing POP is the less invasive character of the process, which results in decreased operative time and blood loss [68]. The disadvantages to using these mesh devices from the erosion and extrusion rates of material. This type of complication is reported in the literature and occurs in 2.8% to 17.3% of cases [69]. Several factors are believed to contribute to mesh erosions. These include a poor healing environment, which is influenced by blood flow, infections, foreign body reactions, and mesh characteristics [70]. Deffiqux *et al.,* [66] compared the erosion rate between different types of mesh and concluded that there were no any differences.

The overall percentage rate of complications cannot be truly calculated and is difficult to ascertain from these types of reports secondary to the fact that the total number of procedures completed is unknown. It is clear, however, that many surgeons who are completing these processes may not be experienced enough or have the skills to take care of the complications; therefore, the patients are then shipped to specialists who seem to be pretty successful in managing the complications.

First mesh kits for POP repair were received by the FDA in 2001 and was reported equal to the surgical mesh repaired for the hernia. However there were no clinical data evaluated. Now a day, out of 100 synthetic mesh kits used for the POP repair, only about 20% are available in the market. Surgical mesh has been used greatly for the transvaginal repair of POP since 2004. Moreover complication free result and effectiveness of the mesh used through the vagina is still a controversial lack of evidence [71]. According to one review 30 studies on 2653 patients performed with success rate 87-95%, on several follow-up from 26weeks to 78 weeks [72]. According to another review, the operation rate to reduce complications and total operation rate overall was highest for transvaginal mesh repair than native tissue vaginal and abdominal repair [73]. In 2010 Cochrane review conducted 9733 patients in 40 studies of several surgical methods for POP repairs and mesh graft was found to be more appropriate for anterior anatomy than native tissue vaginal repair, However transabdominal repair showed better results [74] there was a high complication rate of vaginal mesh repair of POP than that of vaginal native tissue, with 10% mesh erosion complication [3].

The SOGC (Society of gynecology Canada) analyzed 18 studies with POP mesh repair, out of which 9 were 3-12 months follow up, and one was randomized trial 128 anatomical cure rate was less than stage 2 of the POP measuring system (that is leading edge of POP system and of hymeneal ring) and was reported as 75-100% [75]. The SOGC recommends transvaginal mesh repair as new techniques, has high anatomic cure rate in uncontrolled short term case series, but needs specific training for surgeons to every device prior to vaginal mesh repair; through counseling about the benefit and the rise of the procedure is required for every individual patient. In a recent RCT of 389 patients anterior mesh repair and are colporrhaphy, anatomic stage 0 and stage 2 Prolapse showed higher cure rates with interior mesh (60.87%) compared to colporrhaphy (34.5%) in a year. Bladder injury and bleeding were higher in mesh groups. Surgical re-intervention and mesh repair was 3.2%.

Regarding RCTs and Meta-Analyses the initial lack of high-quality data could not guide physicians in the appropriate use of synthetic mesh-based procedures because there was scant Level 1 evidence published in the years after the FDA's approval. Over the past few years, however, multiple RCTs and meta-analyses have helped provide higher quality outcomes data regarding the use of synthetic mesh. The RCTs most reviewed are very well-designed, and all but one met statistical power requirements [76]. However, individual results must be interpreted with caution because most conclusions are weakened by their non blinded outcomes assessment. Generalization of these events is also significantly limited because surgical methodologies between trials are known to change. Regarding to efficacy, though, mesh-based procedures provide equal or greater short-term anatomic cure rates compared with traditional repair, particularly for anterior vaginal wall Prolapse. Most RCTs only reports short-term outcomes, however, and therefore cannot be extrapolated to long-term results. Likewise, there are no exact data to suggest mesh use for apical or posterior compartment Prolapse repair at this time [77]. No investigation has documented significantly improved patient reported outcomes when comparing the different repair methods. For these reasons, widespread use of mesh for POP cannot be recommended over traditional repair without a caution. Perhaps more important are the potential complications and safety implications associated with mesh-based repair, which should be discussed with the patient when considering its use [78].

Complication of transvaginal mesh

Most common post operative problems occur with pain which is related to mesh along with mesh erosion, exposure, perforation such as bladder and bowel [79]. Among them most at least common symptom is mesh erosion which occurs in 5 to 19% of all women, SOGC report suggests 2 to 11% however different ratio suggest that longer follow up is necessary to provide adjunct data. One of the author research found that mesh erosion is commonly seen in 7 to 20% [80] of all women who underwent to these procedures, simultaneously same author described that patients age is the risk factor for developing erosion [81]. In a multicentre cohort retrospective study they concluded that mesh retraction, contraction and shrinkage is associated with pain and it is approximately 11.7% [82]. The SOGC and Canadian association

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report they concluded that urogenital atrophy, and smoking is also associated with mesh erosion as a risk factor, and they suggest to use of tropical estrogen can be helpful in most of the woman [**83**]. Half of the patient required to remove the mesh completely or partially and anatomical cure rates varies upon 18.8 to 56% and POP-Q system stage-2 strongly reported in such patient with 5 years of follow-up [**84**]. 18% of the women developed pelvic muscle dysfunction and pain; of these, one quarter continued to have symptoms after 6 months of therapy. Pelvic pain, groin pain, and dyspareunia can occur with pelvic reconstructive surgery regardless of the use or nonuse of mesh. However, a complication unique to mesh is erosion (also described as exposure or extrusion), which seems to be the most common complication, and may sometimes present several years after the index procedure One of the study reported that pain after vaginal mesh placement are not understood. Most of the hernia mesh also retraction and pain were revealed gradually in patients at 5 years [**85**]. Mesh grafts in the vagina are placed in a clean contaminated field with a single vaginal incision, and the "arms" of some mesh configurations pass into the obturator internus and levator-ani muscles. Shrinkage or contraction of mesh around these structures or excess tension on the mesh arms can cause vaginal pain in some individuals. All vaginal surgery can potentially affect vaginal length and function; however, the addition of synthetic mesh could make the vagina, a cylindrical organ that expands and contracts, less pliable and perhaps more prone to pain or dyspareunia. One ultrasound study evaluating women at 3 months after anterior vaginal mesh placement found severe contraction or shrinkage, defined as a decrease of more than 50% of the size of the mesh, in 9.3% of patients [**86**]. Some of the survey revealed that mesh durability and complication is very lower based with short term follow up and of few limited data; however some of the patient who underwent vaginal procedure healed without any problem, but some group experienced life threatening symptom. So large cohort study is desperately needed to infer the number of mesh- augmented vaginal procedures, that are being performed and its future risk and benefit. The exposed mesh should be excised; the edge of the vaginal epithelium undermined freshment and should close with absorbable interrupted sutures. Proper selection of the patient is necessary to avoid complications. Till the date no randomized controlled trials were published whether to choose correct patient for mesh kit.

Conclusion

Monofilament macro porous polypropylene mesh, due to its low risk of infection and foreign body reaction, highly adopted method of transvaginal surgery for pelvic organ prolapse and found to be more successful according to the short and medium term follow up results of vaginal repairs using this mesh, though vaginal mesh erosion is an issue of concern, but it is reported in studies that using synthetic polypropylene mesh kit for pelvic organ prolapse repair has better outcome result. Initial surveys are very encouraging and showing high cure rates with minimal complications when used properly. Proper patient selection is the best way to avoid unnecessary complications. Long term follow-up is needed to better elucidate the use of polypropylene synthetic mesh for pelvic organ prolapse repair. There is another possibility that stem cell and gene therapy are likely to play a role in future management of pelvic organ prolapsed [**87**]. However matter is concerned about good anatomical and surgical skills for future minimization of complication rate and better choice of meth regarding to develop more advanced technique for POP. These techniques will likely be a part of Gynecologist's future challenges to test materials, finalize dimensions, assemble model test and calibrate model.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

R Thakur designed the study and carried out most of the study. All co-author collected information and provided valuable suggestions in the preparation of the manuscript.

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