

REVIEW ARTICLE

COMPARISON THE SUCCESS RATE OF VESICOVAGINAL FISTULA REPAIR SURGERY WITH TRANSVAGINAL AND TRANSABDOMINAL PROCEDURE: META ANALYSIS

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ABSTRACT

Objective: This paper aims to evaluate the success rate of vesicovaginal fistula (VVF) repair surgery by transvaginal (TVAG) and transabdominal (TPA) procedure. **Method:** Literatures were searched on the online database, PUBMED and Google Scholar. All of the studies should be belonging on to inclusion criteria. The literatures had qualitative analyze by the authors and bias criteria based on *Review Manager 5.3* application. It also had quantitative analyzed by the same application. **Results:** The literatures have 191 patients (transvaginal-n=107; transabdominal-n=84). The data was homogen ($\chi^2 < df; P > 0,05$). The forest plot showed that TPA has a higher success rate than TVAG, still not statistically significant (test overall effect $P > 0,05$; 95%CI was 0,59 to 5,30). **Conclusion:** Transabdominal procedure has a higher success rate.

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INTRODUCTION

Vesicovaginal fistula (VVF) is an abnormal channel between the bladder and the vaginal that cause prolonged and continuous urinary incontinence. Number of cases are high in developing country¹. Incidence rate at Sub-Saharan Africa were 2 million women per 50,000 – 10,000 populations^{2,3}. The etiology of VVF can be acquired and congenital. In developed country, obstetric trauma is the common etiology of acquired VVF⁴. The following number of the common etiology is total abdominal hysterectomy⁵. Malignant infiltration from various pelvic cancers is the third cause of VVF⁶. Pelvic tumor radiation also can be the cause of VVF. It may appears a couple years after the therapy⁶. The others cause could be trauma and iatrogenic from obstetric, gynecologic, or urological surgery^{1,7}. The pathophysiology of VVF in obstetric trauma is an ischemic fibrous while having a labour. In delayed labour, the bladder neck and

the uretra pressed by the head of the fetus and symphysis pubic. This condition cause fibrous ischemia and anterior vagina wall necrosis. The necrosis will detach and remove after day tenth^{8,9}.

The major symptoms of VVF is consistent urine leakage from the vagina⁽⁶⁾, bad smell and wet sensation that were interfere life quality of the patients^{1,10}. Patients complaint the continuous urine leakage from vagina that cannot be held. Also, there were history of obstetric trauma, gynecologic procedure or radiation therapy. The examiner will obtaine small granulated lesion, hyperemia and not specific hollow while did vaginal touche. Methylen blue test will be positive at VVF patients. Imaging examination will support the diagnosis of this case, such as cystoscopy, intravena pyelography (IVP), retrograde and voiding cysto-urethrography, MRI fistulography, pelvic CT Scan and USG⁽¹⁾⁽⁴⁾. Cycstoscopy will provide the specific anatomical origin of the leakage^{4,6}.

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Management of VVF can be divide by two approaches, they are conservative and surgical. Conservative managements are urine catheterization, fibrin-collagen sealant and platelet rich plasma (PRP) injection. Conservative therapies for reccurent VVF use percutaneous nephrostomy (PCN) or modified with ureter occlusion bilateral, sabutyl-2-cyanoacrylate injection, detachable or non-detachable ballons, and sponges made from nylon, plugs, coils or gelatin^{4,6}. Simple VVF is indicated for conservatives with 4-6 weeks of recovery⁽¹¹⁾. There are various approach for surgical management, such as transvaginal, transabdominal, laparoscopy, and combination⁴. Complex and radiated type VVF are indicated for surgical repair. The expected outcome from these therapies are the closure lesion, better quality of life, and sexual functions⁷.

In the UK and developed world, Warner R et al. suggests that vaginal repair is significantly more cost-effective than abdominal repair owing to the shorter operative time and length of stay with no significant difference in the success rates.⁷Tatar B et al. researched that vaginal approach to VVF repair is more cost-effective because the mean hospitalization time is less compared with transabdominal repair, and this difference emphasizes the vaginal route as the first choice without compromising the success rate⁴. This paper aims to evaluate the success rate of vesicovaginal fistula (VVF) repair surgery by transvaginal (TVAG) and transabdominal (TPA) procedure.

METHODS

Data Search Strategy

The literature was obtained from online search engine, PUBMED and Google Scholar. The keywords used are vesicovaginal fistule, transvaginal repair, transabdominal repair, omental flap interposition and Martius labial flap. Then, all of the literatures (n=68) selected by the title and abstract after the duplicate removed. Fifty articles were excluded for the

use of languages other than English and Indonesian. Eighteen articles were screened, then twelve articles excluded because of the unavailable of full text studies. Six full-texted articles were evaluated and furthermore, two articles were excluded because these studies used laparoscopy and robotic surgery. Four articles were included (fig. 1) and analyzed using *Review Manager 5.3* (Cochrane Collaboration, Oxford, UK).

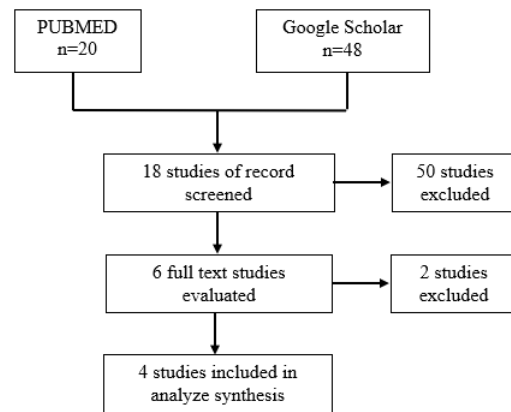


Figure 1. Flowchart of the searched literature

Inclusion Criteria

Inclusion criteria of this review: (1) cross sectional and cohort study, (2) English and Bahasa full text study, (3) vesicovaginal fistule sample, (4) comparison the clinical outcome of VVF repair with transvaginal (TVAG) - Martius labial interposition flap procedure and transabdominal (TPA)-Omental flap interposition procedure, (5) all inclusion papers can be fully accessed, and (6) the data obtained can be analyzed accurately.

Study Quality Assessment

Four of the studies were qualitatively and independently appraised by the authors using bias criteria from *Review Manager 5.3* application. The author discussed and assessed the category of each criteria (low-risk bias, intermediate bias, or high-risk bias). Most of the included literature have high risk of bias. It is shown from the red line of the outcome in funnel plots (fig. 2 and fig. 3).

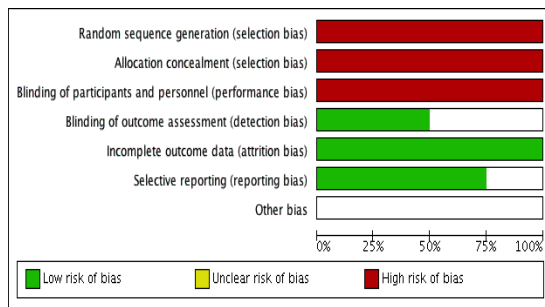


Figure 2. bias stratification risk of articles in this study

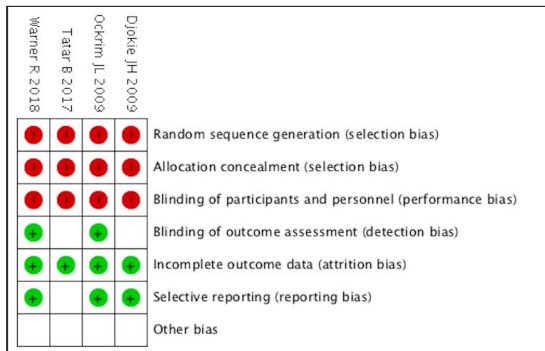


Figure 3. Assessment of the risk of author bias for each inclusion article

Data Extraction

The criteria to extract the data: (1) main author; (2) year of publication; (3) country of the study; (4) design study; (5) inclusion criteria; (6) intervention; (7) success rate of the VVF repair; (8) recurrence rate of the VVF repair. This study compares the success rate of VVF repair intervention by compared TVAG and TPA procedure. The outcome expressed by odd ratio (OR) and the significance represented by P value, then analyzed by *Review Manager version 5.3.* (Cochrane Collaboration, Oxford, UK). Beside of

number, there is a forest plot that will provide summarize outcome of this study.

RESULT
Study Characteristics

Four literatures were reviewed as a retrospective study. Three of them are cross sectional^{4,7,12}, one is a cohort study⁶. One study with prospective data, but reviewed as a retrospective⁷. All of studies have VVF case with variance of age, etiology and time span. A study of Djokic et al, 2009 have 220 participants with the longest time span (1978-2004). Intervention in the literatures had surgical repair with TVAG and TPA. Other approaches were done by another studies, they were Djokic et al, 2009 (Transvesical-TVES n=129) and Tatar et al, 2017 (laparoscopic n=2; urinary diversion (UD) n=2). Still in this review focused on TVAG and TPA approach to compare the recurrent rate for getting the success rate between the approaches. All of the studies have no significant difference in recurrent cases. Some additional outcome also obtained in those literature. Djokic et al, 2009 states that TVAG reffers to simple VVF than TPA for complex VVF and big size lesion and radiologic caused prefer use TPA. A case of VVF in Ockrim et al, 2008 had failed healing because 3 cm of lesion and no omental interposition. Warner et al, 2019 study with prospective data stated that TPA approach has longer operating time, longer length of hospital staying (length of stay-LOS) and higher cost than TVAG approach. Detail data of each study showed in table 1.

Table 1. characteristic of the data from each article

Author	Design Study	Person	Intervention	Comparison	Outcome
JH Djokic et al, 2009	Retrospective – Cohort study	VVF case between 1978-2004 n=220	1. TVAG – martius labial interposition 2. TPA – Flap interposition (omental flap interposition) 3. TVES – extraperitoneal cystostomi approach	recurrence rate of TVAG, TPA, and TVES	<u>success rate:</u> 1. TVAG-56/59 patients (94,9%) 2. TPA-30/32 patients (93,8%) 3. TVES-122/129 patients (94,6%) <u>reccurrence rate:</u> primary: 1. TVAG-3/59 (5,1%) 2. TPA-2/32 (6,2%) 3. TVES-7/129 (5,4%)

					secondary: 1. TVAG-1/3 (33,3%) 2. TPA 0/2 (0%-all patients full recovery) 3. TVES-2/7 (28,6%)
Jeremy L. Ockrim et al, 2008	Retrospective – Cross sectional study	32 of VVF cases between 2000-2006	1. TVAG – martius labial interposition 2. TPA – Flap interposition (omental flap interposition)	recurrence rate of TVAG and TPA	<u>Success rate:</u> 1. TVAG-11/11 patients (100%) 2. TPA-18/21 patients (85,7%) <u>recurrence rate:</u> secondary: PA-2/3 (66,7%) 1 patient had failed surgery with VVF post radiotherapy, >4cm size lesion, no omental interposition.
Burak tatar et al, 2017	Retrospective – cross sectional study	20 of VVF cases between 2006-2015	1. TVAG – martius labial interposition 2. TPA – Flap interposition (omental flap interposition) 3. Laparoscopic 4. Urinary diversion – Ileal conduit technique	recurrence rate of TVAG, TPA, laparoscopic and urinary diversion (UD).	<u>success rate:</u> 1. TVAG-5/5 patients (100%) 2. TPA-11/11 patients (100%) 3. laparoscopy-1/2 patients (50%) 4. SLPE-UD (n=1); ILPE-UD (n=1) <u>recurrence rate:</u> laparoscopy 1 patient SLPE: Supra-levator pelvic exenteratio ILPE: Intra-levator pelvic exenteratio
Ross warner et al, 2019	Retrospective – cross sectional study	47 of VVF cases between 2007-2015	1. TVAG – martius labial interposition 2. and TPA – Flap interposition (omental flap interposition)	1. the mean cost 2. duration of operating time 3. length of hospital stay (LOS) 4. the success number of the repair 5. fistula complexity	Primary outcome: <u>success rate:</u> 1. TVAG-29/32 patients (90,6%) 2. TPA-13/15 patients (86,7%) <u>recurrence rate:</u> 1. TVAG-3 patients 2. TPA 2 patients secondary outcome: 1. total cost of TVAG lower than TPA 2. mean operative time – TVAG 196,89 min; TPA 223,4 min 3. LOS – TVAG 5,3 days; TPA 9,1 days 4. size of the fistula similar at TVAG and TPA

Comparison of The Success Rate at VVF Repair Between TVAG and TPA Approach

Four literatures were analyzed by *Review Manager 5.3* application then the outcome shown in a Forest Plot (fig. 4). The accumulative data are 191 patients (transvaginal-n=107; transabdominal-n=84). point of estimate located at the right side, it

means that transabdominal has success rate higher than transvaginal. Then, the heterogenicity should be considered. From the forest plot, it is known that all of the studies have homogen data ($\text{Chi}^2 < \text{df}; P > 0,05$). However, the accumulative data has no significant effect (test overall effect $P > 0,05$; 95%CI was 0,59 to 5,30).

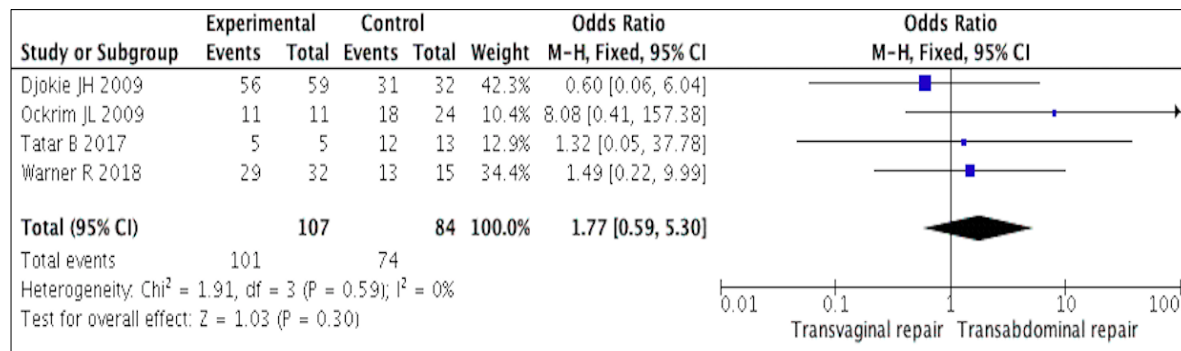


Figure 4. Forest plot of TVAG and TPA VVF repair surgery (experimental= transvaginal; control=transabdominal; CI-confidence interval; df-degrees of freedom)

DISCUSSION

Surgical therapy for vesicovaginal fistule repair has kind of approaches, they were transvaginal, transabdominal, transvesical, laparoscopy, and urine diversion. The most frequent approaches that used by gynecologist in developing countries are transvaginal and transabdominal. Transvaginal (TVAG) approach was used for simple, small, first attempt repair, and distal fistulas⁶. Transabdominal (TPA) approach frequently used for large size of VVF (>2cm)⁴ and the location close to orificium urethra. This condition categorize as a complicated VVF case, yet there is no consensus coincident which fistulas indicated as complicated⁽⁴⁾. The complex VVF operated by urologist commonly using the TPA procedure. Behind all of those reasons, there were advantages and disadvantages from both approaches. The advantages of TVAG with martius labial interposition flap were easy to operate, easy to modified, stronger stitches, protect the urethra, shorter duration of operating time, low morbidity, low cost and shorter length of stay, then the disadvantages of TVAG approach were pain at flap retrieval and asymetrism. On other approach, TPA with omental flap interposition had better vascularity so that the flap can stick out better. The disadvantages of TPA were post-operative pain, temporary ileus, over bleeding, longer operating time, higher cost and longer length of stay. Notwithstanding with all of those evidences based on the literatures which was reviewed in this study, there is no significant different

success rate between TVAG and TPA^{4,6,7,12}. In the study of Burak et al, 2017 it said that the range of success rate of VVF were 70-100%^{11,13,14}, while the TPA was around 90-100%¹⁴. Some of VVF cases with large size or complicated fistula operated by urologist, and they prefer to the TPA approach. This literature also states that, TVAG had less length of stay of the patients and low complication of the surgery. It would be reasonable to say that TPA should be considered if the VVF is a complex and large lesion⁴. Djokic et al, 2009 also stated that TVAG should be considered in non-complicated cases and flap procedure in TPA approach is the most secure technique⁶. It is hard to compare the success rate because of the surgeon’s preferences, the complexity, and co-morbidity of the patients⁶. No interposition also be the risk factor of the failed rate of surgery¹². Tertiary unit which has wide range of etiology also be the factor of this study statement, such as emergency caesarean section, radiotherapy, multiple complex anti-incontinence interventions and infection¹². The study of Warner et al, 2019 which has prospective data, said that TVAG should be the first options for the simple VVF because it has lower cost, shorter LOS, shorter duration operating, minimal pain and morbidity⁷.

Three of the literatures had a little number of participants (Burak et al, 2017 n=20; Ockrim et al, 2008 n=32; Warner et al, 2019 n=47), while one literature had the most number participants which is it had the longest

duration time span (Djokic et al, 2009 n=220). The complexity of fistula also not homogen from each other. Moreover, the study of Ockrim et al, 2008 based on tertiary unit. Different operator is the limitation of the study because the difference level of their skills, although Warner et al, 2019 has the single data surgeon. The bigger participant should be established in this field of study, furthermore a multi-center study is preferable for this kind of problem.

Eventhough all of the literatures had mentioned their preference approach of VVF repair surgery, this study is not be able to conclude, because the statistic analyze was not significant. The type study of the literatures are cross sectional and cohort, it means that it is difficult to randomized the data. But, at the forest plot, the data showed its homogeneity. The forest plot also talked about confidence of interval that means the effect's significancy. Because the effect was not significant, it cannot be concluded the overall effect, although the estimate point showed at the transabdominal side. At the future study, the literature should be more than this, so as the statistic will be significant. If there is randomized controlled study it will be better to gain the clinically relevant conclusion.

CONCLUSION

The approach is depended on the complexity and the size of the fistule, the operator preferences, the kind of the fistula primary or the recurrence fistula. TPA has a higher success rate than TVAG, still not statistically significant

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