

# Minimal Access, Optimal Dryness: A Review of Laparoscopic Repair of Vesicovaginal Fistula

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## ABSTRACT

**Background:** Vesicovaginal fistula (VVF) is an embarrassing condition for women. Various routes of surgical intervention exist for the management of VVF. Laparoscopic repair is safe and effective.

**Aim and objective:** To review the success rate of laparoscopic repair of VVF and to highlight the benefits/advantages of the laparoscopic approach.

**Materials and methods:** Using various databases, previous studies of patients who underwent laparoscopic VVF repair between 2008 and 2018 were reviewed. Outcome measures from these studies were success rate, mean blood loss, mean operating time, length of hospital stay, major intraoperative complications, and conversion to open surgery.

**Results:** Fourteen retrospective studies (full-text articles) were retrieved and reviewed. Two hundred and sixty-nine patients had a laparoscopic repair. The pooled success rate was 96.7%. Mean blood loss ranged from 30 to 400 mL, length of hospital stay ranged from 1.1 to 7.8 days while the mean operating time ranged from 54 to 229 minutes. There was only one major intraoperative complication. Only four patients had to be converted to open surgery.

**Conclusion:** Laparoscopic repair of VVF has a high success rate and is a safe, patient-friendly, and cost-effective route for surgical management of VVF.

**Keywords:** Abdominal repair, Laparoscopic route, Vesicovaginal fistula.

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## INTRODUCTION

Vesicovaginal fistula (VVF) is an abnormal communication between the epithelium of the bladder and that of the vagina which leads to continuous/total involuntary leakage of urine. It is a condition that not only affects the health of the woman but also imposes a great deal of social embarrassment and psychological trauma on the patient. It is considered as one of the most dehumanizing conditions that affect and reduce the quality of life of women.<sup>1</sup>

The etiology of VVF is largely influenced by socioeconomic development/standard of healthcare delivery system. In underdeveloped/developing countries, prolonged labor accounts for over 90% of VVF; however, in developed countries, it is usually from iatrogenic causes particularly from hysterectomies for benign gynecological conditions, radiation therapy, and advanced reproductive tract malignancies.<sup>2</sup>

It has been estimated that there are about 3 million women with unrepaired fistula globally, with about 150,000 new cases every year.<sup>3</sup>

Ever since the first successful VVF repair pioneered by James Marion Sim, various methods and techniques have subsequently been discovered and employed to surgically treat VVF. For the route of repair, there is no consensus regarding the best route, as this is influenced by various factors like the site, size, etiology, surgeons' choice, and level of expertise/competence.<sup>4</sup>

Vesicovaginal fistula can be repaired by two routes: Vaginal and abdominal. The abdominal route repair has been performed predominantly by open surgery (laparotomy) and is associated with more morbidities; these morbidities can be minimized/avoided via minimal access surgery.<sup>5</sup>

Minimal access surgery has reformed the field of gynecology; becoming established in everyday practice and is gradually

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becoming the norm and gold standard in gynecological practice and diagnosis and treatment of various gynecological conditions including repair of VVF. Laparoscopic repair of VVF has been conducted with remarkable success.<sup>6</sup>

The purpose of this article is to review the success rates of the laparoscopic repair of VVF and also highlight some of the benefits/advantages of the laparoscopic repair.

## MATERIALS AND METHODS

### Search Strategy

Relevant studies/publications were searched for using PubMed, Google Scholar, Cochrane library, ScienceDirect, Embase, and Medline. The databases were searched using the relevant medical subject headings (MeSH) terms. Search words included: vesicovaginal fistula, laparoscopic repair, abdominal route. No restriction was placed on the language of publication.

## Study Selection

Studies selected were original research articles published in the last 10 years with >7 patients. Studies >10 years from the date of publication and/or studies with <8 patients were excluded.

## Data Extraction

The data assessed from the studies included: Success rate, mean blood loss, mean operating time, length of hospital stay, major intraoperative complications, and conversion to open surgery.

## RESULTS

Within the limits of the literature search, 14 full-text articles met the aforementioned criteria. All articles were retrospective, there were no prospective studies or randomized controlled trials. From this review, a total of 269 patients underwent laparoscopic repair of VVF. Two hundred and thirty-one (85.9%) cases were primary repairs, while 38 (14.1%) cases had previous failed repairs. Nine out of the 14 series reviewed reported a success rate of 100%, the other series reported success rates of 98, 95.5, 91.6, 87.5, and 86%, respectively. Laparoscopic repair failed in only 9 out of the 269 patients (2 out of these 9 patients were those with previously failed repair). The pooled/overall success rate was 96.7%, while the success rates for those undergoing primary and previously failed repair were 96.9 and 94.7%, respectively. Mean blood loss ranged from 30 to 400 mL, length of hospital stay ranged from 1.1 to 7.8 days while the mean operating time ranged from 54 to 229 minutes. There was only one major intraoperative complication (bleeding), giving a complication rate of 0.37%. Two hundred and sixty-five (98.5%) cases were completed laparoscopically; only four patients had to be converted to open surgery due to severe adhesions, the overall/pooled conversion rate was 1.5% (Table 1).

## DISCUSSION

The first laparoscopic VVF repair was reported by Nezhat in 1994.<sup>16</sup> Like any advancement in medical practice, it was initially greeted with a lot of skepticism and criticism. However, over the years, this approach has come to be embraced and has gained more acceptance among fistula repair surgeons because of the available evidence which has proved it to be very effective. Meta-analysis

and comparative studies have found the success rates between laparoscopic and open laparotomy to be comparable with a statistically significant shorter hospital stay and reduced blood loss.<sup>6,12,20</sup>

Previously, it was thought that the laparoscopic route may be associated with a lot of conversions to open surgery, this review has disproved that, as only 4 out of the 256 repairs were converted to open surgery. Interestingly, conversions were not due to a complication of laparoscopy *per se* but rather from dense intra-abdominal adhesions/fibrosis (due to previous surgeries) which in itself is a relative contraindication to laparoscopy.

It was also thought that laparoscopic repair may not be suitable for patients with previously failed repair; however, this review has revealed that the success rate for primary repair and those with previously failed repairs are comparable.

With a complication rate of <1% from this review, credence has been lent to the safety of the laparoscopic approach to VVF repair. The safety and minimal blood loss in laparoscopic repair may be attributed to the enhanced/magnified vision during surgery which affords the surgeon the benefit of dissecting tissues with a high degree of precision and accuracy without iatrogenic injury to adjacent structures. The pneumoperitoneum also functions as a hemostatic tamponade to help minimize blood loss.

The quick recovery period, reduced hospital stay, and better cosmesis associated with laparoscopic repair have shown that this approach confers on the patient some cost-benefit or cost-utility.

Laparoscopic repair of VVF is a highly technical and advanced laparoscopic procedure which involves a lot of intracorporeal suturing and knot tying, this underscores the need for proper training and skill acquisition to attain expertise and competence before it should be embarked upon. However, the advent of barbed sutures, which eliminates the need for knot tying, can enhance surgical efficiency and significantly shorten the operating time.<sup>21</sup>

## CONCLUSION

The laparoscopic approach to the surgical management of VVF is effective, safe, and associated with minimal complications.

Fistula repair surgeons (particularly) in developing countries should acquire the necessary skills and acquaint themselves

**Table 1:** Outcome of laparoscopic vesicovaginal fistula repair

Studies	No. of patients	Cure rate	Mean blood loss (mL)	Hospital stay (days)	Mean operating time (minutes)	Complication	Conversion
Utrera et al. <sup>7</sup>	8	100	No data	4.7	150	0	0
Abdel-Karim et al. <sup>8</sup>	15	100	110	3.1	171.6	0	0
Miklos and Moore <sup>9</sup>	44	98	39	1.1	144.8	0	0
Sharma et al. <sup>10</sup>	22	100	75	5	140	0	0
Shuah <sup>11</sup>	22	86	180	4.5	145	0	3
Xiong et al. <sup>12</sup>	22	95.5	52	5.6	98.6	0	0
Chu et al. <sup>13</sup>	11	100	229.4	No data	80.2	0	0
Abreu and Tanaka <sup>14</sup>	8	87.5	No data	No data	No data	1	1
Javali et al. <sup>15</sup>	22	100	35	1.5	75	0	0
Mallikarjuna et al. <sup>16</sup>	20	100	30	2.5	54	0	0
Rizvi et al. <sup>19</sup>	8	100	60	No data	145	0	0
Zhang et al. <sup>18</sup>	18	100	95	5	135	0	0
González et al. <sup>19</sup>	36	91.6	No data	7.8	140.4	0	0
Ghosh et al. <sup>20</sup>	13	100	58.69	4	No data	0	0

with this route of repair in order for patients to benefit from the advantages which this approach confers.

Studies done so far on the laparoscopic repair of VVF have been retrospective studies. There is a need for prospective and randomized controlled trials to further substantiate and strengthen the already existing body of evidence.

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