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# Classification of Pelvic Floor Fistulas ('Vesicovaginal/Rectovaginal'): A Review

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**Abstract:** Pelvic floor fistulas are abnormal communications between the lower urinary tract and/or anorectum and the female genital tract. Classification systems for female pelvic floor fistulas have existed for over 150 years. At present, there is no consensus on a classification system. Traditionally, classification systems were used for obstetric fistulas. Earlier classification systems were descriptive (small/large/simple/complex) to communicate clinical findings. More recently, classification systems, in particular the Goh and Waaldijk systems, have been tested to predict the outcome of surgical closure and the risk of post-fistula closure urinary incontinence. **Conclusions**: Features of the fistula may predict outcomes following fistula surgery but other patient features and surgical experience and skill also play a role in the results.

**Keywords:** classification; fistula; vesicovaginal; rectovaginal; obstetric; review



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## 1. Introduction

Female genital tract fistulas or pelvic floor fistulas have been documented for thousands of years (Figure 1). Historically, these fistulas have been associated with childbirth injuries, that is, obstetric fistulas (OF). OF are due to prolonged obstructed labour in the setting of reduced capacity for emergency obstetric services. In this situation, there is no or limited capacity to assist the woman (instrumental or operative delivery) whose labour is not progressing and is obstructed. As the fetal presenting part is obstructed deep in the maternal pelvis, it compresses maternal pelvic organ tissues (vagina, urethra/bladder/rectum) onto the maternal bony pelvis. This prolonged pressure compromises blood supply resulting in pressure necrosis of the affected maternal tissues. As a result, abnormal communications or fistulas occur between the affected sites in the vagina and lower urinary tract/anorectum. Women with pelvic floor fistulas will therefore suffer from continuous urinary and/or faecal leakage into the vagina. In recent times, OF is still a common condition in sub-Saharan Africa [1,2], including fistulas secondary to caesarean section and unrepaired fourth degree tears. Performing a caesarean section when the fetal presenting part is deep and low in the maternal pelvis is difficult and associated with higher maternal injury and risks. When there is prolonged obstructed labour with compromised maternal pelvic tissue and possible pressure necrosis of these tissues, the caesarean section to retrieve the fetal presenting part from deep in the maternal pelvis into the abdomen may cause significant injury to maternal structures including the vagina/bladder/uterus/cervix. Extension of tissue injuries may also predispose the mother to ureteric injuries and increase

blood loss. During these situations, the accoucher must consider such risks of maternal morbidity when determining whether to proceed with an instrumental delivery or a difficult caesarean section, especially when an intrauterine fetal death is diagnosed.

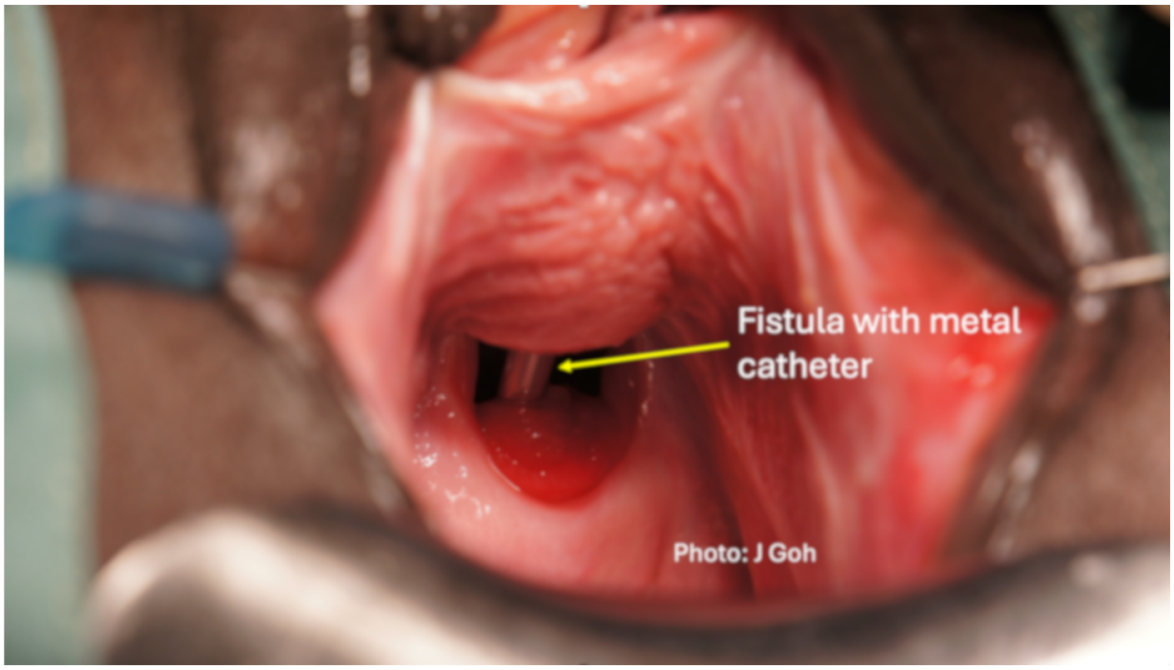


**Figure 1.** Obstetric vesico-vaginal fistula with metal catheter seen in the bladder.

In sub-Saharan Africa, in particular, women with pelvic floor fistula may also suffer from social isolation and mental health dysfunction. In higher resource communities, iatrogenic fistulas are more common, often secondary to surgery.

There is currently no consensus on a standardised classification for pelvic floor fistulas. Earlier classifications utilised anatomical sites or descriptive words e.g., small, large; or subjective terms such as 'simple' or 'difficult' without clarification on the terminology. Without a standardised classification, communication and comparisons of results are often suboptimal. Many of these subjective classifications are not useful, as an 'easy' 'small' fistula to an experienced surgeon, may be difficult and large to an inexperienced surgeon. Anatomical classifications often do not accurately describe the location of the fistula, especially if the fistula is large and spans over more than one anatomical site. For example, a 'urethral fistula' of over 4 cm will involve the bladder and may be classified either as a urethro–vaginal or vesico–vaginal fistula.

More recently, fistula classifications have been used to compare surgical outcomes e.g., closure of the fistula and/or post-obstetric fistula repair incontinence (POFRI) [1–8]. Criticisms of fistula classification regarding prognostic outcomes have led to attempts to score the fistula to predict outcomes [9–12].

However, classification and prediction are two different methods in data analysis. Classification uses an algorithm to categorise/label an observation/data, whereas prediction appraises the outcome created from historical data. For example, classification is categorising a person from medical records/information, e.g., diabetes mellitus. Prediction is calculating the correct treatment for this particular person with a diagnosis of diabetes mellitus.

## 2. Classification of Pelvic Floor Fistulas

Over the past 150 years, there have been numerous classification systems for pelvic floor fistulas. Most systems include features of the fistula such as anatomical site (e.g., bladder, urethra, cervix, rectum, ureter), size of the fistula and vaginal scarring [13]. Most classifications for pelvic floor fistulas are based on categorising lower urinary tract defects. Earlier classifications tended to be descriptive such as small/large/massive; simple or complex; high or low location [13]. Moir [14] described the circumferential fistula. Most fistulas involving the lower urinary tract are due to a defect in the anterior vaginal wall and the posterior urethra/bladder. In the circumferential fistula, the defect involves an entire circumference/segment of the urethra (anterior, posterior and lateral walls of the urethra) together with the anterior vaginal wall. This is believed to be due to severe pressure necrosis from prolonged obstructed labour where the fetal presenting part compresses that particular segment of the urethra onto the posterior aspect of the maternal pubic symphysis. The result is the absence of an entire segment of the urethra, where the distal portion of the urethra is separated from the proximal part by the circumferential fistula. This is a complete disruption with a loss of continuity of the distal urethra from the proximal urethra and bladder neck. Therefore, the repair of a circumferential fistula requires re-anastomosing the proximal portion of the fistula to the distal part of the fistula, often in a setting of dense scar tissue with significant tissue loss (urethral/vaginal) and compromised neurovascular supply.

In 1958, McConnachie [15] used his classification system in an attempt to standardise terminology to enable comparison of data, surgical techniques and results of surgery including POFRI. The parameters McConnachie [15] used to classify fistulas were the size of the fistula, degree of vaginal scarring, repeat fistula repair and whether the sphincters were involved. A number of other fistula surgeons (including Bird, Lawson, Hamlin and Nicholson) throughout the 1960s and 1970s proposed classification systems and utilised these systems to measure the risk of surgical failure to close the fistula and the risk of POFRI [12].

Over the past 20 years, fistula surgeons have predominantly utilised two classification systems [10,12,16–18]—Waaldijk [19] (Table 1) and Goh [20] (Table 2). Waaldijk's [19] system is based on the (i) fistula size, (ii) urethral involvement, (iii) closing mechanism involvement and (iv) circumferential fistula. Waaldijk [19] classified the fistula when the women were under anaesthesia, just prior to commencement of surgery. However, the 'closing mechanism' is not defined [9] but presumably refers to the integrity of the continence mechanism. However, over the past 30 years there has been a paradigm shift in the management of female stress urinary incontinence with the placement of urethral slings from the bladder neck to the mid-urethra. Hence, our understanding of the female continence has evolved.

**Table 1.** Waaldijk classification [19].

| | |
|---|---|
| Type I | not involving closing mechanism |
| Type II | involving closing mechanism |
| Type III | ureter and other exceptional fistula |
| Type A | without total urethra involvement |
| Type B | with total urethra involvement |
| Type a | without circumferential defect |
| Type b | with circumferential defect |

**Table 2.** Goh Classification [20].

| |
|---|
| Types 1–4 of fistula—anatomical position in relation to a fixed reference point. |
| For genito-urinary fistula, the external urinary meatus is that point and the hymen is the fixed reference point for anorecto-vaginal fistulas. |
| Type 1: Distal edge of the fistula is >3.5 cm from external urinary meatus |
| 2: Distal edge of the fistula is 2.5–3.5 cm from external urinary meatus |
| 3: Distal edge is 1.5–2.5 cm from external urinary meatus |
| 4: Distal edge is <1.5 cm from external urinary meatus |
| Types a–c of the fistula—size of the fistula |
| Type a: Size < 1.5 cm, in largest diameter |
| b: Size 1.5—3 cm, in largest diameter |
| c: Size > 3 cm in largest diameter |
| Types i–iii: Other considerations |
| Type i: None or only mild fibrosis and/or vaginal length > 6 cm, normal capacity |
| ii: Moderate or severe fibrosis and/or reduced vaginal length and/or capacity |
| iii: Others—post-radiation, ureteric involvement, circumferential fistula, previous repair |

The Goh [20] classification utilises (i) fixed reference points to describe the fistula, in particular, the distance of the distal edge of fistula based on these fixed reference points; (ii) size of the fistula; and (iii) other considerations—vaginal scarring, previous fistula repair/pelvic radiation and circumferential fistula. Fixed reference points to categorise the fistula were proposed to standardise the description/location of the fistula. Good intra- and inter-observer concordance has been demonstrated using the Goh classification in the outpatient clinic and at time of surgery [21]. WHO [12] suggested a classification based on 'operative difficulty' when the repair is undertaken by a trained specialist fistula surgeon. This classification has two categories—(i) simple/good prognosis and (ii) complicated/uncertain prognosis. Criteria for the simple/good prognosis fistulas are fistulas less than 4 cm in size, vesicovaginal fistula (VVF) only, absent involvement of urethra/continence mechanism, absent scarring, absent circumferential fistula, minimal tissue loss; ureters inside the bladder and no previous repairs. Features of the complicated/uncertain prognosis fistulas are the presence of multiple fistulas, rectovaginal fistula (RVF) or mixed VVF/RVF, involvement of cervix, size of fistula over 4 cm, involvement of urethra, scarring present, circumferential, extensive tissue loss, ureters draining into vagina/bladder stones and previous failed repair. However, many fistulas have characteristics in both categories and therefore may create confusion and difficulties with documentation. This demonstrates that there are multiple fistula factors/features that influence operative challenges which may impact surgical outcomes. A 'simple' classification may oversimplify the category of a fistula and therefore may underestimate its complexity. A simple classification may be more user-friendly but may not define or produce meaningful description for communication and comparison of outcomes.

## 3. Ano-Rectal Vaginal Fistulas

Most of the published literature on ano-rectal vaginal fistulas indicates they are not due to obstetric injuries but are inflammatory bowel, iatrogenic and malignancy related. Obstetric-related rectovaginal fistulas are thought to be less common than that of the lower urinary tract fistulas due to the relative protection of the rectum by the curve of the sacrum [13] and the bladder distending with prolonged labours, forming a pelvic mass that is at higher risk of pressure necrosis. Unrepaired fourth degree tears, however, are common in limited resource settings [22]. Goh classification [20] utilises the same parameters as for the urinary tract except for the location of the fixed reference point. The fixed reference

point used is the hymen. Other classification systems describe simple fistulas as those less than 2.5 cm in size, located near the introitus and due to obstetric trauma or infection and complex fistulas as larger, due to inflammatory bowel disease/radiation/malignancy or previous failed repair and located in the upper vagina [23,24]. In another classification, Type I rectovaginal fistulas are those from the rectum to the vagina, involving the rectovaginal septum; Type II rectovaginal fistulas do not involve the rectovaginal septum and these fistulas are located from the anus to the vagina [25].

There is a paucity of information on risks of failure of closure of rectovaginal fistula (RVF) in limited resource settings and outcomes. Surgery for chronic unrepaired fourth degree tears has good success in closure of the defect and good short- to medium-term functional outcomes [22]. In a survey in west Uganda, over 40% of women suffered social abandonment because of the unrepaired fourth degree tear. Hence, this relatively common obstetric injury has a significant psychosocial impact on women if not repaired. In a review of 214 women following repair of chronic unrepaired fourth degree perineal tear (obstetric anal sphincter injury) who completed the Cleveland Clinic Continence Score, 87% of women denied anal incontinence, including flatal incontinence at 12-month follow up [22]. The most common complaint was flatal incontinence (12.9%), and solid stool leakage occurred in 3% of women at 1 year post repair. At 3-year follow up after the chronic fourth degree tear repair, 80.5% of women denied any anal incontinence and at 5 years, 85.7% women had no anal incontinence.

Reviews of women with RVF repairs with mixed aetiologies in higher resource settings demonstrated closure rates of between 67.3% to 92.7% [26,27]. In the series with the lower closure rates, inflammatory fistulas had lower closure rates than that of obstetric or traumatic fistulas and faecal diversion/stoma did not improve success of surgical closure of the fistula [26]. In addition, women with a seton also did not demonstrate better success of fistula closure. In the study by Thayalan et al. [27], the size of fistula, aetiology, presence of stoma, previous failed fistula repair and duration of RVF did not increase the failure rate of repair. Following successful closure of the rectovaginal fistula, just under 5% of women complained of flatal incontinence and 2.4% complained of faecal incontinence [27].

## 4. Outcomes for Pelvic Floor Fistulas—Risk Factors for Failure/Incontinence

There is still much to be done in providing evidence for women with fistulas and their health care providers regarding holistic care [28]. Women with pelvic floor fistulas suffer from incontinence of urine and/or faeces into the vagina. The women may have significant vaginal scarring from the pressure necrosis of pelvic tissues from the prolonged obstructed labour, deliver a stillborn baby and suffer from labial dermatitis from the constant contact of the area with urine/faeces. Many are abandoned by their families. A holistic functional outcome of these women, apart from the psychosocial, should encompass all aspects of pelvic floor function which includes urinary, sexual and bowel function following fistula repair.

As mentioned above, the aim of a classification system in general is to label similar data by utilising features of the data as a means of communication. Earlier pelvic floor fistula classification systems used anatomical sites to categorise the fistula. As the classification systems evolved, other characteristics of the fistula including surgical complexity were added, e.g., vaginal scarring, circumferential fistula. The two most common published complications from fistula surgery are failure to close the fistula/recurrence and residual incontinence after successful fistula closure. McConnachie [15] was among the first to define success of fistula surgery as closure of the fistula plus lack of incontinence. Of the 298 fistula repairs reported, 79.5% were successfully closed and 64.6% were closed "with complete control of urinary function". McConnachie [15] described utilising "muscle

cross-strut slings" from the pelvic floor in an attempt to reduce the rates of stress urinary incontinence following fistula surgery.

Goh et al. [3] utilised a classification system to predict failure of surgical closure and residual urinary incontinence following successful closure of lower urinary tract fistulas. In this large series of 987 women with obstetric fistulas, almost 24% of the women with successful fistula closure complained of urinary incontinence at discharge from hospital. This is higher than the WHO recommended goal of 10% incontinence [29] following fistula surgery. This target of 10% seems to be a very low rate of incontinence and could be viewed as unrealistic, considering prevalence studies on urinary incontinence in the general population demonstrated much higher rates (25–45%) in women [30]. These higher rates were in populations who have not had severe pelvic floor and lower urinary tract injuries, that is, not the obstetric fistula population. The Continence Foundation of Australia states that 38% of Australian women complain of urinary incontinence [31]. It may be reasonable to assume that women who suffered from prolonged obstructed labour with injury/necrosis of the lower urinary tract and then surgery on the fistula with scarring of the bladder/urethra may have at least the general population rates, if not higher rates of urinary incontinence.

Capes et al. [16] published the first head-to-head comparison of two classification systems regarding prediction of fistula closure after surgery. The Goh [20] and Waaldijk [19] systems were used, and this study demonstrated the Goh classification was significantly better in predicting surgical closure of the fistula. In the study by Goh et al. [3], vaginal scarring and the circumferential fistulas were risk factors for surgical closure failure and post-fistula urinary incontinence, while women with Type 4 (distal fistula edge < 1.5 cm from external urethral meatus) and larger fistulas (>3 cm) were more likely to be incontinent after successful fistula closure. In a retrospective analysis of outcomes of 346 women following repeat obstetric fistula surgery, urethral involvement based on the Goh classification predicted fistula closure [5]. Goh Type 2 fistulas were 4 times less likely to close compared to Type 1 fistulas, whereas Goh Type 3 fistulas were 5 times less likely and Type 4 fistulas were 13 times less likely to have a successful surgical closure compared to Type 1 fistulas [5].

Scoring systems based on fistula characteristics have been proposed to correlate outcomes of fistula surgery including closure of the fistula and POFRI. The Panzi score was devised in DR Congo, utilising three fistula parameters—(i) proximity to the external urethral meatus, (ii) size of the fistula and (iii) whether or not the fistula was circumferential [10]. Each parameter was given a score of 1, if present; or 0 if not present. Hence, the scores ranged from 0–3. The score was utilised to predict the probability of surgical outcomes. This study concluded that for each score increase above zero, surgical failure increased by a factor of 1.65. Unlike other systems, the severity of vaginal scarring was not used in this system. Pope et al. [11], in a retrospective study, employed a scoring system to predict POFRI and correlation of assessment on surgical skill. This study demonstrated the risk of POFRI utilising the Goh classification, fistula size, circumferential fistula and vaginal scarring. Women with higher fistula scores, and hence higher risk of POFRI, were assigned to surgeons with more expertise and experience in fistula management. Women with lower scores were assigned to surgeons learning fistula surgery. The results showed the least risk of POFRI in women (with lowest scores) treated by the 'beginner' surgeon and highest risk of POFRI in women with highest scores, treated by expert fistula surgeon. The authors [11] concluded that the scoring may be used by a beginner fistula surgeon to determine whether to refer the woman to a more experienced/expert surgeon. However, these authors also acknowledge that the terms 'experienced' and 'expert' fistula surgeon are vague and without standardised definitions.

For non-obstetric fistulas, the most common cause is benign gynaecological surgery, in particular, the hysterectomy. In a study of 425 non-OF fistulas with various routes of repair (e.g., abdominal/vaginal), the risks of surgical failure to close the fistula and ongoing urinary symptoms include fistula >3 cm in size, past pelvic radiation therapy and previous vaginal surgery [32]. In this study [32], successful surgical closure of the fistula was achieved in 92.9% of primary cases and 71.6% of recurrent fistulas. Radiation fistulas had lower successful closure rates (66.7%). Radiation fistulas often occur some years after the radiation treatment. The possible factors associated with higher failure rates for successful fistula surgical closure of radiation fistulas include scarring and compromised vascular integrity due to radiation changes. A comparison of numerous classification systems for non-obstetric fistulas concluded that the Goh classification, urethral length, vaginal scarring and bladder capacity were predictors for surgical outcomes [7].

Recent systematic reviews and meta-analyses on risk factors for failure in fistula surgical closure in East and Sub-Saharan Africa demonstrated the following risks with odds ratio: fistulas > 3 cm (OR 3–3.92), previous fistula repair (OR 2.7–3.2), Goh Type 4 fistulas (OR 6.07), vaginal scarring (OR 3.89) and total urethral injury (OR 3.35–3.5) [1,2]. The pooled prevalence of surgical failure to close the fistula was 26.89% in the East Africa analysis [2] and 24.92% in the Sub-Saharan review [1]. Duration of labour over 48 h was a risk factor for surgical failure but not in all the studies. Another review and meta-analysis of data on obstetric fistulas in low- and middle-income countries demonstrated that women who had at least a primary education, were married, had a living neonate and were multiparous were more likely to have successful fistula closure [18]. This demonstrates that surgical outcomes are not only influenced by fistula features and surgeon experience but also patient factors.

Another challenging aspect of lower urinary tract fistula repair is residual urinary incontinence after fistula closure [33]. As mentioned above, risk factors include urethral involvement, circumferential fistula, vaginal scarring and larger fistulas [3,5,11]. In the review of women with surgery for recurrent OF, those with fistulas larger than 3 cm had three times the risk of POFRI, Goh Type 3 fistulas had four times the risk of POFRI and Goh Type 4 fistulas had eight times the risk of POFRI [5]. In terms of stress urinary incontinence diagnosed on a cough test following fistula repair surgery in women with OF and iatrogenic fistulas, independent predictors were previous fistula repair (2.5× risk), Goh Type 3 fistulas (4.2× risk) (there were no Goh Type 4 fistulas) and urethrovesical junction involvement (2.5× risk) [4]. Stress urinary incontinence following fistula repair is likely to correlate to the proximity and severity of the disruption to the supporting structures of the urethra and its integrity, which play a major role in the female continence mechanism. On the other hand, it may be postulated that the chronicity of the fistula in the setting of a large fistula reduces the compliance and capacity of the bladder, and therefore these patients may have significant urinary morbidity despite successful closure of the fistula. The ischaemic insult on the detrusor muscle from the initial injury, repeat repairs and scarring may contribute to the overall continence outcomes of these patients. The circumferential fistula is also a risk for POFRI. These fistulas usually involve the urethra and/or the urethra and bladder neck with significant loss of urethral length as an entire segment of the urethra is absent. The urethra/bladder neck is often densely adherent to the posterior pubic symphysis and hence may result in reduced urethral mobility after the repair. The significant insult on the urethra, shortened urethral length and reduced urethral mobility are risk factors for POFRI.

The challenges in the management of women with POFRI were discussed at the FIGO Expert Fistula Workshop held at the Addis Ababa Fistula Hospital in February 2024, with the intention of publishing a position paper on managing POFRI. After excluding recurrent fistula and pathology such as infections, stones and malignancy, the management of POFRI

involves obtaining a detailed lower urinary tract symptoms history (including urinary urgency, urgency incontinence, stress incontinence, daytime frequency, nocturia, voiding function). A bladder diary is a valuable tool to assist with diagnosis. After excluding pathology, common reasons for female urinary incontinence include the overactive bladder, stress urinary incontinence and chronic urinary retention—or a combination of these [33]. It is vital to obtain the correct diagnosis as surgery for urinary incontinence such as urethral slings may worsen voiding function and may not assist or may worsen the overactive bladder. The development of evidence-based guidelines for assessment and management of women suffering POFRI is aimed to improve patient outcomes and enhance research to obtain further knowledge to guide treatment protocols.

As mentioned above, the WHO recommendation of 10% residual urinary incontinence following fistula closure [29] is impractical as the background prevalence of women with urinary incontinence is at least 1 in 3 [31]. The common causes of female urinary incontinence include overactive bladder (OAB), stress urinary incontinence (SUI), mixed (overactive and stress) urinary incontinence (MUI), chronic retention with overflow incontinence, urinary tract infections, bladder pathology and fistula. In the general population, OAB, SUI and MUI are the most common causes of female urinary incontinence. A thorough urinary history is vital. When a woman with a previous fistula repair complains of urinary incontinence, the above potential causes require exclusion [33]. The type of assessment and investigation of the woman would depend on facilities/resources available, particularly in limited resource settings. The woman requires a vaginal examination with bladder dye test, and if the dye test is negative and there is fluid in the vagina, investigation for a ureteric fistula is required. Further assessments to eliminate the other causes include urine examination for infection and assessment for bladder stone/pathology. When pathology is excluded, a bladder diary provides important information as do urodynamic studies [33]. When subtracted multichannel urodynamic assessment is not available, single channel bedside cystometry for the investigation of women with POFRI may be utilised and was described by Krause and Goh [34]. The single channel cystometry involves the insertion of an indwelling catheter to firstly measure the post-void residual urine volume. The bladder is then filled with fluid, via the indwelling catheter with a catheter-tip syringe, 60 mls at a time to at least 300 mls. The woman is requested to inform the clinician when she has the first sensation of bladder filling, then when she has the first desire to void, and when she has a strong desire to void. The end of the catheter is held vertically 15 cm above the pubic symphysis to measure vesical pressure, ensuring the woman is not straining during this time to avoid a false positive elevation of vesical pressure. When there is elevation of the fluid meniscus at 15 cm above the pubic symphysis, then a diagnosis of detrusor overactivity is presumed. Following removal of the indwelling catheter, the woman is asked to cough to demonstrate presence or absence of stress urinary incontinence. The absence of urethral mobility with a large urinary leakage with coughing may suggest intrinsic sphincter deficiency (very weak urethral closing pressure), in particular, in a woman who has had a previous repair of fistula involving the urethra, for example, a circumferential fistula.

## 5. Conclusions

There is currently no consensus on the classification of pelvic floor fistulas. There is limited data on classifications and outcomes of anorectal vaginal fistulas compared to lower urinary tract fistulas. Historically, fistulas were classified using descriptive terms such as small/large and simple/complex/difficult, to portray the clinical findings. However, these subjective terms are open to miscommunication. More recent classifications utilise fixed reference points and measurements in an attempt to standardise communication.

Classifications have also been utilised to predict the risk of surgical failure to close the fistula and residual urinary incontinence after successful fistula closure. Fistula characteristics associated with failure to close the fistula include Goh Type 4, vaginal scarring, larger fistulas and repeat repairs. Features associated with residual urinary incontinence after fistula closure include fistulas over 3 cm in size and Goh Types 3/4. Scoring systems have been utilised to predict surgical outcomes. Apart from predicting surgical outcomes, a scoring system has been proposed to alert the more inexperienced fistula surgeon regarding the potential complexity of the case and hence prompt referral to a more experienced surgeon to improve outcomes.

Further attempts are required to achieve a consensus on standardisation in fistula classification as this will improve communication between clinicians and provide more meaningful assessment on outcomes.

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