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Review

The choice of surgical approach in the treatment of vesico-vaginal fistulae

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Abstract Vesico-vaginal fistula is a global healthcare problem that has a high prevalence in sub-Saharan Africa, where obstetric complications lead to the development of this condition. Despite this, comparatively few fistula repairs are performed in well-resourced countries, where iatrogenic injury is the leading aetiological factor. As a consequence, much of our knowledge results from the experience of relatively few fistula surgeons in areas of high prevalence borne out of large case series or retrospective cohorts rather than high level evidence. At present, debate surrounds the exact timing of repair and the most appropriate surgical approach for this condition. Certain fistulae can be selected for conservative management, while those that do not demonstrate factors associated with spontaneous closure can be selected for surgery. Fistula surgeons should be aware of several potential repair options and the principles of contemporary fistula surgery, as the first attempt at repair is likely to be the best opportunity to achieve a successful outcome. We review the available literature and provide evidence on the optimal timing of repair, the appropriate surgical approach and the use of tissue interpositioning in fistula surgery.

1. Introduction

Urogenital fistula is a global health problem and is significantly more prevalent in low-resourced countries (LRC) than in well-resourced countries (WRC). Estimates suggest that over 3 million women worldwide have an untreated fistula [1], with an incidence of one in every 800 births in sub-Saharan Africa alone [2].

Vesico-vaginal fistula (VVF) is the most common type and in LRC most often occurs as a result of prolonged obstructed neglected labour, due to the pressure necrosis that develops as the bladder becomes compressed between the foetus and the pubic symphysis. Meanwhile, the VVFs that are seen in WRC commonly develop following iatrogenic injury, with over 60% following a hysterectomy [3], and one in every 788 hysterectomies associated with urogenital fistulae [4].

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VVFs are certainly far less common in WRC, with approximately 120 urogenital fistula repairs performed on an annual basis in the UK alone [5]. As a result, the contemporary management of this infrequently encountered condition is performed in areas of high fistula prevalence and an association between volume and outcome has already been demonstrated [5].

Consequently, much of our knowledge results from the opinions of comparatively few individuals on the basis of case series, rather than clinical trial data, which have an impact on the standardization of treatment protocols and outcome measures.

We therefore review the current literature and aim to draw conclusions on the management of VVFs worldwide.

2. Aetiology of VVF

There is little high-level evidence that reflects the aetiology of VVF. In their recently published systematic review on the aetiology of urogenital fistulae, Hillary et al. [3] concluded that the majority of evidence available in the literature relates to case series published by individual surgeons. In LRC, the majority of fistulae that occur are due to prolonged obstructed neglected labour. The underlying pathological process in this context is due to ischaemia that occurs between the symphysis pubis and presenting portion of the baby. Any instrumentation of this area that occurs subsequent to this process risks fistula formation. Similar processes occur in the context of the iatrogenic fistulae that are seen in WRC. It is important to bear in mind that the fistulae that occur in this situation develop as a result of haematoma formation, infection, poor tissue healing and wide field necorosis rather than inadvertent organ injury or surgical misadventure. The clinical consequence of this become apparent as these devitalized tissues slough-off at a later period and the fistula becomes evident.

Hillary et al. [3] demonstrated that over 95% of the fistulae that are seen in LRC have an underlying obstetric aetiology, while over 80% of fistulae in WRC occur as a result of surgery. There is evidence to suggest that the proportion of iatrogenic fistulae in LRCs is increasing [6], however this may relate to the incorrect classification of a post-caesarean section fistula as iatrogenic, when in fact there is an underlying ischaemic element that occurs during prolonged labour. Meanwhile, the caesarean section fistulae seen in WRC are more akin to other surgical fistulae, due to a lack of ischaemic necrosis of the tissues in this context. Fistulae that develop following radiotherapy becomes manifest months to years after the initial intervention and are associated with chronic small vessel inflammatory changes that lead to tissue ischaemia.

3. Fistula management

The contemporary management of VVF is to perform a "delayed" surgical closure following a period of prolonged catheter drainage, a process, which allows necrotic and inflammatory material to slough and for local inflammatory responses to subside. Using this approach, a small proportion of fistulae may close spontaneously as a result of catheter drainage alone, while those that do not heal can be treated surgically. Clearly, the exact route of repair is dependent to a significant extent on surgical expertise but also on several anatomical factors, including fistula size, location on the bladder wall and involvement of other structures. Several issues exist in the management of urogenital fistulae:

- What proportion of fistulae close spontaneously?
- What is the optimal timing of repair?
- Which surgical approach is appropriate?
- What is the definition of success?

3.1. Conservative management

In WRC, the usual practice is to perform a period of catheter drainage prior to surgical repair, to allow local inflammatory responses to subside, to avoid the debilitating symptoms of urinary leakage for the patient, and to promote spontaneous healing by diverting urine away from the visceral communication to avoid epithelialization to occur along the fistulae track. The exact rates of spontaneous fistulae closure that result from prolonged catheter drainage alone are likely to be underestimates, given that successfully treated fistulae in this context are not referred for surgical management and are therefore not reported.

Hilton [7] demonstrated that 24 patients in his UK series (6.9% of total) achieved spontaneous fistulae closure following a 6–8-week period of continued catheter drainage alone. Meanwhile, both Waaldijk [8] and Tayler-Smith et al. [9] have demonstrated success rates in excess of 10% using conservative management of obstetric fistulae when early catheter drainage is instituted. The group concluded that spontaneous closure is more likely to occur if the time-to-fistulae development was short, the fistulae were small, and the fistulae were immature [9]. The spontaneous closure of radiotherapy-induced fistulae, however, rarely if ever occurs and therefore surgical management should be performed as appropriate [7].

3.2. Timing of surgical intervention

What is considered an "immediate" or "delayed" repair is a matter of debate in fistula surgery. Few published studies exist in the literature that describe the "immediate" repair of fistulae, however exactly what constitutes an "immediate" repair differs between series. Intuitively, we would suggest that a period within 4 weeks of the index insult be considered "immediate", as it is certain to be more technically challenging to perform a repair between the 4th and 12th post-operative weeks. Waaldijk et al. [8] used a definition of <3 months from fistulae creation for "immediate" repair and demonstrated successful closure rates of 95.2%. Certainly, using an "immediate" approach, distress to the patient and the physical effects of urinary leakage are minimized and this is certainly important in LRC, where social isolation is a significant health problem. There is currently a distinct lack of adequate data in the published literature to support the use of an immediate approach over a delayed repair.

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