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Review

Fistula-in-ano: advances in treatment

Samer Deeba, M.D., M.R.C.S.*, Omer Aziz, M.R.C.S., Parvinder S. Sains, M.R.C.S., Ara Darzi, F.R.C.S., K.B.E.

Department of Biosurgery and Surgical Technology, St. Mary's Hospital, Norfolk Place, 10th floor, QEQM Building, London W2 1NY, UK

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Abstract

BACKGROUND: Several techniques have been described for the management of fistula-in-ano, but all carry their own risks of recurrence and incontinence. Technology has evolved over the past 2 decades that may enable surgeons to deal with this troublesome issue with greater success. This review summarizes the history of fistula-in-ano management, the current techniques available, and describes new technologies.

METHODS: Medline searches were performed using the PubMed, Ovid, Embase, Cochrane, and Google Scholar databases to identify articles reporting on fistula-in-ano management using surgery alone, fibrin glues, and fistula plugs. Forty-one articles reporting on the history of fistula-in-ano management and the use of new technologies were included.

RESULTS: Conventional fistula surgery techniques have their place, but new technologies such as fibrin glues and the anal fistula plugs offer an alternative approach, with initial studies reporting good success rates.

CONCLUSIONS: New technologies provide promising alternatives to traditional methods of management. There is, however, a real need for high-quality randomized control trials.
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Fistula-in-ano has been a troublesome pathology to both patient and physician throughout surgical history. The estimated prevalence of nonspecific anal fistulae is 8.6 to 10/100,000 of the population per year, with a male to female ratio of 1.8:1.[1] Optimal management is aimed at eradicating the fistula, preserving the anal sphincter, preventing recurrence, and allowing an early return to normal activity for the patient. Achieving these aims, however, represents a real challenge to the surgeon.

The disease and surgical instruments used in treating fistulae have been well documented historically. Probes were found among the ruins of Pompeii as part of a surgeon's tool box, and the difficulty in managing the pathology was recognized by Hippocrates (460 BC). The English surgeon, John Arderne (1307–1390), wrote "Treatises of Fistula in Ano; Hemorrhoids, and Clysters" in 1376, which alludes to the current practice of probing, and laying open of fistulas, as well as the use of setons for more complicated fistulae. The French King Louis XIV underwent a surgical procedure performed by the famous French surgeon George Mareschal (1658–1736), who was ennobled for his services. In the late 19th and early 20th centuries, prominent physicians and surgeons such as Goodsall and Miles, Milligan and Morgan, Thompson, and Lockhart-Mummery made substantial contributions to the understanding and treatment of anal fistulae.

In modern times, advances in molecular biology and bioengineering have meant that we now have access to a number of new materials that may be used as adjuncts to

* Corresponding author. Tel.: +00442078861012; fax: +00442078866950.
E-mail address: s.deeba@imperial.ac.uk
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fistula closure. This article aims to review the literature and identify new technologies used in fistula management, the latest of which is the fibrin plug.

Materials and Methods

A literature search was performed using the PubMed, Ovid, Embase, Cochrane, and Google Scholar databases to identify articles reporting on the management of peri-anal fistulae. The following key words were used: fistula in ano, anal fistula, fibrin glue, anal fistula plug, and Crohn's fistula. The most informative and recent articles reporting on results from a range of fistula management techniques were selected for this review. These 41 articles (26 prospective studies, 7 retrospective studies, 2 case reports, 3 randomized controlled trials, and 3 reviews) were used to formulate this review and are presented later.

Comments

Traditional surgical management

Cryptoglandular fistulae. Fistulae are thought to emerge in most cases as a consequence to a previous cryptoglandular perirectal abscess that was either drained surgically or spontaneously discharged. A remnant of that abscess cavity and tract from the drainage, consisting of granulation tissue, persists, giving rise to the fistula. The tract connects the primary opening in the rectum (which was the opening of the infected gland) to the secondary opening in the skin of the perianal area (which was the drainage site, be it spontaneous or surgical).

The classic techniques described throughout history, which still carry worldwide popularity, are the *fistulotomy* or the *laying-open technique*. The patient is positioned in the lithotomy position or prone jack-knife position according to preference for the purposes of an examination under general anesthesia. The secondary fistula opening is identified and then probed until the primary opening becomes apparent as the distal end of the probe emerges from it. This is performed sometimes under the aid of injecting methylene blue or hydrogen peroxide diluted solution in the secondary opening to see it come out of the primary opening, thus helping in identification of the latter. The use of transrectal ultrasound in assessing the tract and finding the primary opening sometimes is helpful, especially in conjunction with the use of peroxide, which delineates the tract on the ultrasound image.[2,3] Magnetic resonance imaging also may be used to delineate complex fistula tracts, and especially those associated with supralevator extension. If the fistula is low lying and under the anal sphincter musculature, or involves a small amount of sphincter, it is laid open, although the risk of altered continence exists and must be explained to the patient before any intervention. The objective in managing fistulae is to allow the fistula to heal with minimum surgical trauma to the skin and anal sphincter musculature. Fistulotomy wounds can take prolonged periods of time to heal, causing the patient significant discomfort and distress as well as contour defects around the anus.[4] Simple low fistulas usually are treated adequately by this method, with reported recurrence rates of less than 8%,[5] although some studies report incontinence to flatus in up to 50% of cases.[6]

More complex fistulas and high fistulas traversing through or around the sphincter complex are treated in a step-wise manner. A seton, either loose or cutting, is inserted through the tract and the foreign body reaction enables the tract to mature into a more low-lying position, as is the case with cutting setons. This allows it to be laid open in a second-stage surgery, thus sparing the sphincter. Nevertheless, incontinence rates are still reported to be as high as 63%[7] with this method. Another procedure being performed is the anodermal advancement flap. However, this also is associated with incontinence rates of up to 35% as a result of dissection around the anal sphincter.[8]

Crohn's disease fistulae

Fistulae from Crohn's disease are a more perplexing problem to manage and are resistant to many of the traditional management strategies offered. The pathogenesis of Crohn's fistulae is thought to be different from cryptoglandular fistulae. It is thought to originate as a deep penetrating ulcer in the anorectum, which then is plugged with fecal material. With time and the ensuing high pressure produced by the anorectum, the ulcer finds its way through the skin and transforms into a fistula. Alternatively, it has been suggested that the fistula originates from a cryptoglandular infection that heals poorly as a result of the inflammatory nature of the primary pathology, finally leading to fistula formation. In either case, the transmural involvement of rectum in Crohn's disease is a major contributory factor.

Several medical modalities for the conservative treatment of Crohn's fistulas have been described in the literature. Antibiotic therapy alone has been documented by several series. Closure rates of up to 50% have been reported in some studies; however, there is a high incidence of recurrence after antibiotic therapy is discontinued.[9,10] The use of 6-mercaptopurine and azathioprine for control of active Crohn's disease and closure of fistulae in 54% of cases[11] has been described. The adverse effects of these chemotherapeutic agents are significant drawbacks for patients, with the most common being leukopenia, hepatitis, pancreatitis, and various allergic reactions and infections.

Infliximab, a murine and human chimeric monoclonal antibody to tumor necrosis factor α, has been used with successful closure of up to 62% of fistulae.[12,13] Adverse effects of infliximab include allergic reactions, delayed hypersensitivity reactions, and drug-induced lupus. Other therapies such as cyclosporine and tacrolimus also have been described, with initial response rates reported to be high.

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