

A anorectal fistula treatment with acellular extracellular matrix: A new technique

Wei-Liang Song, Zhen-Jun Wang, Yi Zheng, Xin-Qing Yang, Ya-Ping Peng

Wei-Liang Song, Zhen-Jun Wang, Yi Zheng, Xin-Qing Yang, Ya-Ping Peng, Department of General Surgery, Chaoyang Hospital of Capital Medicine University, Beijing 100020, China

Author contributions: Song WL performed research and wrote the paper; Wang ZJ designed and performed research; Zheng Y, Yang XQ, Peng YP performed research and analyzed data.

Correspondence to: Dr. Zhen-Jun Wang, Department of General Surgery, Chaoyang Hospital of Capital Medicine University, Beijing 100020, China. wang3zj@sohu.com

Telephone: +86-10-85231248 Fax: +86-10-85231248

Received: January 17, 2008 Revised: July 5, 2008

Accepted: July 12, 2008

Published online: August 14, 2008

Song WL, Wang ZJ, Zheng Y, Yang XQ, Peng YP. A anorectal fistula treatment with acellular extracellular matrix: A new technique. *World J Gastroenterol* 2008; 14(30): 4791-4794 Available from: URL: <http://www.wjgnet.com/1007-9327/14/4791.asp> DOI: <http://dx.doi.org/10.3748/wjg.14.4791>

Abstract

AIM: To investigate a new technique of the anorectal fistula treatment with acellular extracellular matrix (AEM).

METHODS: Thirty patients with anorectal fistula were treated with AEM. All fistula tracts and primary openings were identified using conventional fistula probe. All tracts were curetted with curet and irrigated with hydrogen peroxide and metronidazole. The AEM was pulled into the fistula tract from secondary to primary opening. The material was secured at the level of the primary opening. The excess AEM was trimmed at skin level at the secondary opening.

RESULTS: All of the 30 patients had successful closure of their fistula after a 7-14 d follow-up. The healing rate of anal fistula in treatment group was 100%. The ache time, healing time and anal deformation of treatment group were obviously superior to traditional surgical methods.

CONCLUSION: Using AEM anal fistula plug in treatment that causes the anorectal fistula is safe and successful in 100% of patients. It can reduce pain, shorten disease course and protect anal function.

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Key words: Acellular extracellular matrix; Anorectal fistula

Peer reviewers: María IT López, Professor, Experimental Biology, University of Jaen, araje de las Lagunillas s/n, Jaén 23071, Spain; Marie-Catherine Vozenin-brotons, PhD, UPRES EA 27-10, IRSN/IGR, 39 rue C. Desmoulins, Villejuif Cedex 94305, France

INTRODUCTION

Anorectal fistula is the chronic phase of anorectal infection and is characterized by chronic purulent drainage or cyclical pain associated with abscess reaccumulation followed by intermittent spontaneous decompression^[1]. The goals of surgery for fistula-in-ano are permanent healing and preservation of anal continence. Traditional surgical techniques, namely fistulotomy and seton technique, sever the internal anal sphincters and may damage the external anal sphincters. The recurrent rate of "lay-open" fistulotomy was reported to be 2%-9% with functional impairment ranging from 0%-17%^[2-4]. The use of a seton has a recurrence rate of 0%-8%. Minor and major incontinence is 34%-64% and 2%-26%, respectively^[5-10].

Many different methods for treating anorectal fistulae, particularly fistulae in which fistulotomy are contraindicated, have been reported in recent years. Other alternative approaches are the application of fibrin glue and fistula plug. Since 1999, several studies on fibrin glue treatment of anal fistula have been published. The healing rate after debridement and fibrin glue injection is 14%-60%^[11-13]. Incontinence may not be affected. Fistula plug, the latest technique for complex fistula-in-ano repair, has a reported failure rate of 13%. A success rate of 83% with a median follow-up of 12 mo is reported for high cryptoglandular anal fistulas, and the method has also been reported for a smaller group of Crohn fistulas^[14,15].

Our institution began repairing anorectal fistulae using acellular extracellular matrix (AEM) in the past 1 yr. In our study, 30 patients with anorectal fistula were treated using acellular extracellular matrix. All of the 30 patients had successful closure of their fistula after a 7-14 d follow-up, giving an overall successful closure rate of 100% (30 of 30 patients). It can reduce pain, shorten disease course and protect anal function.

MATERIALS AND METHODS

Patients

From January, 2007 to August, 2007, 30 patients with anorectal fistula were selected from ChaoYang Hospital of Capital Medicine University. They were treated with AEM (19 males, 11 females). All the patients had low anorectal fistula. Twenty-eight patients had simple anorectal fistula cases, and 2 patients had complicated anorectal fistula. Their age was 18-72 years (mean, 38 years). All patients underwent mechanical bowel preparation the day before surgery, followed by 2 g of metronidazole by mouth the same evening. A broad-spectrum parenteral antibiotic was given to induce anesthesia. All procedures were performed under general anesthesia at a prone jackknife position.

Anal fistula acellular dermal matrix technique

All operations were performed in the operating room. The primary and secondary fistula tract openings were identified. The fistula tract was then thoroughly cleaned with a blunt curette or gauze strip that was threaded through the tract (Figure 1A). All fistula tracts and primary openings were identified using a conventional fistula probe and/or hydrogen peroxide instillation^[16,17]. All tracts were irrigated with hydrogen peroxide and metronidazole (Figure 1B). The AEM was cut out with a pair of scissors for three or four strips (Figure 2). Each primary opening was occluded by using a AEM anal fistula plug. The AEM was pulled into the fistula tract from secondary to primary the plug fitted snugly into the tract (Figure 1C). The AEM material was secured at the level of the primary opening using a 2-0 vicryl, which was inserted deep to the internal sphincter muscle. The excess AEM was trimmed at skin level at the secondary opening. Care was taken to avoid complete closure of the secondary opening to allow drainage of material and to avoid a closed system. At the end of the procedure, the plug was completely buried within the fistula tract (Figure 1C). In the two cases of multiple separate fistules, the plug was cut into multiple strips to fit multiple fistula tracts. All patients were instructed to have a clear liquid diet for 48 h, avoid any strenuous activity; a broad-spectrum parenteral antibiotic was given. The status of fistula was determined at final follow-up. Success criteria were defined: closure of all secondary openings, absence of fistula drainage and abscess formation.

RESULTS

Thirty patients were prospectively studied during an eight-month period. Twenty-seven patients had successful closure of their fistula tracts after a 7-14 d follow-up, but 3 patients had successful closure of their fistula tracts after 30 d follow-up. The mean healing time was 10.0 d (range, 7-14 d, 27/30). The mean operative time was 20 min (range, 15-25 min). All 28

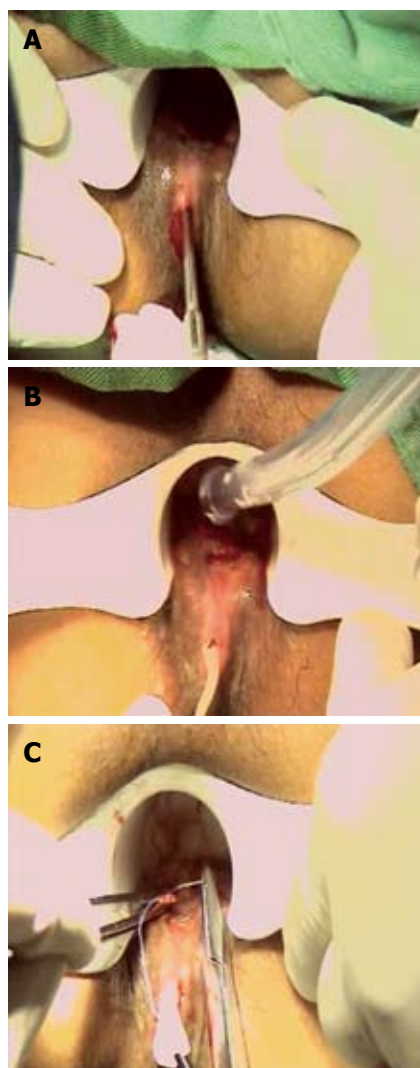


Figure 1 Fistula tract thoroughly cleaned using a blunt curette (A), irrigated with hydrogen peroxide and metronidazole (B), pulled into the primary fistula opening until resistance (C). The AEM is secured at the level of the primary opening using a 2-0 vicryl. The excess of the AEM is trimmed at the level of the secondary opening. Care is taken to avoid complete closure of the secondary opening to allow free drainage of fluid and avoid a closed system.

patients with single fistula tracts had successful closure of their fistula tracts. These 2 patients with multiple tracts had successful closure of their fistula tracts too. The healing rate of anal fistula treatment group was 100%. There was no change of the continence status in all patients. There was no major post operative complication. Successful closure was not significantly associated with single fistula tracts or multiple fistula tracts.

DISCUSSION

Traditional surgical techniques for anorectal fistula, include fistulotomy and seton techniques. Fistulotomy has been performed since ancient times. The outcome is generally acceptable. However, fistulotomy causes various degrees of anal sphincter injury^[6,17-21]. The incontinence status is underestimated. The seton technique is to minimize incontinence, but only with

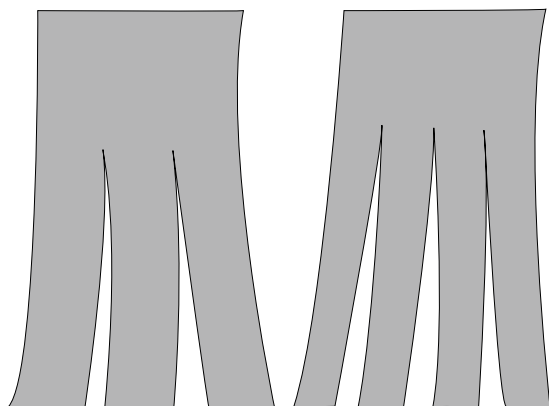


Figure 2 AEM cut out with a knife for three or four strips.

moderate success. Recently, many techniques have been developed, such as endorectal advancement flap, anoderm island flap, excision and closure of internal opening, fibrin glue, and fistula plug. These techniques have less risk of anal incontinence, despite some recurrences. Several studies on fibrin glue treatment of anal fistula have been published since 1999, but, the healing rate after debridement and fibrin glue injection is 14%-60%^[22-26]. Use of anal fistula plug for complex fistula-in-ano repair^[27,28] has a reported success rate of 83%. The method has also been reported for a smaller group of Crohn fistulas^[14,15].

We used fibrin glue and fistula plug during the past year. Our institution began repairing all types of anorectal fistulae using the AEM to drain materials from human or animal skin tissue and to remove the composition of immunogenicity. This technique has been used in the field of burn and plastic surgery, stomatological surgery, tumor repaired surgery and urology for a long time, and clinical results. In our study, the AEM was only used in low anorectal fistula, but could not be used in fistulas of cryptoglandular origin, fistules caused by Crohn's disease, recurrent fistules, and high anorectal fistules. Thirty patients with fistulae in ano were treated, 27 of them had successful closure of their fistula tracts after a 7-14 d follow-up. All the 28 patients with single fistula tracts had successful closure of their fistula tracts. Of them, 2 patients with multiple tracts had successful closure of their fistula tracts too. Giving an overall successful closure rate of 100% (30 of 30 patients), complications and recurrent case were encountered during the postoperative course, immune response and extensive fibrosis were not found in this study, suggesting that treatment of fistula with AEM can reduce pain, shorten disease course, protect anal function. The ache time, and healing time of the treatment group were obviously shorter compared with those achieved by using traditional surgical techniques^[29].

The AEM technique is based on sound principles. It is a new, simple, safe, less invasive and effective technique for closing anorectal fistules, and for avoiding the risks of anorectal incontinence. The early results are satisfactory.

COMMENTS

Background

Anorectal fistula is the chronic phase of anorectal infection. Traditional surgical techniques may damage the external anal sphincters. Many different methods for treating anorectal fistula have been reported in recent years. Other alternative approaches are the application of fibrin glue and fistula plug. However, the result of these approaches is uncertain.

Research frontiers

The use of acellular extracellular matrix (AEM) in the anorectal fistula treatment was first study in the world.

Innovations and breakthroughs

It is a new technique that is simple, safe, minimally invasive for closing anorectal fistules, and for avoiding the risks of anorectal incontinence. The early results are satisfactory.

Applications

This technique can, reduce pain, shorten healing time, protect anal function. Therefore, it can be used in the treatment of fistulae.

Peer review

This paper describes a new technique for the treatment of fistulae, which is of certain importance in clinical treatment of fistulae.

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S- Editor Zhong XY L- Editor Wang XL E- Editor Lin YP