

Bletilla striata promotes the healing of enterocutaneous fistula

A case report

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Abstract

Rationale: Enterocutaneous fistula (ECF) has long been difficult to treat in clinical settings. The current approaches, including surgery, antibiotics, and nutritional support, cannot achieve satisfactory outcomes.

Patient concerns: A 54-year-old man presented with intermittent discharge of purulent material from the fistula of an umbilical incision post colon surgery. His symptoms did not improve after receipt of antibiotic and surgical treatment.

Diagnosis: The patient's symptoms, radiographic findings, and pathological examination led to a diagnosis of ECF.

Interventions: Sterilized Bletilla striata was injected into the fistula once every 3 days for a total of 6 doses.

Outcomes: The ECF completely healed, and the patient was symptom-free after 1 month.

Lessons: The patient's pronounced improvement and the merit of this easy-to-perform low-cost method suggest that Bletilla striata may be used by surgeons for the treatment of chronic abdominal wall fistulas.

Abbreviations: ECF = enterocutaneous fistula, TCM = traditional Chinese medicine.

Keywords: bletilla, case report, enterocutaneous fistula, healing

1. Introduction

Enterocutaneous fistula (ECF) is an aberrant communication between the gastrointestinal tract and skin.^[1] The occurrence of ECF is one of the most troubling and disheartening experiences for patients and their physicians.^[2] The therapeutic goal for the treatment of ECF is to promote spontaneous closure of the fistula.^[3] However, current treatment approaches for ECF,

including surgery, antibiotics, and nutritional support, cannot achieve satisfactory outcomes.

The primary component in Bletilla striata is glucomannan, which affects immune activity by promoting the phagocytic function of reticuloendothelial system, enhancing the activity of natural killer cells, stimulating macrophage activation, inducing the expression of immunoregulatory factors, etc.^[4] Here, we report a case in which treatment of ECF with Bletilla striata resulted in a satisfactory outcome.

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HZ and YJ Both authors contributed equally to this work.

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2. Case description

A 54-year-old man with a 3-month history of hematochezia was admitted to our hospital. The institutional review boards of our hospital had full access to patient's clinical information. Informed written consent was obtained from the patient for publication of this case report and the accompanying images.

The patient's body mass index was 25.4 k, white blood cell count was 4.5×10^3 cells/mm³, carcinoembryonic antigen level was 4.01 ng/mL (<5 ng/mL), and carbohydrate antigen 125 level was 19 kU/mL (<35 kU/mL). Colonoscopy revealed a colon neoplasm, and pathologic examination confirmed adenocarcinoma. A radical resection of colon cancer was performed 2 days after admission, and a pathologic diagnosis of early-stage carcinoma (T1N0M0) was made. Two weeks later, the patient presented with an intermittent discharge of purulent material from the fistula of the umbilical incision (Fig. 1). The tissues surrounding the fistula were red and swollen. A bacteriologic analysis confirmed Escherichia coli infection, and iodine contrast radiography revealed an ECF between the colon and the skin (Fig. 2).

After antibiotic treatment (Amoxicillin), the secretion of purulent material decreased. However, symptoms reappeared

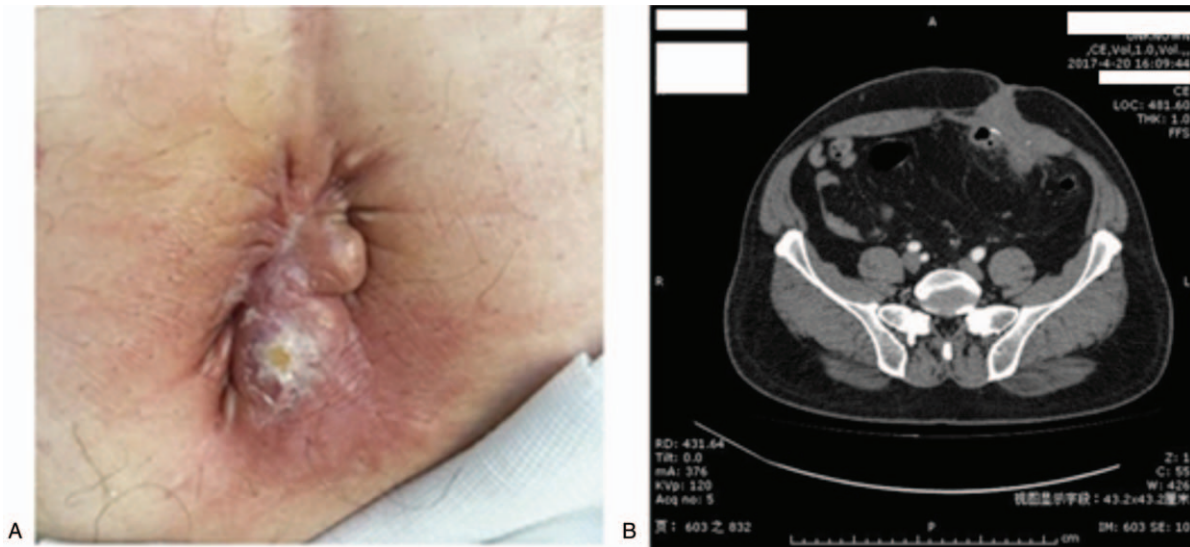


Figure 1. Two weeks after diagnosis of early-stage carcinoma, the patient presented with intermittent discharge of purulent material from the fistula of an abdominal incision. (A) A fistula was observed with yellowish mucopurulent secretions in the umbilical incision. (B) Computed tomography suggested an irregular soft-tissue mass in the left abdominal wall, indicating that the fistula was infected.

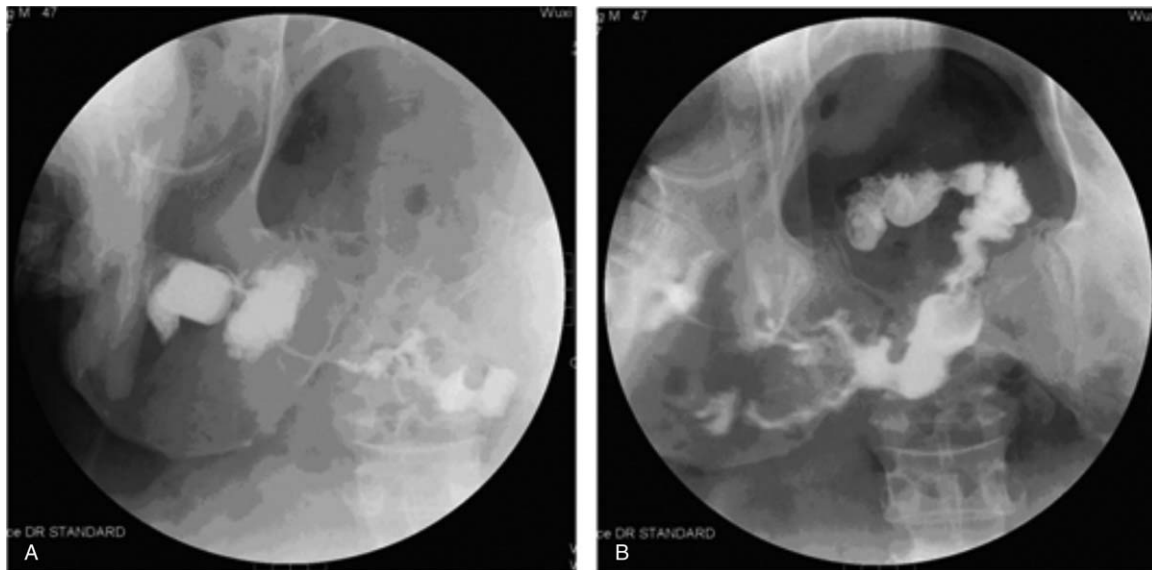


Figure 2. Results of iodine contrast radiography confirmed the existence of an enterocutaneous fistula between the colon and skin. (A) An iodine contrast agent was injected into the abdominal fistula. (B) The inflow of iodine contrast agent into the colonic cavity.

when the antibiotic was halted. Approximately 6 months after the first surgical procedure, a second surgical procedure was performed to alleviate abdominal discomfort, which the patient described as unbearable. The fistula and a section of intestinal wall were removed. Pathological findings suggested inflammatory granulation tissue with fibrous hyperplasia (Fig. 3). However, 2 weeks after surgery, the patient developed a fever. Computed tomography revealed an effusion under the incision (Fig. 4), and

the intermittent discharge of purulent material from the fistula recurred.

Per the recommendation of a physician in the Department of Traditional Chinese Medicine (TCM), the ECF was treated with *Bletilla striata*. During *Bletilla striata* treatment, the patient did not receive oral antibiotics or other treatments. The flower was processed as follows: 50 g of *Bletilla* was boiled in 400 mL of double-distilled water for 3 hours over a small fire (Fig. 5), dried

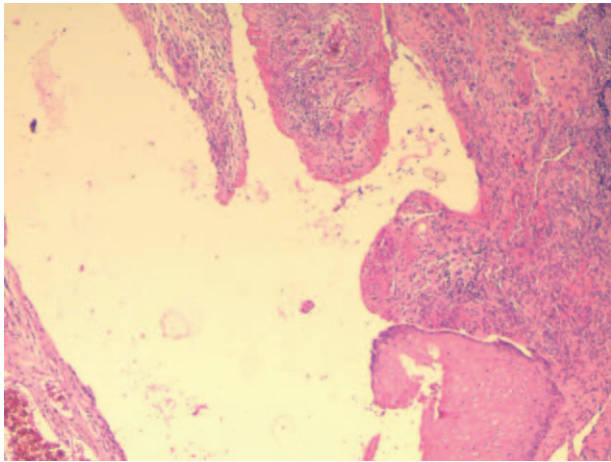


Figure 3. Pathological findings suggested inflammatory granulation tissue with fibrous hyperplasia.

for 48 hours in a dry box (37°C), and then sterilized with high-pressure steam. After washing the fistula with 0.9% saline, we injected 3 mL of sterilized *Bletilla* into the fistula. Treatment was performed once every 3 days for 6 doses, after which the ECF completely healed (Fig. 6); it did not recur until March 20, 2019. The patient visited the clinic every 3 months for follow-up.

3. Discussion

Despite large advances in antibiotics, and surgical critical care, the management of ECFs remains one of the most challenging surgical problems faced today. Even in the most experienced hands and specialized centers, the mortality rate from ECFs is

5% to 15%.^[5-7] TCM has long treated fistulas with good results.^[8-10] However, the majority of TCMs for fistulas are complex and are only reported in Chinese journals, which makes them difficult for practitioners of Western medicine to comprehend.

Bletilla striata, otherwise known as hyacinth orchid or Chinese ground orchid, is a species of flowering plant in the Orchidaceae family that is native to Japan, Korea, Myanmar, and China. The medicinal use of *Bletilla striata* has a long history in China.^[11] In ancient China, it was used externally for wounds. Today, in addition to its use for the treatment of hematemesis, hemoptysis, and traumatic bleeding, *Bletilla striata* has been proven effective for the treatment of ulcers, owing to the efficacy with which it promotes tissue regeneration.^[12] Practitioners of TCM at our hospital have reported a few cases in which chronic skin ulcers were successfully treated with *Bletilla*; but in those cases, patients’ clinical data were not collected and summarized. In this case, we observed that *Bletilla striata* significantly promoted the healing of chronic ECF.

Tissue healing after injury is a complex process involving many physiological and pathological mechanisms. The expression levels of vascular endothelial growth factor and inflammatory factors play an important role in healing.^[13] *Bletilla striata* can suppress inflammation and promote wound healing.^[14] By stimulating RAW264.7 macrophage cells and increasing the expression of nitric oxide and interferon gamma, *Bletilla striata* helps maintain appropriate inflammatory responses.^[12,15,16] Moreover, evidence has suggested that *Bletilla striata* promotes wound healing by upregulating the expression of vascular endothelial growth factor and promoting the proliferation of endothelial cells and fibroblasts.^[17,18] Ointments containing *Bletilla striata* have been shown to significantly improve the activity of superoxide dismutase, increase monoamine oxidase content, and reduce malondialdehyde content, which indicates that *Bletilla striata* has the potential to promote scald healing.^[12]

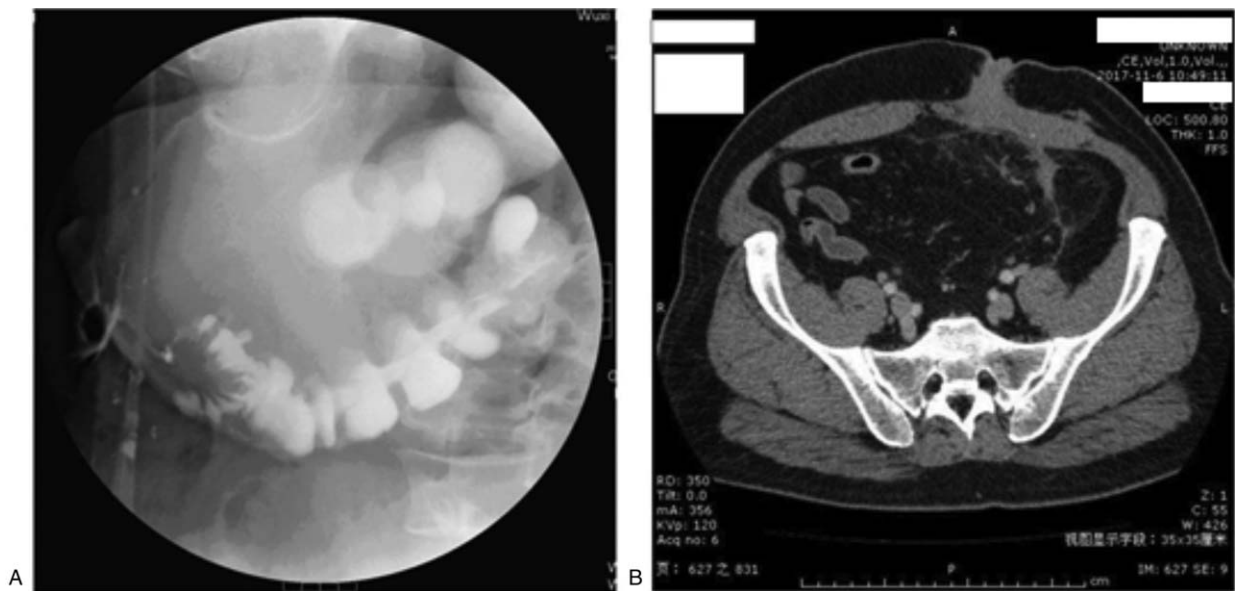


Figure 4. Results of iodic contrast radiography and computed tomography. (A) The iodic agent was injected into the colon cavity along the enterocutaneous fistula. (B) Computed tomography suggested an irregular soft-tissue mass in the left abdominal wall, indicating that the fistula was infected.

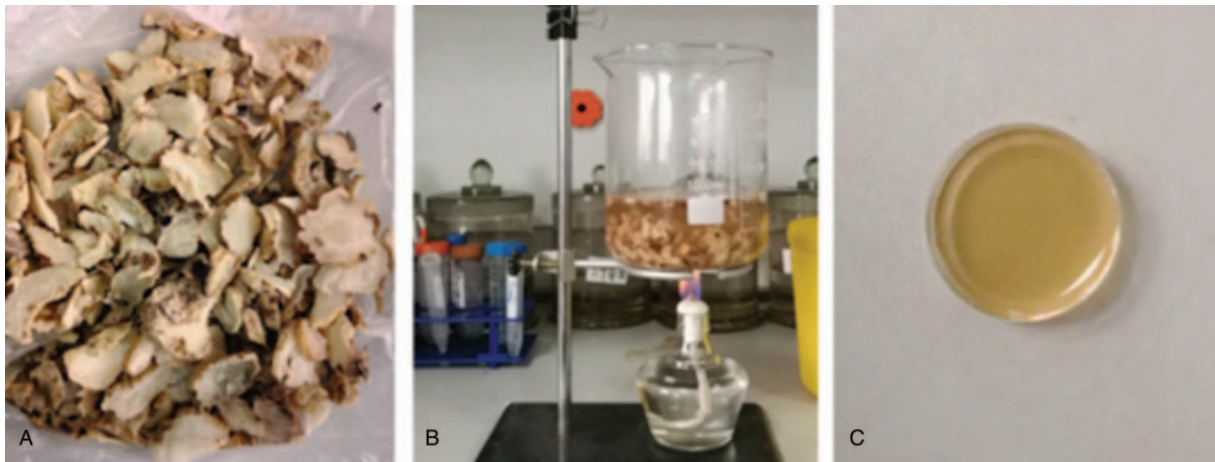


Figure 5. Preparation of *Bletilla striata*. (A) *Bletilla striata* flowers. (B) *Bletilla striata* was boiled in 400mL double-distilled water for 3h. (C) *Bletilla striata* powder.

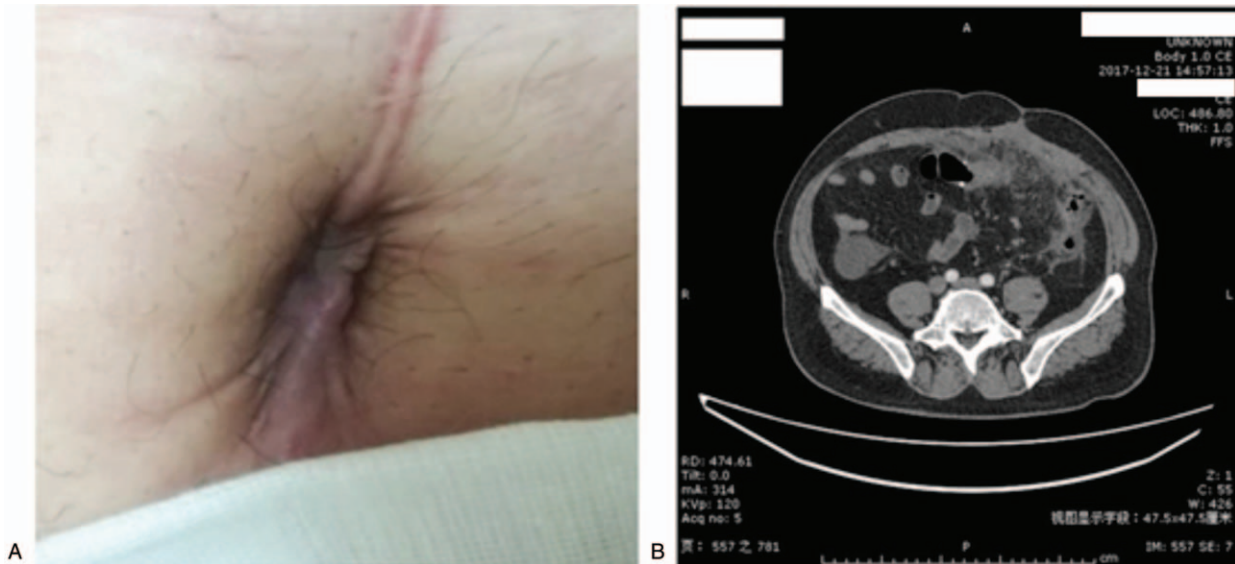


Figure 6. The enterocutaneous fistula completely healed, and symptoms did not recur until 6 months later. (A) Under direct view, the fistula appears healed. No obvious indication of inflammation is shown. (B) Computed tomography shows no continuity in the fistula structure and marked alleviation of swelling of in the local tissue.

Given the uncomplicated methodology, relatively low economic cost, and the therapeutic effect demonstrated in our patient's case, we suggest that surgeons utilize *Bletilla striata* for the treatment of chronic abdominal wall fistulas.

Author contributions

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