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Journal of Clinical Research and Reports

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Case Report

Successful Treatment of Refractory Feline Sporotrichosis Using Electroporation: A Two-Case Reports.

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Received date: March 18, 2026; **Accepted date:** April 03, 2026; **Published date:** June 26, 2026

Citation: Maciel Brunner CH, Luis Eduardo de Pinho Gonçalves, Claudia Hirukawa, (2026), Successful Treatment of Refractory Feline Sporotrichosis Using Electroporation: A Two-Case Report, *J Clinical Research and Reports,* 24(2); **DOI:10.31579/2690-1919/618**

Abstract

Refractory feline sporotrichosis remains a significant clinical challenge, particularly in cases with persistent lesions despite prolonged antifungal therapy. This report describes two cats with cutaneous sporotrichosis unresponsive to itraconazole that were successfully treated using electroporation as an adjunctive local therapy. Both animals presented ulcerative and proliferative lesions with poor response to conventional treatment. Electroporation was performed under general anesthesia using needle electrodes and square-wave electric pulses. Progressive reduction in lesion size, decreased exudation, and complete epithelialization were observed following repeated sessions. In one case, complete healing was achieved after three sessions, whereas in the second case remission occurred after two sessions. No recurrence was observed during long-term follow-up. These findings suggest that electroporation may represent a practical and effective adjunctive treatment for refractory feline sporotrichosis, particularly when conventional therapy alone is insufficient.

Keywords: feline sporotrichosis; electroporation; refractory infection; veterinary dermatology

Introduction

Feline sporotrichosis is a subcutaneous fungal infection of increasing clinical and zoonotic importance, particularly in endemic regions such as Brazil [2]. The disease is primarily caused by species of the genus Sporothrix, with Sporothrix brasiliensis being the species most frequently associated with feline outbreaks and severe clinical presentations [1,3]. Affected cats typically develop ulcerative, nodular, or proliferative cutaneous lesions with high fungal burden, which contributes to transmission through scratches, bites, or contact with exudates. Due to this transmission pattern, feline sporotrichosis represents a significant public health concern [3]. The standard treatment consists of prolonged administration of systemic antifungal drugs, most commonly itraconazole. However, treatment failure and refractory lesions are not uncommon, especially in cases with extensive disease or difficulties in long-term drug administration [4]. Electroporation is a technique that uses short high-voltage electric pulses to increase cellular membrane permeability. Depending on the parameters applied, this effect may be reversible or irreversible, with the latter leading to cell death. In recent years, electroporation has been increasingly explored as a therapeutic tool in clinical medicine [5]. Given the limitations of conventional therapy in refractory cases, electroporation may represent a promising adjunctive approach for improving local treatment outcomes [6]. Therefore, the aim of this report is to describe the clinical outcome of electroporation in two cases of feline sporotrichosis unresponsive to conventional antifungal therapy.

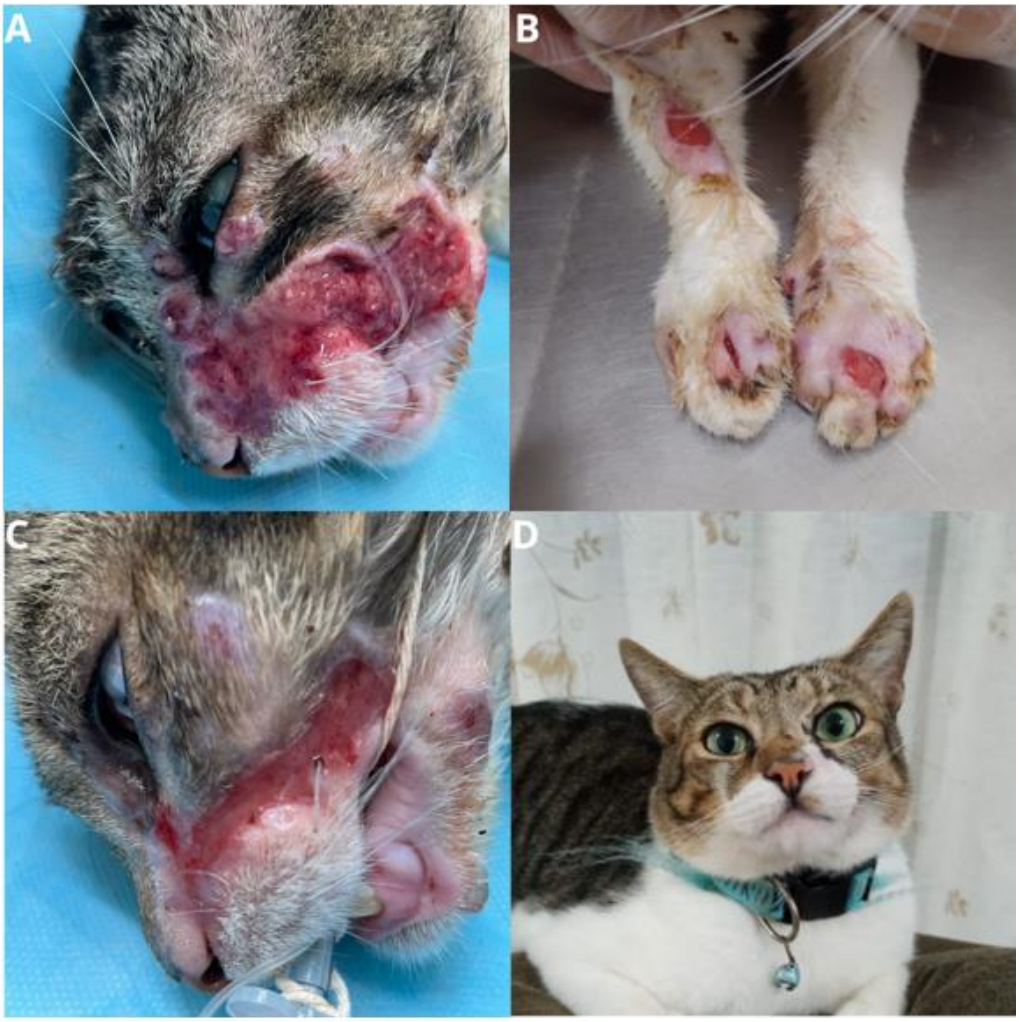
Case Description

Case 1

An adult male mixed-breed domestic cat was presented with multiple ulcerative cutaneous lesions characterized by serosanguineous crusts affecting the right infraorbital region, left humeral region, left metatarsal region, interscapular region, lateral canthus of the left eye, dorsal nasal planum, and both auricular pinnae, with partial exposure of auricular cartilage.

The animal had been receiving oral itraconazole (ITL®, Cevap, São Paulo, Brazil) at a dose of 100 mg once daily for two months without clinical improvement. Electroporation was performed under general

inhalational anesthesia using needle electrodes (Sporo Pulse®, Akko, Santa Rita do Sapucaí, Brazil). Eight square-wave monopolar pulses (1000 V/cm, 100 µs, 5 kHz) were initially applied to all lesions. Postoperative analgesia consisted of dipyrone (Dipirona Gotas®, Biovet, Cotia, Brazil) at 50 mg/kg, orally. Fifty-four days after the first session, lesion progression and the development of a new periungual lesion were observed. A second electroporation session was then performed using the same device, with 19 square-wave monopolar pulses (1450 V/cm, 100 µs, 5 kHz) applied to each lesion. Itraconazole therapy was maintained. Six days after the second session, lesions showed reduced exudation and the presence of smooth granulation tissue. A third electroporation session using the same parameters was performed 90 days after the initial treatment. At that time, several lesions had completely resolved, while the remaining lesions showed marked reduction in size. Complete epithelialization of all lesions was observed 130 days after the first session. No recurrence was noted during a 140-day follow-up period (Figure 1).



(A) Multiple ulcerative lesions observed on the day of the first electroporation session. **(B)** Progression of lesions 54 days after the first session, with development of additional lesions. **(C)** Marked reduction of lesions and advanced healing 90 days after the first session, prior to the third electroporation treatment. **(D)** Complete epithelialization of lesions 130 days after the first electroporation session.

Figure 1: Clinical evolution of cutaneous lesions in Case 1.

Case 2

A four-year-old male stray domestic cat was presented with deep ulcerative lesions affecting the face, ears, and limbs. Initial treatment with ampicillin did not result in clinical improvement.

Cytological evaluation suggested a fungal infection, and treatment with oral itraconazole (30 mg once daily) was initiated. After 30 days, lesion progression was observed, including enlargement of facial lesions and the appearance of a new lesion on a limb. Electroporation was then performed using the same device and parameters (1450 V/cm, 100 µs, 5 kHz). The pulses were applied to the lesions and to an approximately 2 cm margin of surrounding tissue. Postoperative analgesia consisted of dipyrone (50 mg/kg, orally, twice daily). Twelve days after the first session, lesions showed reduced exudation and the formation of smooth granulation tissue. A second electroporation session using the same parameters was performed 21 days later. At that time, lesions had significantly decreased in size and showed well-defined cicatricial borders. Complete epithelialization was observed 50 days after the first treatment session. No recurrence was observed during a follow-up period exceeding two years (Figure 2).

(A) Extensive ulcerative lesions before the first electroporation session. **(B)** Reduction in exudation and development of smooth granulation tissue 12 days after treatment. **(C)** Significant reduction in lesion size prior to the second electroporation session (21 days). **(D)** Complete epithelialization of lesions 50 days after the first treatment session.

Figure 2: Clinical evolution of sporotrichosis lesions in Case 2.

Discussion

Feline sporotrichosis remains an important clinical and zoonotic concern, particularly in endemic regions where Sporothrix brasiliensis infections are associated with high fungal burden and therapeutic challenges [7,8]. Although itraconazole is considered the standard treatment [9], refractory cases are not uncommon and may be associated with prolonged treatment duration and difficulties in drug administration [10]. In the present report, both cases showed poor response to conventional antifungal therapy prior to the introduction of electroporation. Clinical improvement was observed only after adjustment of electrical parameters to values consistent with irreversible electroporation, suggesting that adequate pulse intensity may be critical for therapeutic success [11]. The favorable outcomes observed may be explained by increased local drug uptake, direct cellular damage, or a combination of both mechanisms [11–14]. In addition, the reduction in lesion exudation and the acceleration of tissue remodeling observed after treatment may contribute to decreased environmental contamination, considering the high fungal burden typically present in feline lesions. However, the direct impact of this approach on zoonotic transmission risk remains to be determined. From a clinical perspective, electroporation may offer practical advantages, particularly in animals that are difficult to handle or in cases requiring prolonged therapy. The ability to locally target lesions may reduce treatment time and improve overall case management. To the authors' knowledge, this report represents one of the first clinical descriptions of electroporation applied to feline sporotrichosis. Although controlled studies are needed to confirm these findings, this approach may represent a practical and effective alternative for clinicians managing refractory cases in routine veterinary practice.

Conclusion

Electroporation may represent a promising adjunctive therapeutic approach for the management of refractory feline sporotrichosis, particularly in cases unresponsive to conventional antifungal treatment.

Ethical Statement

All procedures were performed in accordance with clinical veterinary practice. Informed consent was obtained from the animal owners prior to treatment.

Conflict of Interest

The authors declare no conflict of interest.

Funding

No external funding was received.

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DOI:10.31579/2690-1919/618