

Healing of spongiosus-cutaneous fistula with Hyperbaric Oxygen Therapy (HBOT): a case report

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ABSTRACT

Introduction: We present a case of a spongiosus-cutaneous fistula in a 39-year-old man with recurrent episodes of cutaneous abscess in dorsal middle third penis (5×3 cm) treated with Hyperbaric Oxygen Therapy (HBOT).

Case report: After emptying nodular abscess, the patient was noncompliant for further surgery. Therefore, it was suggested the association between HBOT and antibiotic therapy. HBOT is carried out in a hyperbaric room, where the internal pressure is increased (compression phase) by entering compressed air up to 283.71 kPa in about 10 minutes. Every HBOT cycle lasted 24 days in which the patient had been taking Amoxicillin/Clavulanic Acid 875 mg/125 mg 3 tabs/day and Sulfamethoxazole/Trimethoprim 160 mg/800 mg 2 tabs/day for 2 weeks. At the end of the treatment, a penile magnetic resonance imaging and an ultrasonography were executed and they evidenced a complete remission of the lesion. In the subsequent 22 months, there was no recurrence.

Conclusions: Our results suggest that HBOT is an effective treatment for chronic wounds, including a spongiosus-cutaneous fistula of unknown cause, when used in combination with conventional standard therapy or further interventions. At present time, the gold standard remains surgery; nevertheless, our experience with HBOT may stimulate its use in clinical trials.

Keywords: Fistulas, Hyperbaric oxygen therapy, Injuries, Penis disorders, Wounds

Introduction

The most common penile fistulas are urethrocutaneous fistulas due to inflammatory-infective processes, trauma, posturethral surgical complications, radiotherapy, ischemia, and malignancy or congenital urethra's malformations (1). We present a 39-year-old man with a rare case of cutaneous-spongiosus fistula with recurrent episodes of cutaneous abscess treated with Hyperbaric Oxygen Therapy (HBOT).

Case description

On May 2014, a 39-year-old man was hospitalized at Urology Department with a middle third penis superficial dorsal nodular lesion (5×3 cm) with edema of the foreskin and paraphimosis. The patient, in the last 2 years, had previous episodes of similar lesions that were treated by emptying the nodular abscesses with concurrent pharmacological treatments with

antibiotics drugs. The recurrences occurred for three times, from 6 to 12 months from each other, on average, every 9 months. The histological examination showed the presence of inhomogeneous materials mainly composed by inflammatory and keratin cells due to a granulomatous reaction connected to a bacterial infection. At the ultrasound (US), there was a clear evidence of a fistula located between the lesion and the corpus spongiosus of the penis (15×20 mm) with remarkable edema and inflammation, which resulted in a light hypoechoic thickening of the skin's wall (Figs. 1, 2). A penile Magnetic Resonance Imaging (MRI) was done for further investigation, but excluded a urethral fistula.

Two options were presented to the patient: surgical repair of the spongiosus-cutaneous fistula or a less invasive approach with HBOT. The patient refused surgery for personal reasons, so he underwent HBOT. HBOT was carried out in a hyperbaric room, with an internal pressure that increased from 101.3 up to 283.71 kPa (compression phase) in a period of 10 minutes. In total, 96 days of HBOT were provided with a concurrent pharmacological treatment with Amoxicillin/Potassium Clavulanate 875 mg/125 mg 3 tabs/day and Sulfamethoxazole/Trimethoprim 160 mg/800 mg 2 tabs/day. A monthly break was done after every 24 HBOT days.

At the end of the treatment, a penile MRI and a US (Fig. 3) were repeated and they evidenced a complete remission of the lesion. The patient showed no other symptoms. In the subsequent 22 months, no recurrence occurred.

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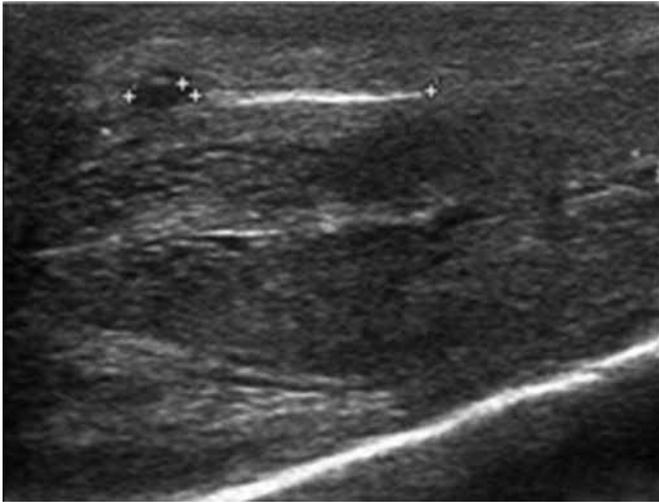


Fig. 1 - Pre-treatment US evaluation of the fistula.

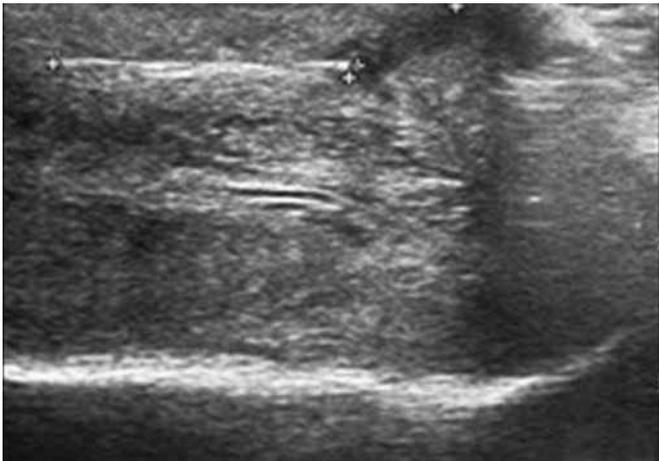


Fig. 2 - Fistula detail.

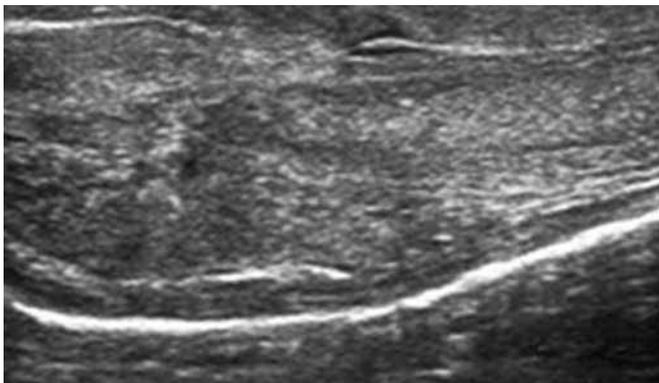


Fig. 3 - Post-treatment US evaluation of the fistula.

Conclusions

Urological fistulas are a frequent surgical complication. Their treatment is based on the cause of the fistula, its position, its dimension, and its anatomic characteristics (1, 2).

Generally, for smaller and early-diagnosed fistulas, the treatment should be conservative, and it consists in adequate nutrition, antibiotic therapy, and the removal of the causes. When fistula is too extended or a conservative approach is not therapeutic, surgical treatment should be considered. However, in the recent years, there is a growing interest in the clinical applications for HBOT, especially in the healing of late radiation tissue injury (LRTI). Bennett et al performed a literature review of 753 participants affected by LRTI of deep tissue treated with HBOT and they concluded that HBOT might improve healing outcomes and its use can be justified (3). The HBOT therapeutic action seems to be related to the temporary suppression of the proinflammatory-induced stimulus, cytokine production, and it induces the liberation of TNF-alpha and endothelins. Furthermore, VEGF levels are significantly increased (4). Thereby, HBOT stimulates angiogenesis, fibroblasts function, granulation tissue formation, and determines anti-inflammatory upregulation of IL-8 and nitric oxide. It also improves the control of infections enhancing leukocytes function (5, 6). Tompach et al exposed cultured endothelial cells and fibroblasts to hyperbaric oxygen. So, they demonstrated growth proliferation of both cell types (7). Several investigators have researched the use of HBOT for treating chronic wounds in diabetic patients, including diabetic foot ulcers. In fact, Baroni et al reported, in a series of patients with diabetic foot gangrene, that those who underwent HBOT experienced a better healing outcome and were less likely to undergo foot amputation. Furthermore, the vasoconstriction induced due to hyperoxia, especially in superficial tissues, decreased edema in the periwound area (8). Similarly, in our case, there was a significant reduction of edema after the first cycle of HBOT. Kolpen et al also demonstrated the potential effects of HBOT to improve the bactericidal capacities of the antibiotics and the ability to increase the oxidative burst through the production of oxygen radicals especially in superficial wounds, bone, and biliary ducts (9). All these experiences confirm that HBOT provide optimal physiological conditions for wound healing.

In conclusion, our case suggests that HBOT is an effective treatment for chronic wounds when used in combination with conventional standard therapy or further interventions. At present time, the gold standard for the treatment of spongiosus-cutaneous fistulas remains surgery; nevertheless, our experience with HBOT may stimulate its use in further clinical trials.

Disclosures

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Conflicts of interest: The authors declare that there are no conflicts of interest.

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