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THERAPEUTIC INNOVATIONS IN NECROTIZING FASCIITIS, A LITERATURE REVIEW

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INTRODUCTION

Fournier's gangrene (FG) is a necrotizing soft tissue infection, typically polymicrobial, which mainly affects the perineum and exposes the patient to the risk of death.[1] It is usually caused by a combination of pathogens acting synergistically in immunocompromised hosts.[2] Tissue necrosis is often initiated by dermatological defects in the perineum, anus or urogenital tract. [3]

Early broad-spectrum antibiotic therapy and surgical approach with extensive debridement significantly reduce mortality.[4] Delayed surgical intervention is the most modifiable risk factor linked to mortality and is a crucial step towards definitive diagnosis .[5]

Fournier's Gangrene has a high mortality rate, 22-40% of all patients.[6-8] This makes it extremely important to study therapies associated with established treatment as a way of reducing morbidity and mortality. Hyperbaric Oxygen Therapy (HBO) improves tissue perfusion, promotes angiogenesis and collagen synthesis, increases tissue oxygen levels and inhibits toxin production. [(9)]

In this context, the aim of this study is to carry out a systematic review of the literature to assess the latest developments in the use of Hyperbaric Oxygen Therapy in Fournier's Gangrene and whether there is a positive relationship in this association. Studies in the literature over the last five years analyzing this association are scarce.

MATERIALS AND METHODS

Considering that observational studies have shown advances in new therapies for Fournier's Grangrene, it is important to look into the use of the hyperbaric chamber in the treatment of this syndrome.

For this study, the question was: Is there a reduction in mortality and a better clinical outcome with the use of OH in Fournier's Syndrome? In order to answer this question, a systematic review study was carried out.

The review was carried out in accordance with the PRISMA (Preferred Reporting Items for Systematic reviews and meta Analyses) standards on studies evaluating the association between Fournier's Syndrome and Hyperbaric Chamber.

To this end, online articles were searched in the PubMed/Medline, Science Direct and Lilacs databases. The following descriptors were used to identify the articles: "hyperbaric oxygen therapy" and "Fournier's Gangrene.

In addition, the list of references of the articles and reviews on the topics in question were evaluated in order to identify studies not indexed in the databases, but which would be relevant for inclusion in this review. The articles identified in the databases were selected independently by two reviewers using forms with the article eligibility criteria. At the end of the review, divergent articles were selected by consensus between the reviewers.

The criteria used to select the articles were: systematic reviews, observational epidemiological studies and clinical trials carried out in the last 5 years (2020-2024). Articles such as communications, editorials and those with methodological weaknesses were excluded. The methodological quality of the selected studies was assessed by adapting the "Effective Public Health Practice Project: Quality Assessment Tool for Quantitative Studies - QATQS" scale (http:// www.ephpp.ca/tools.html).

This scale will assess five issues (classified as "strong", "moderate" or "weak"): 1) selection bias; 2) study design; 3) confounding factors; 4) data collection methods; and 5) type of analysis used for the outcome. Eligible articles were read in their entirety and then information was collected on the year of publication, study design, site, endpoint, study results and authors' conclusions. This information was filled in on a form designed to collect this information.

RESULTS

Searches were carried out in 3 databases, with the following results: Science direct (53); Pubmed (31); Lilacs (16). A total of 100 articles were screened, of which 3 duplicates were identified. 97 articles were analyzed, of which 87 were excluded by title. 10 studies were read in full, and 7 were selected for the study (Figure 1).

The analysis of the articles (Table 1) showed studies from different countries: Brazil (3), Italy (1), Germany (1), Iran (1) and China (1). The vast majority were retrospective comparative studies. All of them used hyperbaric oxygen therapy as an intervention. As endpoints we obtained: treatment outcome, mortality, case outcome, treatment efficacy and clinical outcomes. Of the 7 studies, 6 showed a positive association between the use of hyperbaric oxygen therapy and efficacy in the treatment of Fournier's Gangrene, with statistical significance. Only 1 of the studies showed results without statistical significance.

DISCUSSION

Hyperbaric oxygen therapy has a direct effect on anaerobic bacteria through the formation of free oxygen radicals. During phagocytosis, neutrophil oxygen consumption increases and OH can increase neutrophil activity. In addition, it can lead to the growth of fibroblasts and the formation of blood vessels, thus promoting wound healing. OH can relieve inflammation, reduce inflammatory immune cytokines, stimulate wound repair, maintain wound oxygenation, increase antioxidant enzymes and treat tissue hypoxemia and radiation necrosis.[10-12]

However, there has been ongoing controversy about the effectiveness of OH in terms of mortality and other clinical outcomes in patients with Fournier's Gangrene.[13] Some studies in the literature have shown that the therapy is significantly beneficial in these patients, while others have shown the opposite.[14] The purpose of this review was to evaluate new studies (in the last five years) on the relationship between Fournier's Syndrome and Hyperbaric Oxygen Therapy in order to update new evidence on the use of adjuvant therapy in the treatment of this comorbidity. From the analysis of the studies, we found a positive association in all of them. Hyperbaric Oxygen Therapy is proving to be an effective treatment for Fournier's Gangrene, reducing mortality and improving clinical outcomes. However, it is necessary to conduct research with a uniform population and uniform scenarios in order to reach more robust conclusions.

In addition, most of the studies included were retrospective observational studies, which can lead to various biases. More studies on this association are needed, especially through randomized clinical trials. So far, the use of Hyperbaric Oxygen Therapy has been shown to be a good accessory treatment for the management of Fournier's Gangrene.

CONCLUSION

Analysis of the articles shows that adjuvant therapy with Hyperbaric Oxygen Therapy is a proposal to reduce mortality and improve clinical outcomes in patients with Fournier's Gangrene. We suggest the development of randomized clinical trial studies to elucidate this relationship, which has a major impact on public health due to the high mortality rates associated with FG. If a positive relationship with statistical significance is proven, public efforts for broad access to Hyperbaric Oxygen Therapy are necessary.

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