



## ***Clinical complications of malignant otitis externa and surgical treatment***

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### **REVISÃO**

#### **RESUMO**

Para complicações clínicas da otite externa maligna e seu tratamento cirúrgico, a introdução aborda uma condição rara e grave, caracterizada pela infecção necrosante do canal auditivo externo, muitas vezes associada a comorbidades como diabetes mellitus descompensado. Esta condição requer intervenção rápida devido ao potencial de disseminação para estruturas adjacentes, como o crânio e a base do crânio, resultando em complicações graves, como paralisia facial, osteomielite e meningite. O manejo inclui antibioticoterapia intravenosa de amplo espectro e, em muitos casos, intervenção cirúrgica para desbridamento de tecidos necróticos e controle da infecção. Objetivo: sintetizar evidências recentes sobre a eficácia dos tratamentos cirúrgicos na otite externa maligna, destacando os desfechos clínicos e a mortalidade associada. Metodologia: foi estruturada conforme o checklist PRISMA, utilizando bases de dados PubMed, Scielo e Web of Science para buscar artigos publicados nos últimos 10 anos. Os descritores incluíram "otite externa maligna", "tratamento cirúrgico", "complicações", "mortalidade" e "intervenção". Critérios de inclusão foram estudos clínicos e revisões sistemáticas que abordavam tratamento cirúrgico e desfechos clínicos. Critérios de exclusão foram estudos com foco exclusivo em tratamentos não cirúrgicos, relatos de casos isolados e estudos com menos de 10 participantes. Resultados: destacaram a eficácia do desbridamento cirúrgico precoce na redução da mortalidade e das complicações neurológicas graves. A análise revelou que a antibioticoterapia adjuvante e a vigilância intensiva são cruciais para o manejo bem-sucedido. Conclusão: enfatiza-se a importância da abordagem multidisciplinar e da intervenção cirúrgica oportuna para melhorar os desfechos em pacientes com otite externa maligna, ressaltando a necessidade de mais estudos para elucidar protocolos terapêuticos ideais e estratégias de prevenção.

**Palavras-chave:** "otite externa maligna", "tratamento cirúrgico", "complicações", "mortalidade" e "intervenção"

**ABSTRACT**

For clinical complications of malignant otitis externa and its surgical treatment, the introduction addresses a rare and serious condition, characterized by necrotizing infection of the external auditory canal, often associated with comorbidities such as decompensated diabetes mellitus. This condition requires rapid intervention due to the potential for spread to adjacent structures such as the skull and skull base, resulting in serious complications such as facial paralysis, osteomyelitis, and meningitis. Management includes broad-spectrum intravenous antibiotic therapy and, in many cases, surgical intervention to debride necrotic tissue and control infection. Objective: to synthesize recent evidence on the effectiveness of surgical treatments in malignant otitis externa, highlighting clinical outcomes and associated mortality. Methodology: it was structured according to the PRISMA checklist, using PubMed, Scielo and Web of Science databases to search for articles published in the last 10 years. Descriptors included "malignant otitis externa", "surgical treatment", "complications", "mortality" and "intervention". Inclusion criteria were clinical studies and systematic reviews that addressed surgical treatment and clinical outcomes. Exclusion criteria were studies focusing exclusively on non-surgical treatments, isolated case reports and studies with fewer than 10 participants. Results: highlighted the effectiveness of early surgical debridement in reducing mortality and serious neurological complications. The analysis revealed that adjuvant antibiotic therapy and intensive surveillance are crucial for successful management. Conclusion: the importance of a multidisciplinary approach and timely surgical intervention is emphasized to improve outcomes in patients with malignant otitis externa, highlighting the need for further studies to elucidate ideal therapeutic protocols and prevention strategies.

**Keywords:** "malignant otitis externa", "surgical treatment", "complications", "mortality" and "intervention"

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## **INTRODUÇÃO**

Malignant otitis externa is a serious and potentially fatal condition characterized by a necrotizing infection of the external ear canal. This condition generally occurs in patients with predisposing factors, such as decompensated diabetes mellitus, significantly compromising the immune system. Early diagnosis is crucial, highlighted by the presence of intense pain in the ear, purulent secretion and, in advanced stages, evident neurological impairment. Immediate identification of symptoms allows rapid implementation of broad-spectrum intravenous antibiotic therapy, aiming to control the infection and prevent its spread to adjacent structures, such as the temporal bone and skull base.

Antibiotic treatment forms the basis of initial management, aiming not only to eradicate the infectious agent, usually *Pseudomonas aeruginosa*, but also to reduce local inflammation. The choice of antimicrobials considers increasing bacterial resistance, often requiring combined therapy to achieve maximum efficacy. At the same time, supportive measures such as adequate analgesia and careful cleaning of the ear canal are essential to alleviate discomfort and facilitate the healing process.

Malignant otitis externa is a rare but potentially devastating condition involving a necrotizing infection of the external ear canal, often associated with immunosuppression, as in patients with decompensated diabetes. In addition to initial antibiotic treatment, emergency surgical intervention plays a crucial role in managing this condition. Early surgical debridement is necessary to remove necrotic tissue, reduce bacterial load, and prevent serious complications such as the spread of infection to critical structures such as the skull base. The surgical approach is often complemented by tissue reconstruction techniques to restore the anatomical and functional integrity of the ear canal.

Intensive monitoring is essential to assess response to treatment and early detection of any signs of recurrence or complications. This includes frequent clinical examinations and, occasionally, imaging studies to assess the extent of infection and the success of surgical intervention. Furthermore, multidisciplinary management is essential to ensure a holistic and integrated approach to patient care. The involvement of

specialists such as otorhinolaryngologists, infectious disease specialists and neurologists allows for a complete assessment of the clinical, microbiological and neurological aspects of the condition, thus optimizing therapeutic results and reducing the risk of long-term complications.

The objective of this systematic literature review is to investigate in detail the effectiveness and clinical outcomes of surgical treatments in malignant otitis externa. The aim is to analyze the success rate of surgical debridement in controlling infection and reducing associated serious complications, such as dissemination to adjacent structures and neurological impairment. Furthermore, we seek to compare different surgical approaches used in recent studies, evaluating the relative effectiveness of each technique and identifying possible geographic or institutional variations in treatment practices. This review also aims to provide insights into multidisciplinary management strategies that can positively influence clinical outcomes, such as collaboration between specialists in otolaryngology, infectious diseases and neurology. Ultimately, we hope to offer evidence-based recommendations to optimize care and improve outcomes in patients diagnosed with malignant otitis externa.

## **METODOLOGIA**

The methodology used in this systematic review followed the guidelines established by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist. The search for relevant articles was conducted in the PubMed, Scielo and Web of Science databases, using the descriptors "malignant otitis externa", "surgical treatment", "complications", "mortality" and "intervention". The search was limited to studies published in the last 10 years to ensure the relevance and timeliness of the information. Inclusion criteria were established that covered clinical studies and systematic reviews that specifically investigated the surgical treatment of malignant otitis externa, reporting clinical outcomes and associated complications. Furthermore, studies that discussed different surgical techniques and their effectiveness in controlling infection were considered.

Exclusion criteria were applied to eliminate studies that did not fit the specific objectives of the review, such as isolated case reports, studies with fewer than 10

participants, articles that did not focus on surgical treatment or studies prior to the stipulated period. Works that were not available in full or were not available in a language accessible for adequate critical analysis were also excluded.

The selection of articles was carried out independently by two reviewers, who initially examined the titles and abstracts of the studies identified in the initial search. Subsequently, the selected articles were evaluated in full to determine their final eligibility according to pre-defined criteria. Any disagreement was resolved by consensus between the reviewers or, when necessary, by consulting a third reviewer for a final decision.

This rigorous methodological process allowed the identification and critical analysis of relevant studies on the surgical treatment of malignant otitis externa, providing an up-to-date synthesis of practices and results in this crucial area of otology and otorhinolaryngology.

## **RESULTS**

15 articles were selected. Malignant otitis externa is a rare but extremely serious condition characterized by necrotizing infection of the external ear canal. This infection generally results from a predisposition aggravated by factors such as decompensated diabetes, severely compromising the patient's immune system. Once established, the infection quickly advances, involving adjacent soft tissues and, in more severe cases, reaching bony structures such as the temporal bone. Symptoms often include intense pain in the ear, accompanied by purulent discharge and, in advanced stages, there may be evident neurological impairment, such as facial paralysis. Accurate diagnosis requires a thorough clinical evaluation, often supported by imaging tests to determine the extent of the infection.

Patients with decompensated diabetes are particularly susceptible due to a reduced immune response, making them more likely to develop severe and difficult-to-control infections. The condition of malignant otitis externa represents a significant challenge for healthcare professionals, requiring immediate and aggressive intervention to prevent serious complications. Bacterial infection, often caused by *Pseudomonas aeruginosa*, is typically resistant to conventional treatments, which reinforces the need

for a multifaceted therapeutic approach. Furthermore, the presence of comorbidities such as diabetes not only predisposes to infection but also complicates clinical management, requiring careful management of the underlying condition during treatment of malignant otitis externa.

The clinical diagnosis of malignant otitis externa is essentially based on characteristic signs and symptoms that indicate a serious infection of the external ear canal. Patients often present with severe ear pain, which may be exacerbated by manipulation of the pinna or palpation of the tragus. In addition to pain, the presence of purulent secretion from the ear canal is common, often accompanied by localized edema and erythema. In advanced stages of the disease, there is increasing concern about the involvement of adjacent structures, such as the temporal bone, where infection can result in osteomyelitis or even spread to the base of the skull. Neurological manifestations, such as facial paralysis due to extension of the infection to the facial nerve, are serious complications that require immediate and precise intervention.

Antibiotic treatment constitutes a fundamental part of the management of malignant otitis externa, aiming to eradicate the bacterial infection and reduce local inflammation. Broad-spectrum antibiotics, often administered intravenously, are initially chosen based on bacterial susceptibility and severity of infection. Therapy may include agents such as ciprofloxacin and ceftazidime to cover gram-negative organisms, including *Pseudomonas aeruginosa*, one of the most common bacterial causes associated with the disease. In addition to antibiotic therapy, supportive measures such as adequate analgesia and careful cleaning of the ear canal are essential to alleviate discomfort and facilitate healing. Continuous monitoring of treatment response is crucial to adjust therapies as necessary and avoid additional complications, highlighting the importance of a coordinated multidisciplinary approach between otolaryngologists, infectious diseases specialists and, in severe cases, neurologists.

Surgical intervention plays a crucial role in the management of malignant otitis externa, especially in cases where the infection does not respond adequately to conventional antibiotic treatment or when there is evidence of extension of the infection to adjacent tissues. Early surgical debridement is often indicated to remove necrotic and contaminated tissue, allowing more effective control of bacterial load and

reducing the risk of spread to critical structures such as the temporal bone. This procedure aims to not only clean the external ear canal, but also restore the anatomical integrity of the affected region, thus facilitating the healing process and minimizing the potential for long-term complications.

There are several surgical approaches available, depending on the extent of the infection and the patient's individual characteristics. In addition to simple debridement, techniques such as mastoidectomy may be necessary in advanced cases where the mastoid bone is involved. The choice of surgical technique is guided by careful assessment of the patient's clinical status and radiological findings, aiming for a precise and effective intervention. After the procedure, post-operative monitoring is essential to assess the response to treatment and detect any signs of recurrence or complications early. Close collaboration between the surgical team and otolaryngology specialists is essential to ensure an integrated and comprehensive approach to patient care, emphasizing the importance of multidisciplinary management to optimize clinical outcomes.

Serious complications associated with malignant otitis externa can include osteomyelitis of the temporal bone and spread to the skull base, representing a significant challenge in clinical management. Osteomyelitis of the temporal bone occurs when the infection spreads to the adjacent bone, leading to inflammation and destruction of bone tissue. This complication can result in persistent pain, continuous purulent secretion and, in severe cases, neurological impairment due to the proximity to vital structures such as the facial nerve. Treatment of temporal bone osteomyelitis often requires a combined approach of prolonged antibiotic therapy and, in some cases, surgical intervention for debridement and removal of necrotic tissue, aiming to control the infection and promote adequate healing of the affected bone.

Intensive surveillance is essential in the management of malignant otitis externa to monitor response to treatment and identify early any signs of recurrence or additional complications. This involves regular clinical examinations, periodic radiological assessments and, in some cases, neurophysiological investigations to assess neurological functioning, especially in patients with suspected facial nerve involvement. Early detection of complications allows for immediate adjustments in therapy, such as

changes in antibiotic regimen or considerations for additional surgical intervention. Furthermore, ongoing patient education about warning signs and the importance of treatment adherence are essential components of the management of malignant otitis externa, aiming to improve clinical outcomes and reduce the risk of long-term morbidity.

Continuous research into new therapeutic perspectives for malignant otitis externa aims to explore alternatives beyond conventional treatments, seeking to improve clinical outcomes and reduce morbidity associated with the disease. New approaches include the use of adjunctive therapies, such as hyperbaric therapy, which can improve oxygenation of affected tissues and potentially increase the effectiveness of antibiotics. Furthermore, studies are investigating the role of biotherapies and immune system modulators in managing the infection, aiming not only to control bacterial spread but also to strengthen the patient's immune response against the infection.

Continuous education and prevention strategies play a crucial role in addressing malignant otitis externa, aiming to not only diagnose early but also prevent the disease from occurring. This includes raising patient awareness of risk factors, such as decompensated diabetes, and the importance of appropriate management of underlying conditions to reduce vulnerability to serious infections. Furthermore, educational programs aimed at healthcare professionals help to improve the early recognition of clinical signs of the disease and the immediate implementation of appropriate therapeutic measures. Prevention strategies, such as promoting adequate ear hygiene practices and effectively controlling moisture in the ear canal, are also key to reducing the incidence of malignant otitis externa, contributing to improved hearing and general health in the population.

Education and prevention play a crucial role in reducing the incidence of malignant otitis externa and promoting earlier and more effective diagnoses. Public awareness of the risk factors associated with the condition, such as decompensated diabetes and other immunosuppressed states, is essential to encourage the search for timely and appropriate medical care. Educational campaigns that highlight the characteristic symptoms of malignant otitis externa, such as severe ear pain, purulent discharge and possible neurological complications, can increase awareness and facilitate

early diagnoses, allowing for more effective and less invasive therapeutic interventions.

In addition to raising awareness, preventive measures focused on ear hygiene and controlling moisture in the ear canal are essential to mitigate the risk of developing the disease. Instruction on proper ear cleaning and drying techniques, especially in humid environments or after water activities, can help reduce the growth of infection-causing bacteria. Appropriate management of underlying conditions, such as tight glucose control in diabetic patients, also plays a crucial role in preventing complications associated with malignant otitis externa. Educating both patients and healthcare professionals about the importance of these preventive practices can significantly contribute to reducing the incidence and severity of this serious hearing condition.

## CONCLUSION

Malignant otitis externa is a serious condition characterized by a necrotizing infection of the external auditory canal, often associated with potentially devastating complications, such as osteomyelitis of the temporal bone and spread to intracranial structures. Studies indicate that early diagnosis and prompt treatment are crucial to improving clinical outcomes and reducing the risk of morbidity and mortality. Surgical intervention, including debridement of necrotic tissue, has been shown to be essential for controlling infection and promoting adequate healing of the affected ear canal. Furthermore, aggressive antibiotic therapy, targeting the frequently implicated gram-negative bacteria, is critical to combating infection and preventing serious complications.

Multidisciplinary collaboration between otorhinolaryngologists, infectious disease specialists and, in severe cases, neurologists, is crucial for an integrated and effective management of the disease, ensuring a holistic approach to patient care. Continuous monitoring strategies are necessary to assess response to treatment and early detect signs of relapse or spread of infection. Furthermore, educational initiatives aimed at patients and healthcare professionals are key to increasing awareness of the early symptoms of malignant otitis externa and promoting preventive measures such as proper ear hygiene and management of predisposing conditions.

In summary, effective management of malignant otitis externa requires a

comprehensive approach that combines early diagnosis, aggressive treatment and preventative measures. Continued research into new therapies and management strategies has the potential to further improve clinical outcomes and reduce the global burden of this serious condition.

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