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Clinical evidence and diagnosis of temporal arteritis: a concise systematic review

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Abstract

Introduction: Temporal arteritis (TA), or giant cell arteritis, is a systemic autoimmune vasculitis that affects patients over 50 years of age. Temporal artery biopsy is considered the gold standard for diagnosis, although it has low sensitivity. It was shown that TA can lead to irreversible blindness in about 20% of untreated cases. **Objective:** A concise systematic review was carried out to contribute to the diagnosis and treatment of temporal arteritis, assessing whether a series of patients met the clinical and laboratory criteria for diagnosis, regardless of the biopsy result, as well as whether these results alter the management of these patients. **Methods:** The research was carried out from December 2022 to January 2023 in the Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases, following the PRISMA rules for systematic review. The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument. **Results and Conclusion:** A total of 140 articles were found, and a total of 32 articles were evaluated and 6 were included in this systematic review. Considering the Cochrane tool for risk of bias, the overall assessment resulted in 32 studies with a high risk of bias and 43 studies that did not meet GRADE. It was concluded that, regardless of the biopsy result, all patients should immediately start treatment with corticosteroids. Early diagnosis and treatment must be performed to avoid compromising the contralateral eye. In addition, it is necessary to perform other diagnostic imaging tools to increase the sensitivity and closure of the diagnosis of temporal arteritis.

Keywords: Temporal arteritis. Giant cell arteritis. Autoimmune vasculitis. Diagnosis. Biopsy. Image exam.

Introduction

Temporal arteritis (TA), or giant cell arteritis, is a systemic autoimmune vasculitis that affects patients over 50 years of age [1]. Symptoms include headache, jaw claudication, scalp tenderness, fever, weight loss, and symptoms of polymyalgia rheumatic (PMR). In addition, ocular symptoms such as transient or permanent vision loss or stroke may occur. There is no diagnostic laboratory test for this disease, therefore temporal artery biopsy is considered the gold standard for diagnosis, although biopsy sensitivity can be as low as 50% [2].

In this sense, imaging modalities have been frequently used to establish the diagnosis when temporal artery biopsy is not positive. TA can cause rapid and irreversible bilateral vision loss in the elderly and is therefore considered an ophthalmological emergency. Many of the symptoms and signs of TA can be vague, nonspecific, and of gradual onset, often leading to a late or inaccurate diagnosis. In this regard, a wide range of optometrists and healthcare professionals needs to maintain a robust understanding of the clinical presentation, key investigations, and time-sensitive management of this disease, as early initiation of treatment for TA significantly reduces vision loss and improves the quality of life of patients [1].

In this context, it was shown that TA can lead to irreversible blindness in about 20% of untreated cases. Therefore, high doses of glucocorticoids should be

started promptly to prevent complications related to the disease, however, it is imperative to increase the accuracy of the diagnosis. In this sense, ultrasound (US) is effective for the diagnosis of TA. Still, in cases of suspected TA with the involvement of large vessels, other imaging modalities can be used for the diagnosis, such as computed tomography and PET (Positron Emission Tomography) [3].

Therefore, a concise systematic review study was carried out to contribute to the diagnosis and treatment of temporal arteritis, evaluating whether the patients met the clinical and laboratory criteria for the diagnosis, regardless of the biopsy result, as well as whether these results change the management of these patients.

Methods

Study Design

The rules of a systematic review of the PRISMA Platform were followed (Transparent systematic review and meta-analysis report-HTTP://www.prismastatement.org/).

Data sources and research strategy

The search strategies for this systematic review were based on the keywords (MeSH Terms): "*Temporal arteritis. Giant cell arteritis. Autoimmune vasculitis. Diagnosis. Biopsy. Imaging exam*". The research was carried out from September to October 2022 in Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. In addition, a combination of keywords with the Booleans "OR", "AND" and the operator "NOT" were used to target scientific articles of interest.

Quality of studies and risk of bias

The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument.

Results and Discussion

Main Clinical Findings

For the review, 140 articles were found. Initially, duplication of articles was excluded. After this process, the abstracts were evaluated and a new exclusion was performed, removing the articles that did not include the theme of this article, resulting in 64 articles. A total of 32 articles were evaluated, 9 articles were selected and 6 were included and developed in this concise systematic review study (Figure 1). Considering the Cochrane tool for risk of bias, the overall assessment resulted in 32 studies with a high risk of bias and 43 studies that did not meet GRADE.

Figure 1. Flowchart showing the article selection process.

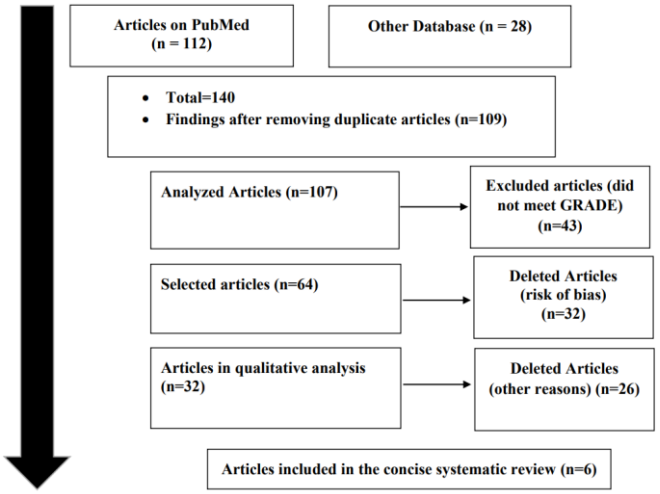
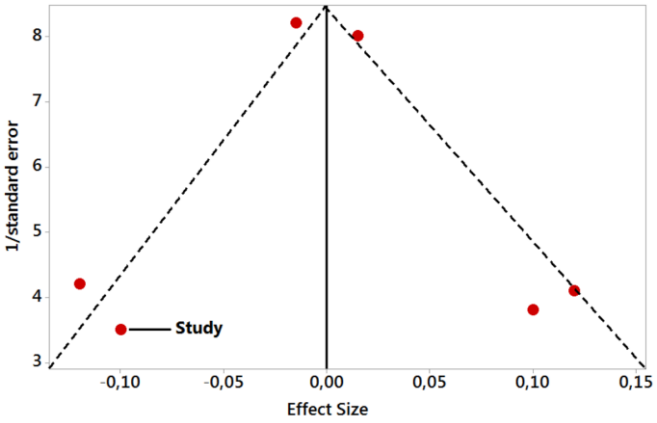


Figure 2 presents the results of the risk of bias in the studies through the Funnel Plot. This graph showed symmetrical behavior, not suggesting a significant risk of bias, both between studies with small sample sizes (lower precision) that are shown at the bottom of the graph and in studies with large sample sizes that are displayed in the upper region.

Figure 2. The symmetrical funnel plot does not suggest a risk of bias among the small sample size studies that are shown at the bottom of the plot. High confidence and high recommendation studies are shown above the graph (NTotal = 6 current clinical studies evaluated in full in the concise systematic review).



Based on the literature search process, a clinical study evaluated the ACR (American College of Rheumatology) score at disease presentation and whether the temporal artery biopsy result affects the clinical management of the patient with clinically suspected TA. A total of 129 temporal arteries were biopsied with a total of 17 positive biopsy results. The total of 10 biopsy specimens was insufficient to confirm or refute AT. Overall, 13.2% of the biopsies were TA-positive and 87.3% of the biopsy-negative patients continued prednisolone therapy for clinical reasons.

Based on new diagnostic exams such as high-resolution MRI (Magnetic Resonance Imaging), color duplex USS (Ultra Sound Scan), and PET (Positive Emission Topography), invasive surgery can be justified for all patients in histological terms when the results may not change management [4].

Furthermore, a prospective multicenter clinical cohort study with 381 patients compared the clinical efficacy and cost-effectiveness of ultrasound with biopsy in the diagnosis of patients with suspected TA. We analyzed 381 patients who underwent ultrasound and biopsy within 10 days of starting treatment for suspected TA and who attended a follow-up evaluation (mean age 71.1 years; 72% female). Biopsy sensitivity was 39% [95% confidence interval (CI) 33% to 46%], which was significantly lower than previously reported and lower than ultrasound (54%, 95% CI 48% to 60%); the specificity of biopsy (100%, 95% CI 97% to 100%) was superior to ultrasound (81%, 95% CI 73% to 88%). Strategies combining clinical judgment (clinician assessment at 2 weeks) with testing showed sensitivity and specificity of 91% and 81%, respectively, for a biopsy and 93% and 77%, respectively, for an ultrasound. Therefore, there is no independent gold standard diagnosis for AT. The baseline diagnosis used to determine accuracy was based on classification criteria for GCA that include clinical features at presentation and biopsy results [5].

Besides, a large, retrospective, multicenter study examined Mayo Clinic's experience with temporal artery biopsies over 11 years to help form guidelines that would lead to optimal performance of the technique. The dataset included 3,817 temporal artery biopsies performed on 2,539 patients at the Mayo Clinic. Overall, 681 patients (27%) had a positive biopsy on at least one side. Biopsy length was uniformly noted to have no significant effect on biopsy positivity. Of the 603 patients with bilateral biopsy, 43 (7%) had a negative initial biopsy followed by a positive result on the contralateral side [6].

Also, a retrospective clinical study evaluated the rate of disagreement between pathology results in patients undergoing bilateral biopsy for suspected TA. During the study period, 310 patients underwent bilateral biopsies. These patients were mainly female (73.9%), elderly (mean age 70.8 years), and Caucasian (95.8%). The patient's preoperative symptoms were typically bilateral (59%) and included headache (81%), vision changes (45.2%), and temporal sensitivity (32.6%). Most patients (85.2%) were using preoperative corticosteroid therapy at the time of surgical biopsy, with a mean duration of preoperative corticosteroid therapy of 15.1 days. Overall, 91 patients (29.4%) had a positive pathological diagnosis after bilateral biopsy. Of these patients, 11 had a positive pathological result in only a single sample, resulting in a disagreement rate of 12.1%. Preoperative temporal artery duplex showed low sensitivity (27.3%) to identify patients with positive pathologic disease. There were no significant differences between patients with positive and negative pathology in terms of the mean length of the surgical specimen (1.67 cm vs 1.64 cm; p=0.67) or the specialty of the referral provider (p=0.73) [7].

Linked to this, a retrospective observational study evaluated the diagnostic performance of ultrasonography and biopsy in the diagnosis of TA. A total of 78 patients underwent ultrasound and biopsy. Thirty-five (45%) received the final clinical diagnosis of TA. Compared with the final clinical diagnosis, a biopsy had a sensitivity of 69% (51- 83%) and a specificity of 100% (92-100%), and ultrasonography had a sensitivity of 63% (45-79%) and a specificity of 79 % (64-94%). The area under the receiver operating characteristics curves were 0.84 and 0.71 for biopsy and ultrasound, respectively (p = 0.048). The ultrasound false negative rate was 4 in 78 (5%). Therefore, the sensitivity of ultrasound is almost on par with that of biopsy, although the overall diagnostic accuracy of ultrasound was somewhat lower [8].

Finally, another retrospective clinical study identified the clinical, laboratory, and histopathological characteristics that can predict the diagnosis of TA. Of the 101 patients who underwent a biopsy, 31 (31%) were diagnosed with TA. Age was statistically significant for the diagnosis of TA (p=0.009), with a mean age of 74.4 years (± 8.1) in those with TA versus 68.9 years (± 10.0) in those without. The incidence of transient vision loss was higher in AT than in non-AT patients (p=0.005). Anterior arteritic ischemic optic neuropathy (n=3), ophthalmic artery occlusion (n=2), and posterior ischemic optic neuropathy (n = 1) were observed only in the AT group. Age at the time of biopsy healed and suggested temporal arteritis are predictive for the diagnosis of TA. Transient vision loss is most commonly seen in TA, and anterior arteritic ischemic optic neuropathy, ophthalmic artery occlusion, and posterior ischemic optic neuropathy are important ophthalmic manifestations of TA. CD68 staining is more sensitive but less specific for the diagnosis of TA compared to other histopathological findings such as the presence of multinucleated giant cells and transmural inflammation [9].

Conclusion

It was concluded that, regardless of the biopsy result, all patients should immediately start treatment with corticosteroids. Early diagnosis and treatment must

be performed to avoid compromising the contralateral eye. In addition, it is necessary to perform other diagnostic imaging tools to increase the sensitivity and closure of the diagnosis of temporal arteritis.

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Data sharing statement
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Conflict of interest
The authors declare no conflict of interest.

Similarity check
It was applied by Ithenticate[@].

References

1. Ling ML, Yosar J, Lee BW, Shah SA, Jiang IW, Finniss A, Allende A, Francis IC. The diagnosis and management of temporal arteritis. Clin Exp Optom. 2020 Sep;103(5):572-582. doi: 10.1111/cxo.12975.
2. Serling-Boyd N, Stone JH. Recent advances in the diagnosis and management of giant cell arteritis. Curr Opin Rheumatol. 2020 May;32(3):201-207. doi: 10.1097/BOR.0000000000000700.
3. Ponte C, Martins-Martinho J, Luqmani RA. Diagnosis of giant cell arteritis. Rheumatology (Oxford). 2020 May 1;59(Suppl 3):iii5-iii16. doi: 10.1093/rheumatology/kez553.
4. Bowling K, Rait J, Atkinson J, Srinivas G. Temporal artery biopsy in the diagnosis of giant cell arteritis: Does the end justify the means? Ann Med Surg (Lond). 2017 Jun 15;20:1-5. doi: 10.1016/j.amsu.2017.06.020.
5. Luqmani R, Lee E, Singh S, Gillett M, Schmidt WA, Bradburn M, Dasgupta B, Diamantopoulos AP, Forrester-Barker W, Hamilton W, Masters S, McDonald B, McNally E, Pease C, Piper J, Salmon J, Wailoo A, Wolfe K, Hutchings A. The Role of Ultrasound Compared to Biopsy of Temporal Arteries in the Diagnosis and Treatment of Giant Cell Arteritis (TABUL): a diagnostic accuracy and costeffectiveness study. Health Technol Assess. 2016 Nov;20(90):1-238. doi: 10.3310/hta20900.
6. Butendieck R Jr, Calamia K, Sandin A. A study of temporal artery biopsy for the diagnosis of giant cell arteritis. Clin Rheumatol. 2022 Sep 12. doi: 10.1007/s10067-022-06371-0.
7. Mehta K, Eid M, Gangadharan A, Pritchard A, Lin CC, Goodney P, Stableford J. The utility of the bilateral temporal artery biopsy for diagnosis of giant cell arteritis. J Vasc Surg. 2022 Jun 13:S0741-5214(22)01624-X. doi: 10.1016/j.jvs.2022.04.043.
8. Hansen MS, Terslev L, Jensen MR, Brittain JM, Døhn UM, Faber C, Heegaard S, Klefter ON, Kønig EB, Subhi Y, Wiencke AK, Hamann S. Comparison of temporal artery ultrasound versus biopsy in the diagnosis of giant cell arteritis. Eye (Lond). 2022 Jan 29. doi: 10.1038/s41433-022-01947-1.
9. Muniz Castro HM, Bhattacharjee MB, Chaudhry IA, Chuang AZ, Mankiewicz KA, Adesina OO. Diagnosis of giant cell arteritis using clinical, laboratory, and histopathological findings in patients undergoing temporal artery biopsy. Clin Neurol Neurosurg. 2022 Oct;221:107377. doi: 10.1016/j.clineuro.2022.107377.