# Does This Patient Have Temporal Arteritis?

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## RATIONAL CLINICAL EXAMINATION REVIEW SOURCE

This is a rational clinical examination abstract, a regular feature of the *Annals'* Evidence-Based Emergency Medicine (EBEM) series. Each features an abstract of a rational clinical examination review from the *Journal of the American Medical Association* and a commentary by an emergency physician knowledgeable in the subject area.

The source for this rational clinical examination review abstract is: Smetana G, Shmerling R. The rational clinical examination: does this patient have temporal arteritis? *JAMA.* 2002;287:92-101.

The *Annals'* EBEM editors assisted in the preparation of the abstract of this rational clinical examination review as well as selection of the Evidence-Based Medicine Teaching Points.

## OBJECTIVE

To review and summarize the accuracy and precision of historical features, physical examination, and erythrocyte sedimentation rate in the diagnosis of temporal arteritis.

## DATA SOURCES

The authors performed a MEDLINE search of English-language articles from 1966 to 2000 combining topic-specific search terms with a search strategy developed for use in the rational clinical examination series. They also hand searched bibliographies of retrieved articles, previous reviews, monographs, and textbooks. Two investigators worked independently to determine eligibility, retrieve data, and assess validity.

## STUDY SELECTION

The authors selected studies that provided detailed clinical information on patients with suspected temporal arteritis referred for temporal artery biopsy. They determined 41 of 114 studies to be eligible for review. Twenty-one of these studies included both biopsy-positive and biopsy-negative patients and formed the core of the review. The majority (17 of 21 studies) were retrospective chart reviews.

## DATA EXTRACTION AND ANALYSIS

The authors classified the quality of evidence in each study using 2 methods, developing their own detailed criteria, as well as using a scheme previously adapted for the rational clinical examination series. Eleven of 21 studies were of the highest quality (study quality 1) on the basis of these criteria. The authors of the review calculated sensitivity, specificity, and likelihood ratios for selected historical and physical examination features only in patients ultimately undergoing temporal artery biopsy. The 2 investigators worked independently to determine eligibility, retrieve data, and assess validity for each study.

## MAIN RESULTS

The prevalence of biopsy-positive temporal arteritis was 39% in the included studies compared with less than 1% in the general population.[1] No studies evaluated the precision or interobserver variation of history and physical examination findings for the diagnosis of temporal arteritis.

Jaw claudication and diplopia had likelihood ratios of 4.2 and 3.4, respectively. They were present in 34% and 9%, respectively, of patients who were determined to have temporal arteritis. Abnormalities of the temporal artery on physical examination had likelihood ratios that ranged from 2.6 for tenderness over the artery to 4.6 for beading. The presence of any temporal artery abnormality had a likelihood ratio of 2, and the absence of any abnormality had a likelihood ratio of 0.53. See the Table for likelihood ratios and sensitivities in selected findings. Only 2 of 1,435 patients with biopsy-proven temporal arteritis were younger than 50 years.

Several studies examined the accuracy of erythrocyte sedimentation rate. A "normal" erythrocyte sedimentation rate, which was not consistently defined in these studies, had a likelihood ratio of 0.2. An "abnormal" erythrocyte sedimentation rate was present in 96% of patients with a positive biopsy, but had a likelihood ratio of 1.1 among patients with suspected temporal arteritis. When the cutoff of normality of erythrocyte sedimentation rate was defined as greater than 50 mm/h, the likelihood ratios for abnormal and normal sedimentation rate were 1.2 and 0.35, respectively.

## CONCLUSIONS

The authors conclude that many of the historical and physical examination features commonly found in patients with temporal arteritis have limited value in predicting the presence of disease as defined by positive biopsy results and that the verification bias inherent in the data makes the significance of the results greater. Among the subset of patients suspected of

**Table.** Positive and negative likelihood ratios and sensitivities for selected symptoms and signs among patients with positive temporal artery biopsy results.

| Symptom/Sign | LR+ (95% CI)* | LR− (95% CI)* | Sensitivity (95% CI)† |
|---|---|---|---|
| Jaw claudication | 4.2 (2.8–6.2) | 0.72 (0.65–0.81) | 0.34 (0.29–0.41) |
| Diplopia | 3.4 (1.3–8.6) | 0.95 (0.91–0.99) | 0.09 (0.07–0.13) |
| Beaded temporal artery | 4.6 (1.1–18.4) | 0.93 (0.88–0.99) | 0.16 (0.07–0.28) |
| Prominent/enlarged temporal artery | 4.3 (2.1–8.9) | 0.67 (0.5–0.89) | 0.47 (0.40–0.54) |
| Tender temporal artery | 2.6 (1.9–3.7) | 0.82 (0.74–0.92) | 0.41 (0.30–0.52) |
| Absent temporal artery pulse | 2.7 (0.55–13.4) | 0.71 (0.38–1.3) | 0.45 (0.26–0.66) |
| Any temporal artery abnormality | 2.0 (1.4–3.0) | 0.53 (0.38–0.75) | 0.65 (0.54–0.74) |
| ESR abnormal | 1.1 (1.0–1.2) | 0.2 (0.08–0.51) | 0.96 (0.93–0.97) |

*LR+*, Positive likelihood ratio; *LR−*, negative likelihood ratio; *ESR*, erythrocyte sedimentation rate.
*Pooled data including results for patients with both positive and negative biopsy results. Please refer to Smetana and Shmerling[2] for specific references to studies cited.
†Pooled data including results of all eligible studies, including those that reported clinical features for patients with positive biopsy results only.

having temporal arteritis and referred for biopsy, certain clinical features did modify the likelihood of disease, such as jaw claudication, diplopia, and abnormal artery findings on physical examination. A small number of clinical features are helpful in predicting the likelihood of a positive temporal artery biopsy among patients with a clinical suspicion of disease. The most useful finding is a normal erythrocyte sedimentation rate, which makes temporal arteritis unlikely.

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## COMMENTARY: CLINICAL IMPLICATIONS

The emergency physician faces a difficult challenge in approaching the patient with suspected temporal arteritis. Traditional teaching states that temporal arteritis should be suspected in patients aged older than 50 years presenting with concerning features on the history and physical examination such as fever, new headache, visual complaints, or jaw/tongue claudication. Prompt identification, referral for biopsy, and institution of treatment are paramount in preventing the most severe complication of the disease, irreversible blindness. Therefore, the challenge lies in determining which features significantly increase the probability of temporal arteritis.

This review presents useful data for emergency physicians, with the caveat that the data are largely derived from retrospective reviews and the population is one of very high disease prevalence (those being referred for temporal artery biopsy). In the patient history, jaw claudication and diplopia are important historical elements. Although their absence does not make the diagnosis of temporal arteritis less likely, their presence is significant in predicting presence of disease with sufficient power to be clinically useful. On physical examination, abnormalities of the temporal artery examination should be sought (ie, beading, prominence, tenderness, absence of pulse), because the likelihood of disease is substantially increased in their presence. Among laboratory tests, whereas a "normal" erythrocyte sedimentation rate (or erythrocyte sedimentation rate $<50$ mm/h) rendered temporal arteritis significantly less likely, a high erythrocyte sedimentation rate was less predictive of disease.

Finally, the diagnosis of temporal arteritis is only the first in a line of clinical decisions required of emergency physicians in the course of evaluating patients with a chief complaint of headache. When to begin treatment is another important clinical decision, and no clear therapeutic strategy is advocated by the authors of the review. Many clinicians initiate corticosteroid therapy in the patient with suspected temporal arteritis when the referral for biopsy is made. The authors of this study acknowledge that no constellation of signs and symptoms has been derived that provides sufficient predictive value to justify or safely preclude immediate treatment. Therefore, although the study does offer worthwhile data on how to refine the evaluation of a patient with suspected temporal arteritis, the decision to treat, and if so, when to treat, is still left to the clinician.

## TAKE HOME MESSAGE

Emergency physicians considering a diagnosis of temporal arteritis should seek a history of jaw claudication and/or diplopia and carefully examine the temporal artery for abnormality, because these features significantly increase the likelihood of the diagnosis.

Although a normal erythrocyte sedimentation rate makes the diagnosis far less likely, an abnormal erythrocyte sedimentation rate is a sensitive but nonspecific finding. Virtually all individual features demonstrated poor sensitivity, and the lack of any feature on history or physical examination does not effectively rule out temporal arteritis in patients older than 50 years. Temporal artery biopsy remains the criterion standard for diagnosis and should be promptly arranged and corticosteroid treatment initiated in patients suspected of the disease.

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## EVIDENCE-BASED MEDICINE TEACHING POINT

**Verification bias.** The data from this review represent an excellent example of workup bias, also called verification bias. Verification bias exists when the decision to perform the reference standard (also referred to as the "gold standard," in this case the temporal artery biopsy) is influenced by the results of other tests. In this case, physical examination, historical findings, and erythrocyte sedimentation rate all acted as screening tests and led to referral of patients for temporal artery biopsy. This biases the results and should prompt the reader to examine a study to see if other means of measuring outcome were used in those patients who did not receive the invasive test. For example, in invasive testing such as for pulmonary embolism, the reference standard of pulmonary angiogram is often not performed on patients who have a negative workup. In high-quality diagnostic studies, patients should be followed up for several months afterward to ensure that the negative assessment was valid, particularly in those patients who did not receive the reference standard test. The clinical outcome then acts as an appropriate "proxy measure" of outcome.

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### REFERENCES

1. Gonzalez-Gay MA. Epidemiology of the vasculidities. *Rheum Dis Clin North Am.* 2001;27:729-749.
2. Smetana G, Shmerling R. The rational clinical examination: does this patient have temporal arteritis? *JAMA.* 2002;287:92-101.

## CORRECTION

In the December 2004 issue, in the article by Miller et al ("Is the Initial Diagnostic Impression of 'Noncardiac Chest Pain' Adequate to Exclude Cardiac Disease?"; pages 565-574), there were incorrect values in Table 2. The correct table is shown here. We regret this error.

**Table 2.** Demographic characteristics of patient groups.

| | All (N=2,992) | No ACE (N=2,802) | Any Evidence of ACE (N=190) | Definite ACE (N=85) |
|---|---|---|---|---|
| **Demographics** | | | | |
| Age, y, mean (SD) | 48.7 (16.3) | 47.9 (16.0) | 60.1 (15.6) | 61.1 (16.3) |
| ACI-TIPI, mean (SD) | 16.0 (12.9) | 15.5 (12.7) | 23.8 (15.0) | 26.0 (15.5) |
| Female sex, No. (%)* | 1,800 (60.2) | 1,710 (61.1) | 90 (47.4) | 34 (40.0) |
| Male sex, No. (%) | 1,188 (39.7) | 1,088 (38.9) | 100 (52.6) | 51 (60.0) |
| White, No. (%) | 1,080 (36.1) | 1,002 (35.8) | 78 (41.1) | 41 (48.2) |
| Black, No. (%) | 1,606 (53.7) | 1,508 (53.8) | 98 (51.6) | 37 (43.5) |
| Other races, No. (%) | 306 (10.2) | 292 (10.4) | 14 (7.4) | 7 (8.2) |
| **Cardiac biomarkers, No. (%)** | | | | |
| Cardiac biomarkers in ED | 1,592 (53.2) | 1,430 (51.0) | 162 (85.3) | 75 (88.2) |
| Any cardiac biomarker positive† | 72 (2.4) | 0 (0.0) | 72 (37.9) | 45 (52.9) |
| First marker positive | 71 (2.4) | 0 (0.0) | 71 (37.4) | 45 (52.9) |
| **Non–ischemic-related final diagnoses, No. (%)‡** | | | | |
| Congestive heart failure | 64 (2.1) | 38 (1.4) | 26 (13.7) | 13 (15.3) |
| Pneumonia | 107 (3.6) | 94 (3.4) | 13 (6.8) | 9 (10.6) |
| Pericarditis | 11 (0.4) | 9 (0.3) | 2 (1.1) | 0 (0) |
| Dissecting aneurysm | 4 (0.1) | 0 (0.0) | 4 (2.1) | 4 (4.7) |
| Pulmonary embolism | 23 (0.8) | 21 (0.7) | 2 (1.1) | 0 (0.0) |
| Chest pain not otherwise specified | 1,426 (47.7) | 1,386 (49.5) | 40 (21.1) | 19 (22.4) |
| Other | 1,489 (49.8) | 1,380 (49.3) | 109 (57.4) | 45 (52.9) |
| **Evaluation, No. (%)** | | | | |
| Admitted | 756 (25.3) | 612 (21.8) | 144 (75.8) | 75 (88.2) |
| Noninvasive testing | 241 (8.1) | 179 (6.4) | 62 (32.6) | 26 (30.6) |
| Sestamibi | 85 (2.8) | 77 (2.7) | 8 (4.2) | 2 (2.4) |
| CABG | 6 (0.2) | 0 (0.0) | 6 (3.2) | 6 (7.1) |
| Catheterization (with or without intervention) | 53 (1.8) | 20 (0.7) | 33 (17.4) | 25 (29.4) |

*ACE,* Adverse cardiac event; *ACI-TIPI,* Acute Cardiac Ischemia–Time Insensitive Predictive Instrument; *CABG,* coronary artery bypass grafting.
*Sex not available for 4 patients.
†Defined as noted in text except CK–MB ≥6 used as CK–MB index could not be calculated for all patients.
‡Patients could be given >1 final diagnosis.