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## Clinical usefulness of temporal artery biopsy

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**SUMMARY** To assess the diagnostic usefulness of temporal artery biopsy in temporal arteritis (TA) and establish clinical features capable of predicting its positivity we have retrospectively studied the biopsy specimens and the clinical features of 103 patients who had undergone temporal artery biopsy. Temporal artery biopsy reached a positive predictive value of 90.2% with respect to the final diagnosis based on the criteria proposed by Ellis and Ralston and the clinical course. The simultaneous presence of recent onset headache, jaw claudication, and abnormalities of the temporal arteries on physical examination had a specificity of 94.8% with respect to the histological diagnosis and of 100% with respect to final diagnosis. The presence of any of these clinical features, though of little specificity (34.4%), had a sensitivity of 100% with respect to histological diagnosis, selecting a group of patients in whom temporal artery biopsy has more discriminative value.

**Key words:** temporal arteritis.

Temporal arteritis (TA) is a systemic vasculitis common in elderly people which affects large and medium sized vessels, in particular the carotid branches. This fact conditions its classic clinical manifestations and makes its histological diagnosis easy. Since the original description by Horton *et al.*,<sup>1</sup> diagnosis is achieved by biopsy of the superficial temporal artery. The segmental nature of the lesions<sup>2</sup> can give rise to false negative biopsies. Moreover, the numerous descriptions of atypical presenting forms<sup>3-5</sup> have increased the index of suspicion and, in the same way, the number of negative results.<sup>6</sup> Because of this, there remains controversy about the diagnostic usefulness of temporal artery biopsy.<sup>7-11</sup>

We have conducted the present study to assess the diagnostic usefulness of temporal artery biopsy and find clinical features that can predict its positivity.

### Patients and methods

The names of all patients who underwent temporal artery biopsy between 1970 and 1984 were obtained through the archives of our pathology department.

The medical records were reviewed for information on clinical manifestations, laboratory findings, and clinical course during a median follow up of 51 months.

Biopsy specimens were examined by one of us (AO) without knowledge of the clinical and original histological diagnosis. Histological diagnosis of TA was established by demonstration of lesions defined as classical giant cell arteritis, atypical giant cell

Table 1 *Temporal arteritis: diagnosis criteria*

- |    |   |
|----|---|
| 1  | Age greater than 55   |
| 2  | Positive response within 48 hours to corticosteroid therapy                     |
| 3  | Length of history greater than two weeks  |
| 4  | Positive temporal artery biopsy   |
| 5  | Proximal, symmetrical girdle or upper arm muscle pain, stiffness, or tenderness |
| 6  | Jaw claudication  |
| 7  | Clinical abnormality of a temporal artery (tenderness, thickening, redness)     |
| 8  | Systemic symptoms or signs (malaise, anorexia, weight loss, anaemia, pyrexia)   |
| 9  | Recent onset headache   |
| 10 | Visual disturbance (loss, diplopia, blurring)                                   |

Criteria 1-3 plus any three of criteria 5-10 required for clinical diagnosis.

From Ellis and Ralston.<sup>12</sup>

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arteritis, or healed giant cell arteritis according to Allsop and Gallagher.<sup>7</sup>

In those patients with a negative biopsy we used the criteria proposed by Ellis and Ralston<sup>12</sup> to establish the clinical diagnosis of TA (Table 1).

Student's *t* test was used for the analysis of quantitative variables. A  $\chi^2$  test of significance with Yates's correction was used for all 2×2 tables.

## Results

One hundred and three patients underwent temporal artery biopsy between 1970 and 1984. In 45 cases (43.7%) biopsy was diagnostic and in 58 (56.3%) was negative. Ten out of 58 patients with negative biopsy fulfilled the Ellis and Ralston clinical criteria and were considered to be affected by TA. These patients were followed up for a mean of 40.6 months (range 15–89) with complete remission of corticosteroid therapy and no other potential cause for their complaints emerging. The final diagnosis of the other 48 patients is shown in Table 2. In the three patients with no final diagnosis the clinical criteria were not fulfilled, their symptoms were non-specific or disappeared in few months without corticosteroid therapy.

The fact that the negative artery biopsy specimens were significantly longer (1.4 cm; range 0.2–6 cm) than the positive ones (1.1 cm; range 0.1–5 cm ( $p<0.005$ )) demonstrates that biopsy specimens were adequate and had no influence on the results.

Clinical findings are shown in Table 3. Age and sex distributions of the groups with positive (group A) and negative (group B) biopsy were similar (group A: 42% men; median age 69.8 years (range

Table 3 Temporal artery biopsy: clinical findings

	Positive biopsy (n=45)	Negative biopsy (n=58)
	No (%)	No (%)
ESR greater than 40 mm/h	45 (100)	55 (95)
Myalgias	24 (53)	28 (48)
Arthralgias	18 (40)	22 (38)
Arthritis	3 (7)	7 (12)
Malaise	32 (71)	33 (57)
Anorexia	32 (71)	35 (60)
Weight loss	27 (60)	30 (52)
Anaemia	28 (62)	34 (59)
Fever	27 (60)	26 (45)
Visual disturbance	15 (33)	13 (22)
Headache	36 (80)	27 (47)*
Jaw claudication	19 (42)	7 (12)*
Abnormal temporal artery	38 (84)	21 (36)*

\* $p<0.005$  by  $\chi^2$  test.

ESR=erythrocyte sedimentation rate.

51–85); group B: 35% men; median age 68.5 years (range 34–87)). There was great similarity between the two groups in the frequency of muscular and skeletal manifestations (polymyalgia rheumatica, arthritis, arthralgias), of constitutional symptoms (fever, anaemia, weight loss, anorexia, malaise), of increased erythrocyte sedimentation rate (ESR) (group A: median ESR 112.2 mm/h (range 47–155); group B: mean ESR 100.8 mm/h (range 10–170)), and of visual disturbances, including blindness.

Only jaw claudication, recent onset headache, and abnormalities on physical examination of temporal arteries (tenderness, redness, thickening, diminished or asymmetric pulse) were discriminative. These were significantly more frequent in the patients with positive biopsy ( $p<0.005$ ). All patients with positive biopsy had at least one of these three findings, whereas 20 patients (34%) with negative biopsy had none of them. Eighteen patients with TA had all three features. In 15 of them temporal artery biopsy was positive and the other three were considered to have TA on clinical grounds.

Sensitivity, specificity, and the predictive value of temporal artery biopsy with respect to the final diagnosis were 81.8%, 100%, and 90.2% respectively. Despite poor specificity (34.4%), the presence of any of the three discriminative clinical features (recent onset headache, jaw claudication, and abnormal temporal arteries) was associated with a 100% diagnostic sensitivity with respect to the positivity of the biopsy. The simultaneous presence of all three symptoms reached a specificity of 94.8% with respect to the histological diagnosis and of 100% with respect to the final diagnosis.

Table 2 Negative temporal artery biopsy: final diagnosis (n=58)

Diagnosis	Number
Polymyalgia rheumatica	15
Temporal arteritis	10
Infections	3
Pneumonia 2	
Urinary tract 1	
Atherosclerotic vascular disease	6
Connective tissue disease	9
Rheumatoid arthritis 2	
Systemic lupus erythematosus 1	
Reactive arthritis 1	
Vasculitis 5	
Miscellaneous	2
Chronic hepatitis 1	
Hypothyroidism 1	
Malignant disease	10
Undiagnosed	3

## Discussion

The diagnosis of temporal arteritis is established by temporal artery biopsy because this is easily obtained and because of the predilection of the illness for this artery. The segmentary character of the lesions,<sup>2</sup> however, and the fact that they may affect other vascular territories<sup>13 14</sup> means that TA cannot be excluded by a negative result. Thus several methods have been proposed to increase the diagnostic accuracy of temporal biopsy, such as removing a longer segment of artery<sup>2 15</sup> or taking a contralateral biopsy specimen.<sup>16</sup> Furthermore, the selection of the biopsy site by palpation,<sup>2 4</sup> angiography,<sup>17</sup> or Doppler<sup>18</sup> and multiple sectioning of the specimen<sup>2</sup> have been proposed. Despite these manoeuvres, temporal artery biopsy is not diagnostic in all cases and this has led to the establishment of clinical criteria to achieve the diagnosis of TA without histological confirmation.<sup>12 15 19</sup> For this reason, and the remote possibility of complications of the procedure, such as stroke,<sup>16</sup> some authors argue that temporal biopsy is not necessary<sup>7 8</sup> as its result does not influence therapeutic decisions. This opinion is not generally accepted because there is a significant percentage of patients that present in an atypical way with predominance of constitutional symptoms<sup>3-5</sup> or of focal symptoms related to other vascular territories.<sup>13 14</sup> The finding of a positive biopsy is particularly useful in cases in which clinical suspicion is weak. Other authors remark on the usefulness of temporal artery biopsy especially in patients with a poor response to treatment, arguing that on rare occasions the temporal artery may be affected by a necrotising vasculitis, such as polyarteritis nodosa, presenting with clinical manifestations similar to those of TA.<sup>9 20</sup>

Hall *et al* have shown that provided the site and size of the temporal artery biopsy are carefully chosen the result has a predictive value of 94% with respect to the need for long term treatment.<sup>15</sup> Although they found a higher frequency of jaw claudication and clinically abnormal temporal arteries in the group of patients with positive biopsy, they did not analyse the predictive value of these or other features on the outcome of the biopsy. In their series the presence of jaw claudication and abnormal temporal arteries had poor sensitivity. Nearly 25% of the patients with TA presented neither of these features.

The aim of our study was to assess the diagnostic usefulness of temporal artery biopsy in TA and to identify clinical criteria capable of predicting its positivity. Furthermore, we have tried to establish criteria for selection of those patients who would get

most advantage from temporal artery biopsy and those in whom it is not necessary. Temporal artery biopsy at our institution achieved a diagnostic sensitivity of 81.8%, with a positive predictive value of 90.2%. In agreement with Hall *et al*<sup>15</sup> we consider temporal artery biopsy to be a useful diagnostic procedure if correctly performed. In our series there were no significant differences between the groups with positive and negative biopsy with respect to most of the clinical and biological parameters, suggesting that they were appropriately selected for biopsy. Only three features (recent onset headache, jaw claudication, and abnormal temporal arteries on examination) were more frequent in the patients with positive biopsy. The simultaneous presence of these three clinical features is highly specific (all the patients in whom they were present had the final diagnosis of TA, 83% of them with histological confirmation). Thus in this group of patients the diagnosis of TA could be made without performing a temporal artery biopsy. The presence of any of these three clinical features, though of little specificity, had great diagnostic sensitivity (100% of the patients with positive histology presented with at least one of them). These, therefore, are the patients in whom temporal artery biopsy would have the greatest discriminative value. The predictive accuracy may be due to the careful history obtained and the detailed examination of the temporal arteries and the rest of the extracranial arteries, evaluating not only inflammatory signs or the absence of pulsation but also minor asymmetries and irregularities. According to our results temporal artery biopsy is unnecessary in those patients without any of these three discriminative features because it will give no additional information. Atypical presentations have been reported, however, and although in some of these clinical examination of the temporal arteries was not recorded,<sup>21 22</sup> in others they were normal.<sup>23-25</sup> We conclude that when, after a careful clinical history and a detailed examination of the extracranial arteries, none of the above mentioned three clinical features is found, temporal artery biopsy should be postponed until other investigations are performed. Although this conclusion requires confirmation by prospective studies, it would be especially useful in the patients with polymyalgia rheumatica, in whom temporal artery biopsy may not be necessary. We think that in these patients a correct approach would be to start treatment with low dose corticosteroids. The risk of clinical or histological vascular lesions appearing should then be less than 1%, as was found in the follow up of patients with polymyalgia rheumatica selected by Ayoub *et al* with less restrictive criteria.<sup>26</sup>

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