CLINICAL AUDIT

Temporal artery biopsy... Who needs one?

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Objective: To review a 10 year period of temporal artery biopsies, using the American College of Rheumatology (ACR) 1990 criteria: a five point scoring system for the diagnosis of giant cell arteritis (GCA).

Design: Population based, retrospective cohort analysis.

Setting: One district general hospital in the United Kingdom, over one decade.

Participants: All patients who underwent temporal artery biopsy from July 1994 to June 2004.

Main outcome measures: ACR score and temporal artery biopsy result.

Results: During the 10 year period 111 patients were identified. The median (range) age at presentation was 71 (29-85) years. Seventy five patients had an initial ACR score of three or four at presentation. There were 20 positive biopsy specimens. In 19 of these cases at least three of the other criteria were positive so there was already sufficient clinical information for a confident diagnosis. In only one case did the positive result influence the diagnosis by changing the ACR score from two to three. In our series, corticosteroid treatment before biopsy did not significantly reduce the yield of the biopsy.

Conclusions: The ACR score of three or more has a sensitivity of 93.5% and specificity of 91.2% for the diagnosis of GCA. Using these criteria, 68% of patients had sufficient clinical features when referred to make a confident diagnosis of GCA. Temporal artery biopsy was therefore unnecessary in this group. In the remaining group (ACR score ≤ 2) there was one positive biopsy. The biopsy only changed the diagnosis in this one case—less than 3% of the uncertain cases and less than 1% of the total cases. Using the ACR criteria and restricting biopsy to those cases in which it might change the diagnosis will reduce the number of biopsies by two thirds without jeopardising diagnostic accuracy.

Giant cell arteritis (GCA), also known as temporal arteritis, is a granulomatous arteritis of unknown aetiology occurring chiefly in those over 50 years of age. Typically it involves the branches of the external carotid artery and the vertebral, ophthalmic, and posterior ciliary arteries. It produces a broad range of symptoms including headache, jaw claudication, and loss of vision. Furthermore, prompt diagnosis and treatment are essential to the prevention of permanent blindness.¹

Biopsy of the temporal artery has previously been considered fundamental to making the diagnosis. However, the procedure carries a significant false negative rate, because of skip lesions, reported in the range of 5% to 9%.^{2,3} Furthermore, it is less well recognised that the procedure has a small risk of significant complications including scalp necrosis,⁴ facial nerve injury,^{5,6} and stroke.⁷

The American College of Rheumatology (ACR) has developed a five point scoring system,⁸ with equal weighting for each of the following parameters:

- age over 50 years
- erythrocyte sedimentation rate (ESR) > 50 mm 1st hour
- superficial temporal artery tenderness
- temporal (that is, lateralised) headache
- positive histology of a temporal artery biopsy

A score of three or more is highly accurate (sensitivity 93.5% and specificity 91.2%) in distinguishing GCA from other forms of vasculitis.⁷

It was our impression of the referrals for temporal artery biopsy that in most cases corticosteroid treatment had already been started at the time of referral and that the biopsy result rarely influenced the patient's subsequent management. The purpose of this study was to review this

and, in the light of the ACR recommendations, to refine the indications for temporal artery biopsy in this institution.

METHODS

The patient group consisted of all patients who underwent a temporal artery biopsy at our institution over the period from July 1994 to July 2004. Patients were identified retrospectively by a search of operating theatre logs, hospital discharge coding records, and histopathology records. The coding search was for the ICD 9 code 446.5 (giant cell arteritis; until 1995), the ICD 10 code M31.6 (giant cell arteritis; after 1995) and the OPCS code L67.1 (biopsy of an artery). For all patients identified, the case notes, histopathology and haematology records were reviewed to confirm their inclusion in the study, and to determine the dates of presentation and biopsy, the ACR score at presentation, and the commencement date and duration of corticosteroid treatment.

Data were stored and processed on a personal computer using Microsoft Excel 98 (Microsoft Corporation, Seattle, WA, USA). Statistical analysis was performed using SPSS v11.0 (SPSS, Chicago, IL, USA). Comparisons between groups were performed using the χ^2 test; significance was accepted at $p < 0.05$.

SURGERY

All procedures were performed under local anaesthesia by one of three consultant surgeons with a specialist interest. The procedures were performed on the next available operating list. The superficial temporal artery was identified at a symptomatic site when possible and, using a no touch

Abbreviations: ACR, American College of Rheumatology; GCA, giant cell arteritis; ESR, erythrocyte sedimentation rate

Table 1 Clinical features at the time of presentation

	Number (%)
Age > 50 years	108 (97)
ESR > 50 mm 1st hour	71 (64)
Artery tenderness	56 (50)
Temporal headache	75 (68)
Initial ACR score ≥ 3	75 (68)

technique on the biopsied section, a length of between 1 cm and 2.5 cm was excised, placed in formalin, and sent for histological examination. The wounds were closed with interrupted nylon sutures, which were removed on the 10th postoperative day.

RESULTS

A total of 111 patients were identified. All patients appeared on at least two of the search methods used. Three patients had bilateral biopsies performed. Full data were obtainable for all the patients. None of the patients had visual symptoms. The median age at presentation was 71 (range 29–85) years. The female to male ratio was 80:31. Table 1 shows the clinical findings at presentation.

Seventy four patients had been given corticosteroids before the biopsy was taken. The median duration of treatment before biopsy was 7.5 days (range 1–12 days). Table 2 shows the distribution of the initial ACR score (excluding histological result) at the time of presentation.

There were 20 positive biopsies (18% of samples). The initial ACR score was 3 or 4 in 19 of these cases. The remaining case had a score before biopsy of 2. The result of the biopsy was therefore clinically relevant (that is, changed the final ACR score from <3 to ≥ 3) in only one patient (0.9% of cases).

In those patients with a score of three or four at presentation there was a significantly higher rate of positive biopsies compared with those with scores less than three (19 of 75 compared with 1 of 36, $p = 0.0038$). Seven (9%) of those with an initial score of three or four had corticosteroid treatment stopped or withheld once the biopsy result was available.

Corticosteroid treatment had been started before biopsy in 67 cases. The median duration of treatment before biopsy was four days (range 1 to 251 days). There was no significant difference in the number of positive biopsies in this group compared with those not receiving treatment when biopsied (10 of 67 *v* 10 of 44, $p = 0.295$). In a further 14 patients treatment was started immediately after biopsy, with a median delay (time from referral for biopsy to treatment) of 0 (range 0 to 9) days.

In 73 cases it was not clear from the medical records when the result of the biopsy became available or what action, with regard to treatment dose or duration, was taken as a result. It was therefore not possible to determine the clinical

usefulness of the temporal artery biopsy as, in most cases it was not clear if the result had influenced subsequent management of the patient.

This was a retrospective audit and as such no formal follow up has been performed for the purposes of this study. To our knowledge there have been no significant complications in this study cohort.

DISCUSSION

The identification of all patients by at least two of the independent search methods gives confidence that all relevant patients have been included.

In only one case did the biopsy result change the ACR score to confirm the diagnosis of GCA. This patient was given corticosteroid treatment immediately after the biopsy was performed and treatment was continued after the result became available. In over two thirds of the patients there were sufficient grounds for a confident diagnosis of GCA at presentation, based on age, temporal headache, temporal artery tenderness, and the ESR. In the remainder the biopsy result only influenced the subsequent management in less than 3% of the cases. In the large majority of cases, therefore, there was not an absolute clinical indication for the investigation.

Less than 20% of the temporal artery biopsies performed in this institution yielded a positive result, which is lower than the 33% to 82% yields reported elsewhere.^{9–12} This decreased to 12% in those treated with corticosteroids before the biopsy was performed, although this difference did not reach significance in our group.

Given the potentially devastating outcome of failure to treat GCA promptly, it is entirely reasonable to instigate treatment as soon as the diagnosis is suspected and to decide on the duration of treatment once the results of investigations are available. This treatment, however, significantly reduces the yield of temporal artery biopsy and further reduces the negative predictive value.¹³ A positive biopsy result is often used to confirm the need for a prolonged course of treatment. In practice, however, those with a negative result, especially if treatment was started before the biopsy was taken, will usually receive the same course of treatment.

Temporal artery biopsy, even when performed under local anaesthetic, is not without morbidity. Some of the reported complications are as devastating as the results of untreated GCA, although the risks of these are very low. The result of the biopsy only influences the patient's management in a few per cent of cases. While a tissue diagnosis can be helpful in the management of a problematic patient, we question the usefulness of, and indeed the need for, this procedure in most cases.

We found the standard of record keeping to be disappointing. Details regarding the initial presentation were reliably recorded and the histology reports were, generally, filed in the appropriate section of the medical record. Too often, however, the actions taken as a result of the histology

Table 2 Partial ACR score (excluding biopsy result) at presentation

Partial ACR score before biopsy	Number	Number (%) with +ve biopsy	Number (%) taking corticosteroids
0	1	0 (0)	1 (100)
1	6	0 (0)	3 (50)
2	29	1 (3.4)	12 (41)
3	54	7 (12.0)	38 (70)
4	21	12 (57.1)	13 (62)

findings were not clearly recorded. We were therefore unable to assess how frequently and to what extent the biopsy influenced the further management of the patient. Action is being taken to tackle this.

Varma and O'Neill¹⁴ studied the clinical usefulness of temporal artery biopsy and found that temporal artery biopsy "was seen to be of limited value in changing the course of management when the diagnosis was certain" and that "in patients where the diagnosis of GCA was probable or possible (i.e. with presence of two criteria or with atypical presentation), biopsy was found to be of increasing benefit." Although they compared each of the ACR criteria with the biopsy result they did not comment on the initial ACR score nor calculate the proportion of cases in which this was sufficient to make a biopsy unnecessary.

An obvious limitation of this study is that it relied on the accurate coding of both theatre records and discharge coding. This assumption may not be totally accurate and therefore patients may be missing from our data despite undergoing temporal artery biopsy during the study period. However, of those who were identified, we were able to retrieve adequate data for all cases. We did not find any cases with a coded diagnosis of GCA who did not undergo a biopsy.

CONCLUSIONS

Temporal artery biopsy has a place in the diagnosis of GCA but we have found that, in practice, it rarely influences patient management. In most cases there is sufficient information from clinical grounds and an ESR to make the diagnosis with confidence.

As a result of this study we have revised the indications for temporal artery biopsy in our institution. The ACR scoring system is used and temporal artery biopsy is only performed when the result will affect the nature or duration of treatment. Temporal artery biopsy was only performed once

in our hospital in the year 2005, after implementation of this protocol.

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