Original Article

Is it giant cell arteritis? a retrospective audit on temporal artery biopsy for giant cell arteritis

Nadine Anne De Battista, Thelma Dionne Xerri, Mark Sammut, Matthew Sammut, John Agius

Abstract

Background: Giant cell arteritis (GCA) is the commonest of the vasculitides and should form part of the differential diagnosis of a new-onset headache in patients over 50 years with elevated inflammatory markers. Temporal artery biopsy (TAB) is the gold standard for its diagnoses.

Aim: The aim of this audit was to determine whether patients referred for a TAB between 2010 and 2015 at Mater Dei Hospital qualified for a diagnosis of GCA and the significance of the TAB result in affecting management of GCA by correlating the clinical profile and biochemical criteria according to the guidelines based on the American College of Rheumatology (ACR) criteria.

Results: The percentage of positive TABs in our cohort of 170 patients was 23%. The ESR (sensitivity - 100%) was shown to be a significant factor associated with a positive TAB when compared to CRP (sensitivity 90%). 79.5% of positive TAB results were patients aged between 70-89 years of age, proving age is also a significant factor. New onset headache was the most common complaint (66%). Only 45.9% of patients were started on steroids prior to TAB despite the clinical suspicion of GCA. This increased to 54.1% of patients on steroids after TAB was performed, pending a histology result.

Conclusion: Our findings, which are similar to comparing studies, question the practicality of TAB in the clinical diagnosis of GCA. Clinical symptoms, raised ESR and increasing age proved to be significant factors contributing to the clinical diagnosis and management of GCA. Non-invasive ultrasonography can further confirm the diagnosis and is to replace TAB in the near future.

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Keywords

Giant cell arteritis, Temporal artery biopsy, New-onset headache, ESR, Age

Introduction

Giant cell arteritis (GCA), also known as temporal arteritis, is a chronic systemic vasculitis of unknown aetiology, usually occurring in older people, affecting medium and large arteries, leading to a variety of complications if not promptly treated. GCA predominantly affects branches of the external carotid artery. Histopathologically, it is a granulomatous inflammation of the affected vessels with eventual arterial luminal narrowing and distal ischaemia.[1]

GCA is the commonest of all the vasculitides and should form part of the differential diagnosis of new-onset headache in patients over 50 years of age

with elevated inflammatory markers. The reported incidence of GCA is between 7 and 29/100,000 in Europe for people aged more than 50 years. [2] The condition is a common cause of acute blindness, with visual loss occurring in up to one-fifth of patients, thus making it a medical emergency requiring prompt initiation of treatment. Moreover, it is one of the commonest indications for long-term glucocorticoid use in the community.[3-5]

GCA is often managed both in the community by general practitioners and in secondary care by rheumatologists, ophthalmologists and other specialists thus further emphasizing the importance of formulating guidelines in order to ensure proper quality care. Temporal artery biopsy is currently the gold standard for diagnosis of GCA.[6]

Guidelines

The guidelines used for this audit as a standard for comparing our data were the British Society of Rheumatology (BSR) and the British Health Professionals in Rheumatology (BHPR) guidelines for the management of GCA based on the American College of Rheumatology (ACR), published in 1990.

The ACR classification criteria for diagnosing GCA is if at least three of five of the criteria listed below are present:

1. Age at disease onset ≥50 years: development of symptoms or findings beginning at the age of 50 years.
2. New onset headache
3. Temporal artery tenderness to palpation or decreased pulsation, unrelated to arteriosclerosis of cervical arteries
4. Elevated ESR: ESR ≥50 mm/h according to the Westergren method
5. Abnormal artery biopsy: biopsy specimen with artery showing vasculitis characterized by a predominance of mononuclear cell infiltration or granulomatous inflammation, usually with multinucleated giant cells.

Aim

The aim of this audit was to determine:

1) Whether patients referred for a temporal artery biopsy between 2010 and 2015 qualified for a diagnosis of GCA
2) The significance of a temporal artery biopsy result in affecting management of giant cell arteritis by correlating the clinical profile and biochemical criteria associated with a positive histology obtained from a temporal artery biopsy

Methodology

Permission was obtained from the Chairperson of Surgery and the Data Protection Unit in Mater Dei Hospital prior to data collection. The time period for patients included in this audit was between 2010 and 2015.

Patients who underwent temporal artery biopsy in the Mater Dei Hospital Surgical Theatres were included in the study. iSOFT clinical Manager and discharge letters were used for data collection. A proforma was used for data collection. Patient demographics, clinical indication for temporal artery biopsy, histological results, ESR and CRP were collected for the patients.

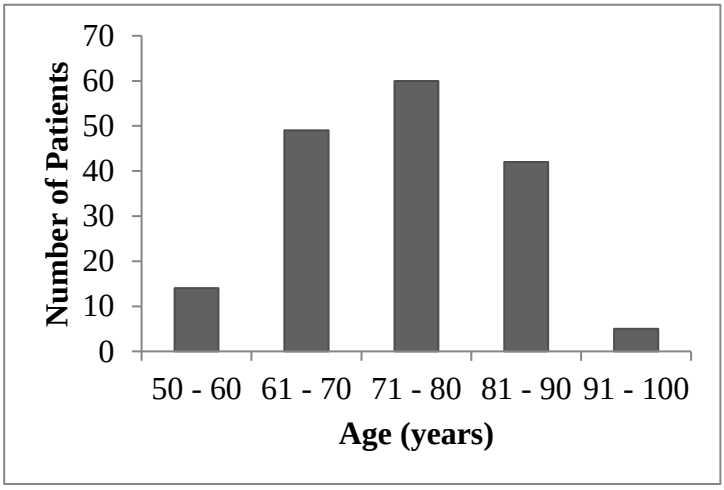
The data collected was then compared to the BSR and BHPR guidelines for the management of Giant Cell Arteritis, based on the American College of Rheumatology 1990 criteria.

Results

A total of 201 patients were identified from the Surgical Theatre Logbooks. 170 patients (55 males vs. 115 females) were included in the audit after patients without availability of ESR, CRP or temporal artery biopsy results were excluded. The mean age of the patients was 74.34 years (range 55 to 97 years).

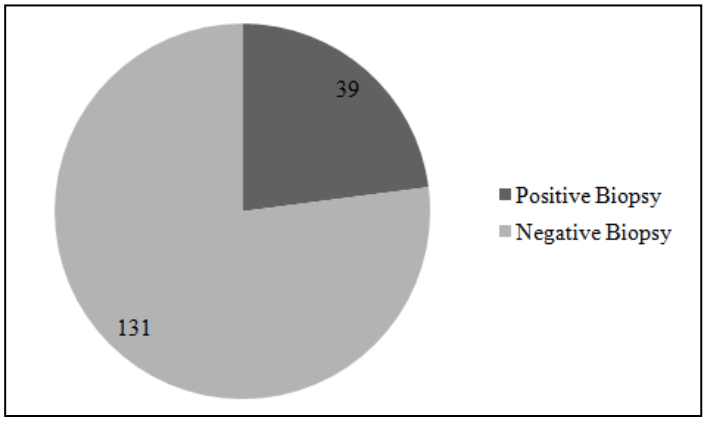
Figure 1 shows the age distribution of the patients included in the audit.

***Figure 1**: Age Distribution*



As shown in Figure 2, 131 (77%) patients had a negative TAB result compared to 39 (23%) patients with a positive TAB result. The average length of the branch of temporal artery sent for histology was 8.3mm. The length ranged from 2mm to 21mm. 145 (85% of the total population studied) patients had a TAB specimen of 5mm or longer. 111 (76.55%) of patients with a TAB biopsy of >5mm was negative for a temporal artery diagnosis, whilst 34 (23.45%) of patients with a TAB biopsy <5mm was positive for a temporal artery diagnosis. 25 (15% of the total population) had a TAB specimen less than 5mm, with 20 of the patients having a negative TAB and 5 patients with a specimen less than 5mm had a positive TAB result.

Figure 2: *Temporal artery biopsy result*



The average ESR result was 72.60mm/hr. Figure 3 shows the distribution of the ESR results in the patients included.

Figure 3*: ESR Distribution*

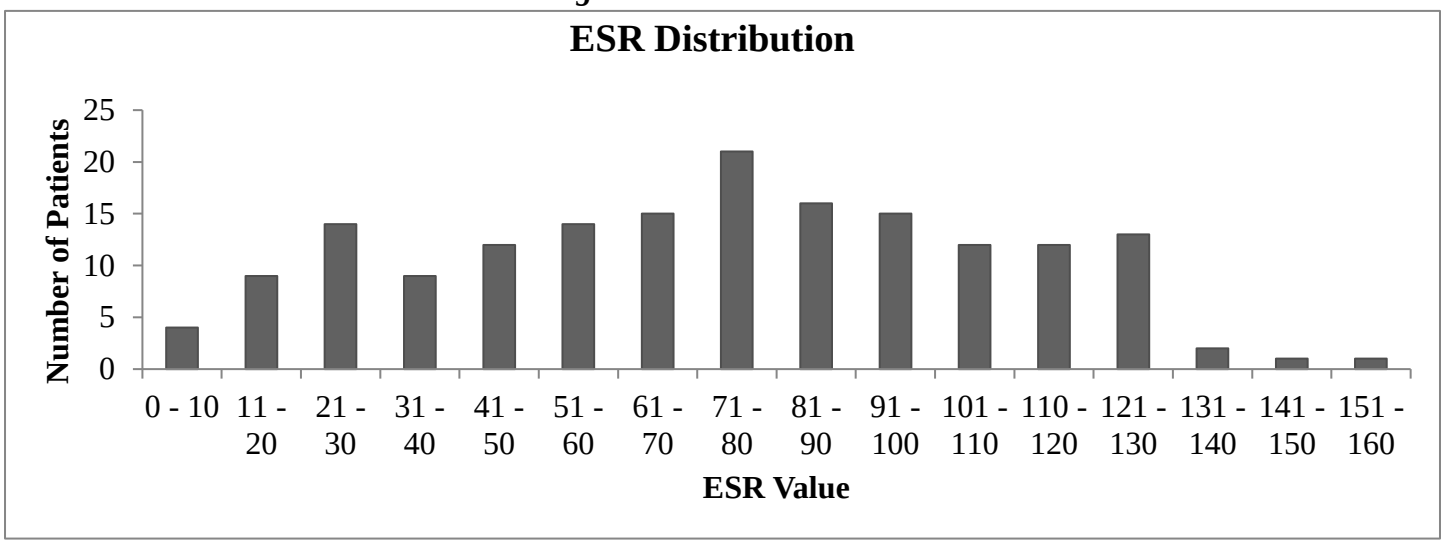


Figure 4*: CRP Distribution*

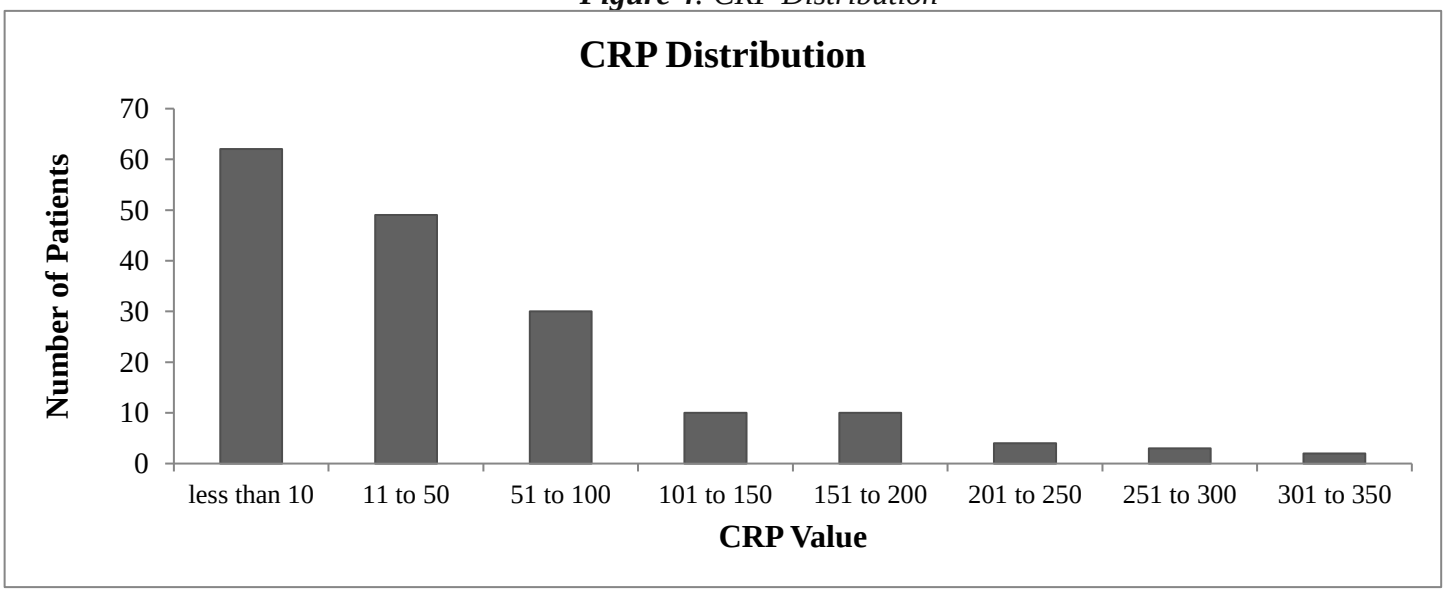


***Figure 5**: Patients' Symptoms*

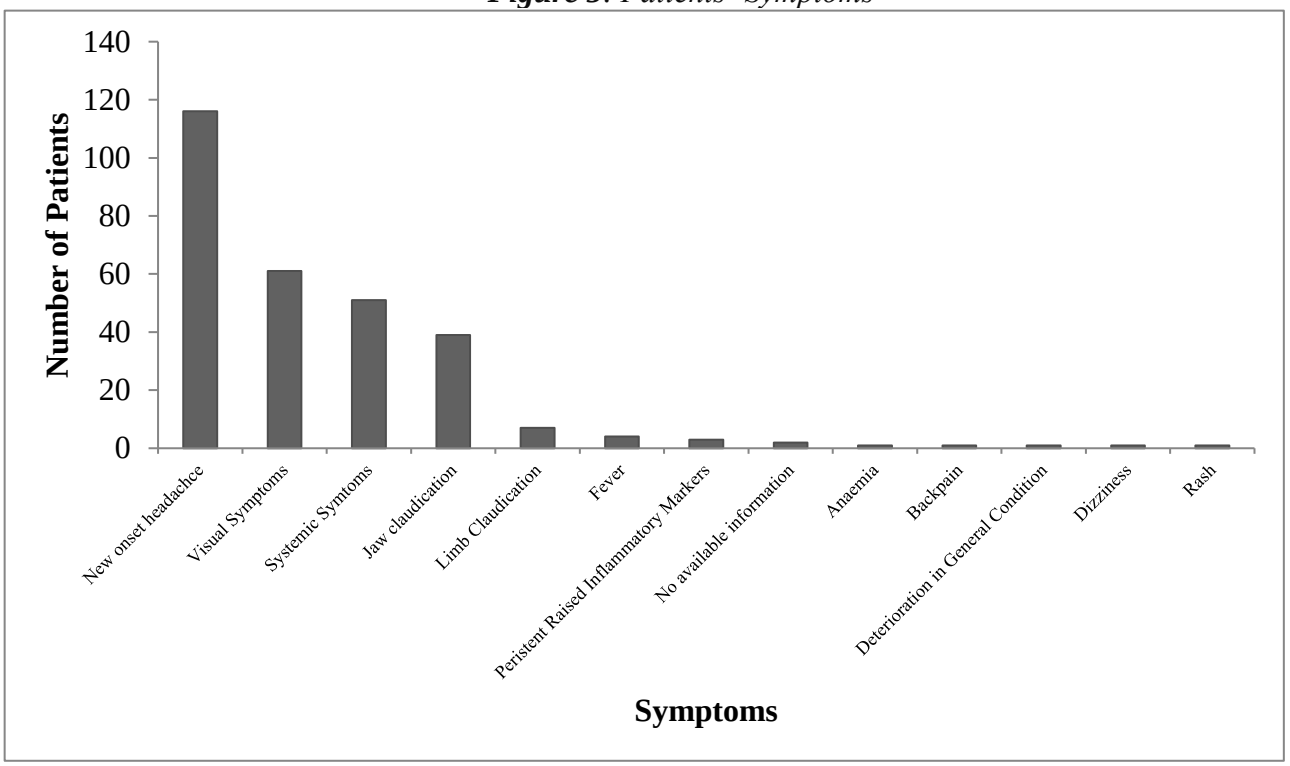


***Table 1**: Sensitivity, Specificity, PPV and NPV results*

Parameter	Sensitivity	Specificity	PPV	NPV
ESR value >10	100.00%	3.05%	23.49%	100.00%
ESR value >100	25.64%	78.81%	23.26%	77.17%
CRP >6	90.00%	35.88%	30.00%	92.16%
CRP >100	41.03%	90.08%	55.17%	83.69%
ESR and CRP positive	94.81%	21.76%	26.26%	93.44%
Headache present	64.86%	30.00%	20.87%	75.00%
Jaw Claudication	21.62%	86.05%	30.77%	79.29%
Visual Symptoms	36.84%	64.12%	22.95%	77.78%
Headache, jaw, visual symptoms present	25.00%	79.41%	30.00%	75.00%
Symptoms and inflammatory markers >50	100.00%	76.47%	42.86%	100.00%

The average CRP result was 54.42 (range 6 to 320). The distribution of the CRP result is shown in Figure 4.

The most common symptom for which TAB was performed was for new onset headaches (60% of patients). Figure 5 shows the different symptoms reported by patients undergoing TAB procedure.

Sensitivity and specificity rates for TAB positive results were calculated in relation to variables. Positive predictive value (PPV) and negative predictive values (NPV) were also calculated for different parameters (Table 1).

Steroids administration to patients following the TAB procedure was recorded. 78 (45.9%) patients had steroids prescribed prior to the TAB procedure whilst 76 (44.7%) patients did not have steroids prescribed prior to the TAB procedure. No information was found for 16 (9.4%) patients. Following the TAB histopathological result, steroids were stopped in 49 (28.90%) patients. Steroids were continued in 92 (54.10%) patients.

Discussion

In our cohort of 170 patients undergoing temporal artery biopsy, patients with an ESR >10 had a positive TAB with a sensitivity of a 100%. A CRP value less than 6 was sensitive in 90% of cases with a positive TAB. This shows that ESR is an

important significant factor associated with a positive histological diagnosis of GCA when compared to CRP.

Positive TAB results were seen in 39 patients, 79.5% of which were patients aged between 70-89 years of age. Such a result shows that age is a significant factor associated with a positive TAB result. These results mirror a similar study outcome by Saedon *et al*. The authors in this study concluded that ESR and age are the two important significant factors associated with a positive histological diagnosis of GCA.[7] This was compared to a previous study by Kernani *et al*. which showed that elevated CRP provided a sensitivity of 87% for a positive TAB when compared to an elevated ESR which had a sensitivity of 86%.[8] Our audit suggests that ESR still has an important role in the work-up of GCA and may be superior to CRP in predicting a positive TAB.

A variety of symptoms were reported by the patients undergoing a TAB, with new onset headache being the most common complaint in 66% of patients. A positive TAB with new onset headache was reported in 25 patients (14.71%) of the patient population. The sensitivity was 64.86%, however a negative predictive value of 75% was seen, indicating that there is a 75% chance of having a positive TAB without a headache. A sensitivity of only 25% was seen in patients who reported headaches, jaw claudication and visual symptoms collectively, with a negative predictive value of 75% of more seen both in the cohort of patients who reported the triad of symptoms, or in those patients who had individual symptoms. This shows that there was at least a 75% chance of having a positive TAB without any of these symptoms.

In our study, the average length of the branch of temporal artery sent for histology was 8.3mm with a range from 2mm to 21mm. 85% of TAB specimen had a biopsy length of 5mm or more; 76.55% of which had a negative TAB whilst 23.45% had a positive TAB. The other 20 cases had a biopsy length of less than 5mm, 80% of which had a negative TAB with 20% having a positive TAB. This shows that TAB length did not significantly correlate with a positive histology result. This is in conflict with previous studies. Mahr*et al*. identified 5mm as the TAB length for diagnostic sensitivity[9] whilst Ypsilantis *et al*. identified that 7mm is the cut-off length with the highest positive predictive value for a positive biopsy.[10] Moreover, Su *et al*. recommend a length of at least 12.5mm to allow for artery contraction following tissue fixation.[11]

Recent guidelines by the British Society for Rheumatology and British Health Professionals in Rheumatology for the management of GCA recommend that high-dose glucocorticosteroid therapy should be initiated immediately when clinical suspicion of GCA is raised.[2] In our study, only 45.9% of patients were started on steroids prior to TAB despite the clinical suspicion of GCA. This increased to 54.1% of patients on steroids after TAB was performed with a pending histology result.

The percentage of positive TABs in our cohort was 23%. Similarly, Saedon *et al*.'s study involving 153 patients found a positive TAB in 29% of patients [7] whilst Mahr*et al*,'s study included 1520 patients with only 15% resulting in a positive TAB.[9] These findings question the practicality of TAB in the clinical diagnosis of GCA in view of the low percentage of positive biopsies seen in our study and similar results in other studies with a high proportion of patients with negative biopsies in our study still being treated as GCA, based on clinical symptoms and inflammatory markers.

The role of TAB is starting to be replaced by colour duplex ultrasonography which is a new, noninvasive method to diagnose GCA whilst reducing the chances of false-negative biopsies due to skip lesions.[12] Other imaging modalities such as positron emission tomography and three tesla-magnetic resonance imaging are also being used in other centres.[13-14]

Limitations

This audit was done retrospectively based on observational data. Therefore, it is limited by possible inconsistent record keeping. This might have influenced the data regarding the initiation of steroid treatment prior to TAB for a presumptive diagnosis of GCA and steroid treatment pending biopsy result. Another limitation to this audit was the level of specialization of the surgeon performing the TAB. Despite this, similar clinical and biochemical criteria associated with a positive TAB were found in other studies.

Conclusion

From this study, it is evident that it would be

practical to reduce the number of TAB performed if there was sufficient clinical suspicion of GCA to commence treatment. Clinical symptoms as well as a raised ESR, are significant factors contributing to the clinical diagnosis of GCA. Diagnosis can be further confirmed by ultrasonography as a non-invasive methodology to replace TAB in the near future.

References

1. Seetharaman M. Giant Cell Arteritis (Temporal Arteritis): Practice Essentials, Pathophysiology, Etiology. Emedicine.medscape.com. [Internet]. 2015 [cited 2016 October 17]. Available from: http://emedicine.medscape.com/article/332483-overview
2. Dasgupta B, Borg FA , Hassan N , Alexander L , Barraclough K , Bourke B, et al. BSR and BHPR Standards, Guidelines and Audit Working Group. BSR and BHPR Guidelines for the management of giant cell arteritis. British Society of Rheumatology. 2010.
3. Vanhoof J, Declerck K, Geusens P. Prevalence of rheumatic diseases in a rheumatological outpatient practice. Annals of the Rheumatic Diseases. 2002; 61(5):453-5.
4. González-Gay M, García-Porrúa C, Llorca J, Hajeer A, Brañas F, Dababneh A et al. Visual Manifestations of Giant Cell Arteritis: Trends and Clinical Spectrum in 161 Patients. Medicine. 2000; 79(5):283-92.
5. Loddenkemper T, Pankaj P, Katzan I, Plant GT. Risk factors for early visual deterioration in temporal arteritis. J NeurolNeurosurgPsychiatr 2007; 78:12559.
6. Chakravarty K, Elgabani SHS, Scott DGI, Merry P. A district audit of the management of polymyalgia rheumatica and giant cell arteritis. Rheumatology. 1994; 33(2):152-6.
7. Saedon H, Saedon M, Goodyear S, Papettas T, Marshall C. Temporal artery biopsy for giant cell arteritis: retrospective audit. JRSM Short Reports. 2012; 3(10):1-5.
8. Kermani T, Schmidt J, Crowson C, Ytterberg S, Hunder G, Matteson E et al. Utility of Erythrocyte Sedimentation Rate and C-Reactive Protein for the Diagnosis of Giant Cell Arteritis. Seminars in Arthritis and Rheumatism. 2012; 41(6):866-71.
9. Mahr A. Temporal artery biopsy for diagnosing giant cell arteritis: the longer, the better? Annals of the Rheumatic Diseases. 2006; 65(6):826-828.
10. Ypsilantis E, Courtney E, Chopra N, Karthikesalingam A, Eltayab M, Katsoulas N et al. Importance of specimen length during temporal artery biopsy. British Journal of Surgery. 2011; 98(11):1556-1560.
11. Su G, Foroozan R, Yen M. Quantitative analysis of temporal artery contraction after biopsy for evaluation of giant cell arteritis. Journal Canadien d'Ophtalmologie. 2006; 41(4):500-3.
12. Ball E, Walsh S, Tang T, Gohil R, Clarke J. Role of ultrasonography in the diagnosis of temporal arteritis. British Journal of Surgery. 2010; 97(12):1765-71.
13. Blockmans D, Ceuninck L, Vanderschueren S, Knockaert D, Mortelmans L, Bobbaers H. Repetitive18F-fluorodeoxyglucose positron emission tomography in giant cell arteritis: A prospective study of 35 patients. Arthritis & Rheumatism. 2006; 55(1):131-7.
14. Loeb J, Engelstad B, Creek W. Clinical Images: Giant cell arteritis revealed by positron emission tomography. Arthritis & Rheumatism. 2006; 54(5):1710.