Factors contributing to capturing positive findings on temporal artery biopsy: an Australian experience from two rheumatology referral centers

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Background

Temporal artery biopsy (TAB) is widely recognised as the diagnostic gold standard for GCA despite having a poor sensitivity due to the presence of 'skip' lesions. There is, however, a lack of consensus guiding TAB practice, particularly in relation to optimal length, need for bilateral specimens, and number of segments examined.

This study investigated the impact of factors such as total biopsied length, laterality, segment number, and referral center on histopathological outcomes in an Australian setting.

Methods

Reports for all available biopsy specimens labelled "temporal artery" were extracted from the pathology service records of two rheumatology referral centers with adjacent geographic catchments. Each histopathology report was manually reviewed to establish length of biopsied artery, laterality, and number of segments, along with patient demographics such as age, sex, and referral center.

Key histopathological findings including intimal hyperplasia, disruption of the internal elastic lamina, presence of giant cells, and adventitial inflammation were recorded. Multivariable logistic regression with site-varying intercept was performed.

Results

TAB reports from a total of 577 patients were captured, with results available from the two centers from 1999-2019 and 2010-2019, respectively.

The mean age in this group was 73, and 69% were female (Table 1). Positive biopsy weakly correlated with increased total length of biopsy in centimeters (OR 1.25 [1.06-1.47]) (Figure 1) and increased age in years (OR 1.02 [1.00-1.05]) but not laterality or sex (Table 2).

Table 1. Patient characteristics by biopsy result.

	Negative (n = 455)	Positive (n = 122)	Total (n = 577)
Age (years)			
Mean (SD)	72 (± 11)	75 (± 8.9)	73 (± 10)
Sex			
Female	310 (68%)	88 (72%)	398 (69%)
Male	145 (32%)	34 (28%)	179 (31%)
Maximum biopsy length (cm)			
Mean (SD)	1.8 (± 0.86)	2.0 (± 1.1)	1.9 (± 0.92)
Total biopsy length (cm)			
Mean (SD)	2.4 (± 1.6)	2.8 (± 2.1)	2.5 (± 1.7)
Mean biopsy length (cm)			
Mean (SD)	1.7 (± 0.78)	1.9 (± 0.97)	1.7 (± 0.83)
Laterality			
Bilateral	130 (29%)	39 (32%)	169 (29%)
Unilateral	325 (71%)	83 (68%)	408 (71%)

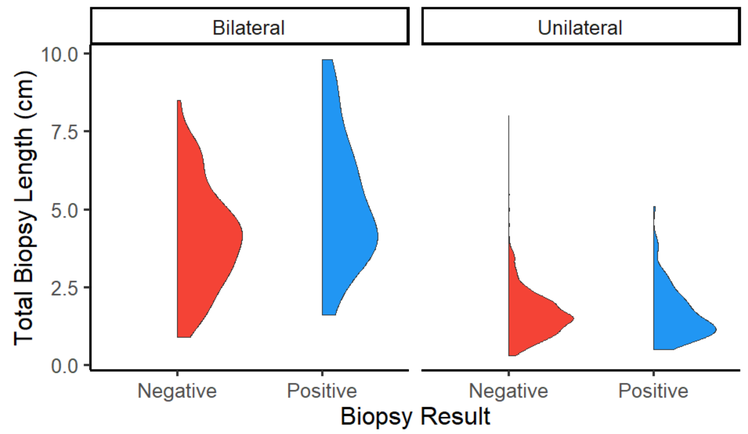
Different centers have **different yield** from temporal artery biopsy, independent of biopsy length.

There was a substantial **difference between the two centers, which was incompletely accounted for once corrected for total biopsy length and calendar year of biopsy**, suggesting either unmeasured differences in patient demographics or a difference in clinical practice. This change was **preserved across analysis of different histopathological subtypes**.

Table 2. Associations with positive TAB on multivariable logistic regression.

	Overall positive finding	Intimal hyperplasia	Giant cells	Adventitial inflammation
Total biopsy length (cm)	1.25 (1.06 – 1.47)	1.18 (0.98 – 1.40)	1.21 (1.00 – 1.46)	1.07 (0.87 – 1.31)
Unilateral (vs. bilateral)	1.56 (0.82 – 3.07)	1.12 (0.56 – 2.30)	1.28 (0.61 – 2.77)	0.82 (0.38 – 1.82)
Age (years)	1.02 (1.00 – 1.05)	1.02 (1.00 – 1.04)	1.03 (1.00 – 1.05)	1.00 (0.98 – 1.03)
Male (vs. female)	0.83 (0.52 – 1.29)	0.63 (0.37 – 1.05)	0.59 (0.32 – 0.92)	0.75 (0.41 – 1.31)
Center 2 (vs. center 1)	**0.54 (0.34 – 0.84)**	**0.41 (0.24 – 0.68)**	**0.55 (0.32 – 0.92)**	**0.46 (0.25 – 0.82)**

Figure 1. The effect of total biopsy length on result, stratified by laterality.



Conclusion

Total biopsy length was weakly associated with a positive TAB result, but **differences in results between referral centers** independent of biopsy length suggest **other selection factors may be important** in determining TAB yield. Examination of differences in results between a greater number of referral centers would assist in determining the extent of this variability.

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