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Performance of the Southend pre-test probability score (PTPS) for giant cell arteritis in a fast-track clinic in Western Australia

#### Key Message

 The Southend pre-test probability score might be useful in risk stratifying patients presenting to GCA fast-track clinics.

DEAR EDITOR. We report the performance of the Southend pre-test probability score (PTPS) for GCA in our GCA assessment clinic. GCA is the most common large vessel vasculitis. Intense vascular inflammation leads to myointimal proliferation and potential vessel occlusion. which can result in major ischaemic events, such as blindness and stroke. Therefore, GCA is considered a medical emergency, necessitating timely and accurate diagnosis and intervention [1, 2]. GCA most frequently presents with headache, which is a common and nonspecific presentation. Associated features can include jaw claudication, scalp tenderness, visual disturbances and non-specific constitutional symptoms; however, the symptoms at presentation are heterogeneous. Physical signs, when present, can include thickened or tender temporal arteries on palpation in addition to diminished or absent pulses [1]. Inflammatory markers are generally elevated, but normal inflammatory markers do not preclude the diagnosis. For these reasons, diagnosis can be challenging.

Objective confirmation of the diagnosis is pursued to justify the use of aggressive and long-term immunosuppression. Historically, TA biopsy has been considered the gold standard for diagnosis for GCA. TA biopsy has a high specificity but low sensitivity (as low as 39%), is invasive and can be difficult to obtain in a timely manner [1]. Recently, imaging modalities such as US, PET scan, MRI and CT scan have been endorsed as diagnostic tools in international guidelines, but they assume local competency and ease of access [1–3]. Furthermore, the pre-test probability of GCA is essential to consider when assessing the clinical utility of these imaging modalities, because none provides stand-alone definitive confirmation of the disease.

The pre-test probability of disease is a crucial component of GCA assessment and clinical decision-making. Therefore, a clinical tool to define the probability of GCA objectively is likely to be very useful. Recently, the Southend pre-test probability score (PTPS) has been developed to aid GCA assessment [4, 5]. The tool was developed retrospectively and has not been tested in different populations. In this study, we aimed to apply the PTPS to patients seen through our GCA fast-track clinic in Western Australia to assess the utility of this score in risk stratifying patients with suspected GCA.

Patients presenting to the Royal Perth Hospital GCA fast-track clinic were consented for prospective data collection. GCA was defined as clinical diagnosis of GCA at 6 months, based on the opinion of clinicians, formulated on history, examination, TA US and TA biopsy or additional imaging in select cases. We calculated the Southend PTPS retrospectively from the data collected prospectively over the 18 months between November 2019 and May 2021. Using the PTPS, we risk stratified patients into low-risk (PTPS < 9), intermediate-risk (PTPS = 9–12), and high-risk (PTPS > 12) groups and correlated these with the final clinical diagnosis. We then dichotomized the PTPS into low-risk or intermediate/high-risk groups to determine the sensitivity, specificity, positive predictive value and negative predictive value.

Data were analysed from 104 patients over the specified time frame. The demographics and the prevalence of features of the Southend PTPS are presented in Table 1. The clinical diagnosis of GCA at 6 months occurred in 25, giving a prevalence of 24%. Using the PTPS, 45 (43%) of the 104 patients were classified as low risk, 34 (32%) intermediate risk and 25 (24%) high risk for GCA. In the low-risk category, GCA prevalence was 0%, in the intermediate-risk group 15% and in the high-risk category 80% (P < 0.001).

The Southend PTPS (dichotomized) had a sensitivity of 100%, specificity of 56.9%, positive predictive value of 42.3% and negative predictive value of 100%.

In conclusion, the PTPS (applied retrospectively) successfully stratified patients referred to our fast-track clinic into high and low risk for GCA, when using the clinical diagnosis as the gold standard. Our study provides external validation to the currently published work. This tool might be useful in risk stratifying patients who are undergoing specialist assessment for GCA in the fast-track clinic setting; the negative predictive value suggests that this tool is valuable to exclude GCA, but this needs to be tested prospectively.

LETTER

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.  $\begin{tabular}{ll} \begin{tabular}{ll} TABLE 1 Baseline demographics and features of patients with GCA compared with the total number of patients \end{tabular}$ 

Age, years       4       0 $< 49$ 4       0         50-60       20       4         61-65       19       3         >66       61       18         Gender	Demographics	Number of patients (n = 104)	
50-60         20         4           66         61         18           Gender	Age, years		
61-65       19       3         > $66$ 61       18         Gender	<49	4	
>66         61         18           Gender	50–60	20	-
Gender         Male         30         12           Female         74         13           Duration of symptoms, weeks         2           >24         13         2           12-24         9         1           6-12         16         2           <6	61–65	19	3
Male       30       12         Female       74       13         Duration of symptoms, weeks       2         >24       13       2         12-24       9       1         6-12       16       2         <6		61	18
Female       74       13         Duration of symptoms, weeks $>$ 24       13       2         > 24       13       2         12-24       9       1         6-12       16       2         <6			
Duration of symptoms, weeks       24       13       2         >24       13       2         12-24       9       1         6-12       16       2         <6			
>24       13       2         12-24       9       1         6-12       16       2         <6		74	13
12-24       9       1         6-12       16       2         <6			
6-12         16         2           <6			
<6			-
CRP, mg/l <sup>a</sup> 25         4           6-10         14         0           11-25         26         4           >25         36         15           Symptoms         Headache         11         4           No         11         4         14           Yes         93         21           Polymylagia         0         87         19           Yes         17         6         6           Constitutional         0         77         19           Single         22         6         6           Combination         5         0         0           Ischaemic         0         86         13           No         86         13         2           Signs         12         8         14           Visual         No         92         17           Yes         12         8         14           TA abnormality         0         1         1           No         85         16         1         1           Thickening         2         2         2         2           Bruit         0			
0-5         25         4           6-10         14         0           11-25         26         4           >25         36         15           Symptoms         Headache         11         4           No         11         4           Yes         93         21           Polymylagia		66	20
6-10         14         0           11-25         26         4           >25         36         15           Symptoms         Headache         11         4           No         11         4         14           Yes         93         21           Polymylagia         17         6           No         87         19           Yes         17         6           Constitutional         77         19           Single         22         6           Combination         5         0           Ischaemic         No         86         13           Yes         18         12         Signs           Visual         No         92         17           Yes         12         8         TA abnormality           No         92         17         Yes           Yes         10         1         Thickening         4         3           Pulse loss         5         5         5         5           Extracranial artery abnormality         0         0         0           No         102         23         7			
11-25       26       4         >25       36       15         Symptoms       Headache       No       11       4         No       11       4       Yes       93       21         Polymylagia       No       87       19       Yes       17       6         Constitutional       No       77       19       Single       22       6         Combination       5       0       0       Ischaemic       No       86       13         Yes       18       12       Signs       Visual       No       92       17         No       92       17       Yes       12       8       14         Signs       Visual       No       92       17         Yes       12       8       14       3         Pulse loss       5       5       5       5         Extracranial artery abnormality       No       101       1       Thickening       2       2         Bruit       0       0       0       0       0       0       0       0         Pulse loss       0       0       0       0       0       0			-
>25         36         15           Symptoms         Headache            No         11         4           Yes         93         21           Polymylagia             No         87         19           Yes         17         6           Constitutional             No         77         19           Single         22         6           Combination         5         0           Ischaemic             No         86         13           Yes         18         12           Signs             Visual             No         92         17           Yes         12         8           TA abnormality             No         102         23           Thickening         4         3           Pulse loss         5         5           Extracranial artery abnormality             No         102         23           Thickening         2			
Symptoms Headache         11         4           No         11         4           Yes         93         21           Polymylagia			-
Headache         No         11         4           Yes         93         21           Polymylagia		36	15
No         11         4           Yes         93         21           Polymylagia	, , , , , , , , , , , , , , , , , , ,		
Yes         93         21           Polymylagia			
Polymylagia           No         87         19           Yes         17         6           Constitutional         77         19           No         77         19           Single         22         6           Combination         5         0           Ischaemic         7         19           No         86         13           Yes         18         12           Signs         12         8           Visual         7         8           No         92         17           Yes         12         8           TA abnormality         8         16           Tenderness         10         1           Thickening         4         3           Pulse loss         5         5           Extracranial artery abnormality         10         1           No         102         23           Thickening         2         2           Bruit         0         0           Pulse loss         0         0           Cranial nerve palsy         104         25           Yes         0			-
No         87         19           Yes         17         6           Constitutional         77         19           No         77         19           Single         22         6           Combination         5         0           Ischaemic         0         13           No         86         13           Yes         18         12           Signs         Visual         12           No         92         17           Yes         12         8           TA abnormality         No         85           No         85         16           Tenderness         10         1           Thickening         4         3           Pulse loss         5         5           Extracranial artery abnormality         No         102           No         102         23           Thickening         2         2           Bruit         0         0           Pulse loss         0         0           Cranial nerve palsy         No         104           No         104         25           <		93	21
Yes         17         6           Constitutional		07	10
Constitutional           No         77         19           Single         22         6           Combination         5         0           Ischaemic			
No         77         19           Single         22         6           Combination         5         0           Ischaemic		17	0
Single         22         6           Combination         5         0           Ischaemic		77	10
Combination         5         0           Ischaemic			
Ischaemic           No         86         13           Yes         18         12           Signs         12         3           Visual         7         7           No         92         17           Yes         12         8           TA abnormality         85         16           Tenderness         10         1           Thickening         4         3           Pulse loss         5         5           Extracranial artery abnormality         102         23           Thickening         2         2           Bruit         0         0           Pulse loss         0         0           Cranial nerve palsy         0         0           Ves         0         0           Alternative         1         1           Infection         12         0           Cancer         5         2           Systemic rheumatic diseases         1         0           Head and neck pathology         0         0	5		
No         86         13           Yes         18         12           Signs         Visual         7           No         92         17           Yes         12         8           TA abnormality         85         16           Tenderness         10         1           Thickening         4         3           Pulse loss         5         5           Extracranial artery abnormality         0         0           No         102         23           Thickening         2         2           Bruit         0         0           Pulse loss         0         0           Cranial nerve palsy         0         0           Cranial nerve palsy         0         0           Alternative         1         1           Infection         12         0           Cancer         5         2           Systemic rheumatic diseases         1         0           Head and neck pathology         0         0		5	0
Yes         18         12           Signs         Visual         7           No         92         17           Yes         12         8           TA abnormality         8         16           Tenderness         10         1           Thickening         4         3           Pulse loss         5         5           Extracranial artery abnormality         7         102           No         102         23           Thickening         2         2           Bruit         0         0           Pulse loss         0         0           Cranial nerve palsy         0         0           Ves         0         0           Alternative         1         1           Infection         12         0           Cancer         5         2           Systemic rheumatic diseases         1         0           Head and neck pathology         0         0		86	13
Signs           Visual           No         92         17           Yes         12         8           TA abnormality         85         16           Tenderness         10         1           Thickening         4         3           Pulse loss         5         5           Extracranial artery abnormality         102         23           Thickening         2         2           Bruit         0         0           Pulse loss         0         0           Cranial nerve palsy         0         0           Ves         0         0           Alternative         1         1           Infection         12         0           Cancer         5         2           Systemic rheumatic diseases         1         0           Head and neck pathology         0         0			
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No         92         17           Yes         12         8           TA abnormality         85         16           Tenderness         10         1           Thickening         4         3           Pulse loss         5         5           Extracranial artery abnormality         7         23           No         102         23           Thickening         2         2           Bruit         0         0           Pulse loss         0         0           Cranial nerve palsy         0         0           Kers         0         0           Alternative         1         1           Infection         12         0           Cancer         5         2           Systemic rheumatic diseases         1         0           Head and neck pathology         0         0	-		
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Systemic rheumatic diseases10Head and neck pathology00			
Head and neck pathology 0 0			
1 05	-		

<sup>a</sup>The CRP values for three patients in the control group and four in the GCA group were missing from the records (this would not have changed the category of the patients). *Funding:* No specific funding was received from any bodies in the public, commercial or not-for-profit sectors to carry out the work described in this article.

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#### Data availability statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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