CSVS

THE COLLEGE AND SOCIETY
FOR CLINICAL VASCULAR SCIENCE
Great Britain and Ireland

Protocol Guidelines

GIANT CELL ARTERITIS DUPLEX ULTRASOUND EXAMINATION

Version 2.0

April 2025

Doc Ref PS-PG002

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2.0	CSVS new branding and formatting edits.	Author: Veronica Sarayarajah Review: April 2028 Approval: CSVS Exec 2025	Sep 2025

Introduction

This document was prepared by the Professional Standards Committee (PSC) of the College and Society for Clinical Vascular Science (CSVS) to support the practise and delivery of high quality standardised Clinical Vascular Science. This document may be used in its entirety (or referenced in part with suitable additions made by local policy implementers) by all parties involved with clinical vascular science. Suggestions for improving this document are welcome and should be sent to the Chair of the PSC (see csvs.org.uk for current PSC Chair details).

Purpose

Giant cell arteritis (GCA) primarily affects the medium and large vessels in the temporal and axillary arteries in adults over the age of 50. In the past temporal artery (TA) biopsy used to be the gold standard for diagnostics but ultrasound has shown to have high sensitivity (88%) and high specificity (96%) for the detection of GCA [1].
Duplex ultrasound is used to assess the axillary artery and branches of the temporal artery – the common, frontal and parietal arteries for signs of wall thickening or occlusions.

Common indications

Its clinical presentation includes:

- >50 years of age
- Acute onset (symptoms <6weeks)
- Throbbing headache (usually temples)
- Thickened temporal arteries/ absent pulsation
- Scalp necrosis
- Visual disturbance including field defects.
- Sudden permanent loss of vision in one eye/ visual disturbance
- Tenderness of the scalp or over the temporal arteries
- Jaw claudication- when chewing.
- An ESR of >50mm/h is considered indicative of GCA (normal range <20mm/h)
  A CRP of >20mg/L is considered indicative of GCA (normal range <5mg/L) [2].

Contraindications and Limitations

- Small vessels are very difficult to image (typically temporal arteries less than 2mm) and can be compressed with too much probe pressure.
- Heavily calcified vessels make it difficult to compress.
- Tortuous vessels can make it difficult to scan in different planes. Ensure to scan in cross section and longitudinal so that the vessel is assessed along their length.
- The Temporal arteries usually pass beyond the hairline, which can make imaging difficult. Copious amounts of gel may be needed to image these vessels.
- Previous temporal artery biopsy

Patient Referral and pathway

Patients presenting with GCA is deemed a medical emergency and are often referred for an ultrasound by the Rheumatology department. The referral should include details of the presenting symptoms.

Prompt diagnosis and treatment are critical to avoid blindness. Steroid treatment is often started immediately on clinical indication of GCA. therefore, arrangements for imaging should ideally be made before or as early as possible after initiation of therapy (best between 24-72hrs) [2] and for same day clinical review with the outcome of the Duplex by the Rheumatology team. A delay to imaging from commencing steroid treatment may see the halo sign disappear and reduce the sensitivity of ultrasound for detecting GCA[2].

Equipment

A linear high frequency (hockey stick) transducer of 15MHz or more is ideal to assess the temporal, frontal, parietal and axillary arteries. You may wish to ensure your measurement units reported lie within the capability of the probe resolution parameters for uncertainty of measurement assurance[3.]

A medium/ high frequency transducer for the axillary arteries (ultrasound of the axillary arteries increases diagnostic yield in the detection of GCA)[4.]

Patient preparation

No specific preparation is required for scanning the temporal arteries. Access would be required to the patient's head and arms. The test involves using the probe to apply pressure on the sides of the head to compress the arteries. Careful explanation of this will aid compliance as it sometimes can be uncomfortable for the individual.

The patient is asked to remove their clothing to expose the axilla and tie back their hair to expose the temporal arteries. The patient is examined supine with the arm raised above the head when scanning the axilla, however the proximal axillary artery may also be imaged from the infraclavicular region. The head can be turned to one side for examining the temporal arteries. The patient's dignity and privacy should be maintained.

Examination

During the examination the CVS should assess the following:

The common, parietal and frontal branches of the temporal arteries in B mode, and may consider also using colour and/or power Doppler.

- Locate the common branch of the TA in transverse by the ear, where the vessel is at most prominent. This vessel often demonstrates some tortuosity.
- Assess the TA and its frontal and parietal branches in B-mode to demonstrate their anatomical course, and the presence or absence of any wall thickening or halo using compression technique. Consider using colour and/or power Doppler to demonstrate patency/stenosis.
- Examine the **entire** length of the axillary arteries for the presence or absence of any wall thickening or halo. Consider using colour and/or power Doppler to demonstrate patency/stenosis.

Appearance of Vessels:

A non-diseased vessel should be patent and compressible (Figure 1), with no evidence of halo or atherosclerosis.

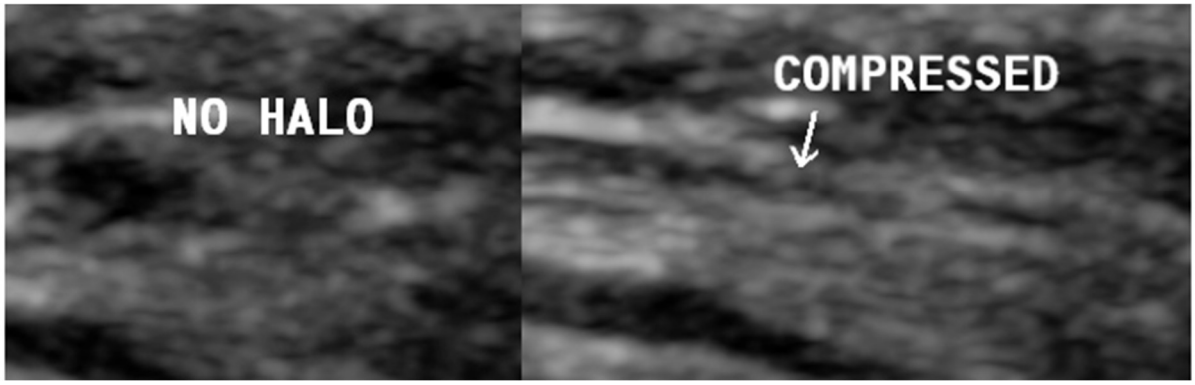

Fig 1a : temporal artery compressed, no signs of a halo.

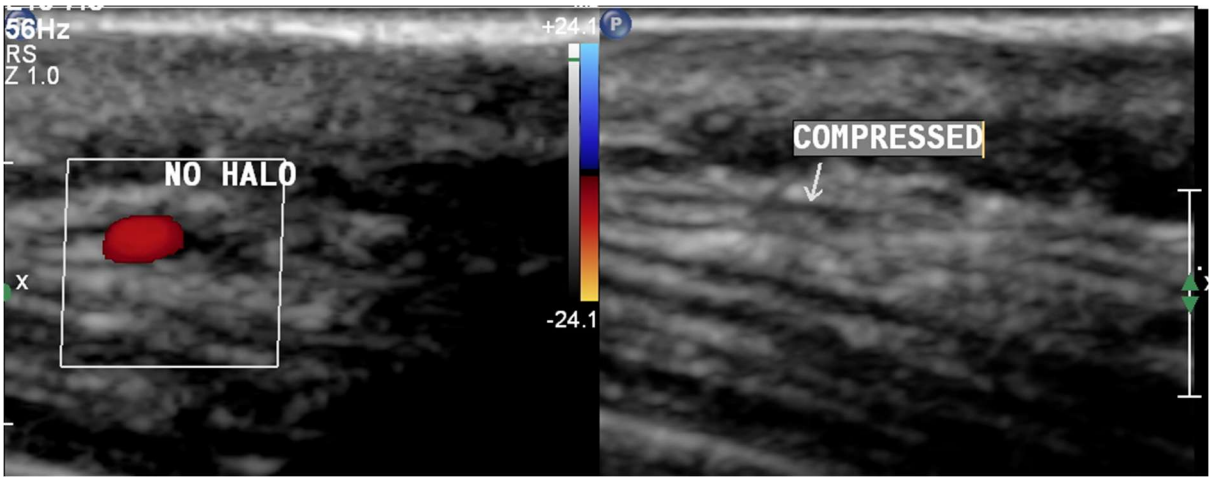

Fig 1b: Temporal artery in colour mode and compressed, no signs of a halo.

Abnormal Appearances

Inflammatory vessels with a positive halo have circumferentially thickened walls and do not fully compress (Figure 2), Halo sign - a dark (hypoechoic) area around the vessel lumen probably due to arterial wall oedema[7]. Ensure colour settings/gain adequate to prevent colour bleed.

Vessels with atherosclerosis may demonstrate disease which is often not circumferential and hypoechoic. Atherosclerosis may appear heterogeneous or calcified rather than the halo sign for GCA.

Temporal artery:

- A wall thickness of <0.3mm is normal [7].
- A wall thickness (halo) of 0.7mm or greater can be indicative of GCA (positive biopsy result)[7].
- Wall thickening falling between these values may be considered equivocal.

Axillary artery

- A wall thickness of <1mm is normal
- 1.0-1.5mm equivocal
- >1.5mm a sign of definitive vasculitis[7]

Positive compression sign

- This applies to the temporal artery and its branches.
- Thickened wall remains visible upon compression.

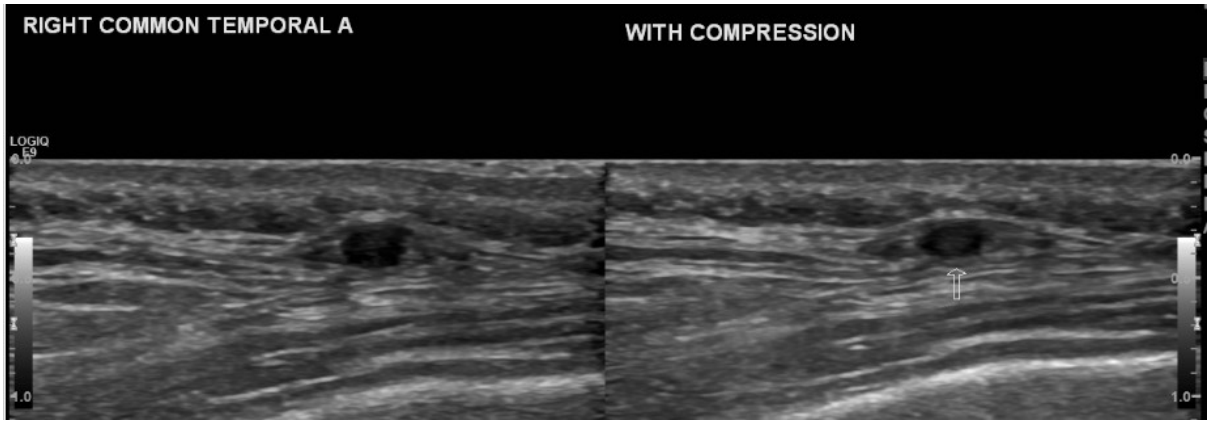

Figure 2a Right: Compressed artery the thickening is still visible.

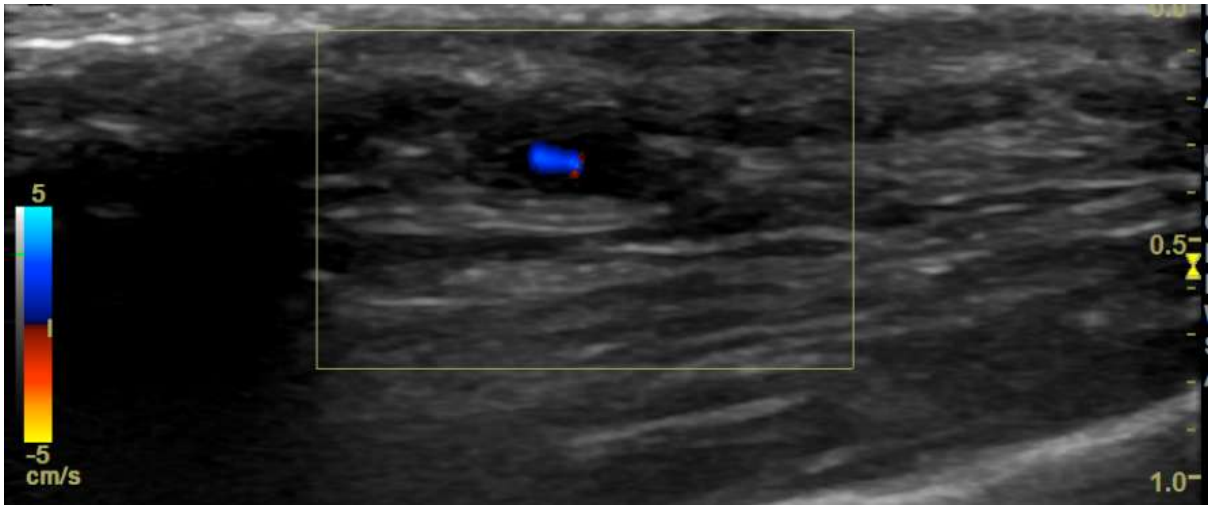

Figure 2b: thickening of the artery with colour Doppler

Reporting:

It should be written by the CVS undertaking the examination and viewed as an integral part of the whole examination.
The report should include correct patient demographics; date of examination; examination type and the name and status of the CVS.
In addition to the report, an appropriate number of annotated images that represent the entire ultrasound examination should be stored in accordance with local protocols and SVT Image Storage Guidelines[8]

The report should include:

- Which arteries have been assessed, commenting on patency, compressibility, and the presence or absence of any disease or any features of GCA, as above.
- Any limitations to the examination.

References

1) Mackie, S. L. et al. (2020) 'British Society for Rheumatology guideline on diagnosis and treatment of giant cell arteritis', Rheumatology. https://doi:10.1093/rheumatology/kez672

2) Santoro L., D'Onofrio F., Bernardi S., Gremese E., Ferraccioli G., Santoliquido A. (2013) Temporal ultrasonography findings in temporal arteritis: early disappearance of halo sign after only 2 days of steroid treatment. Rheumatology (Oxford) 52: 622.

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4) The utility of ESR, CRP and platelets in the diagnosis of GCA Chan et al BMC Rheumatology, 2019

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8) Aschwanden, M. et al. (2013) 'Temporal artery compression sign - A novel ultrasound finding for the diagnosis of giant cell arteritis, Ultraschall in der Medizin. https://doi:10.1055/s-0032- 1312821

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10) Schmidt W.A., Seifert A., Grominica-Ihle E., Krause A., Natusch A. Ultrasound of proximal upper extremity arteries to increase the diagnostic yield in large-vessel giant cell arteritis, 2008, 47:96-101

11) SVT Guidance on Image Storage and use, for the vascular ultrasound scans http://www.svtgbi.org.uk/professional-issues/