SUPPLEMENTARY DATA

Supplementary Table S1. Further definitions and details of typical Grey scale and colour Doppler settings required for assessing arteries for GCA

Grey scale settings	**Description**	**Example of recommended value***
Compound mode	This is a spatial compounding tool that combines multiple images from different angles into an image with enhanced tissue and border differentiation.	On, Type mean
Speckle reduction	Speckle Reduction Imaging (SRI) adapts the image to be smoother/cleaner by eliminating weak signals and enhancing strong ultrasound signals from tissues.	3
Rejection	This regulates the minimum level of echoes displayed, it can be increased to reduce noise.	0
Frame average/Persistence	This function combines/averages multiple image frames into a single image. It is useful to adjust the background noise and make the image smoother and softer. The higher the number of averages the less noisy (grainy) the image will be but the frame rate will decrease significantly.	2
Suppression	Eliminates low-level echoes associated with acoustic noise.	0
Grey maps	This option adjusts the brightness of each shade of grey displayed; it is complementary to dynamic range which regulates the number of grey shades displayed.	Grey Map F
S/A	SRI HD/Averages	3/2
Power output (AO%)	This optimizes image quality and allows to reduce beam intensity.	100%
Colour Doppler settings	**Description**	**Example of recommended value***
Map compress	Changes the baseline gradation of the grey scale used in order to make it intrinsically brighter (all greys become lighter) when using low values, or intrinsically dimmer (all greys appear darkened) when high values are used. The centre value is 7 (0-14).	7
Frame average	This function combines/averages multiple image frames into a single image. It is useful to adjust the background noise and make the image smoother and softer.	8
Accumulation	Enhances the flow in an image. It detects the maximum signal and then holds it for the level specified (between 1 and 7, plus Off). When defined as Off, the Frame Averaging parameter is used to control the level of flow enhancement.	Off
Threshold	This setting allows to prioritize colour information over grey-scale information, optimizing the colour priority of blood flow.	70%
Map	Allows a specific color map to be selected.	V5

Packet size	Controls the number of samples gathered for a single color flow vector. When increased, it improves the sensitivity and accuracy of colour averaging, improving image quality but also decreases the frame rate.	16
Flash suppression	Suppresses flash artefacts that arise in areas of elevated signal strength to achieve enhanced flow discrimination.	0
Transparency map	Enhances the flow of interest from the adjacent flows by regulating the transparency or opacity of each pixel or voxel in the flow data.	0
Sample volume	Controls the volume of blood flow signal sampled within the colour box. Smaller values increase sampling accuracy (more useful for measurements and smaller vessels). Larger values increase sensitivity for detection of flow (more useful in larger vessels).	0
Spatial filter	This option improves smoothing of the image in the areas were the signal is homogenous, reducing the speckle in the other regions.	2
Line density	This adjusts the spatial resolution of the image by regulating the number of scan lines.	3
Frame rate	Indicates the number of frames per second that can be acquired. Higher frame rates correspond to lower line densities and lower depths. It can be considered as temporal resolution. A high frame rate is crucial in small, fast moving tissues.	20
L/A	Line density/Average	3/8
S/P	Spatial filter/Packet size	2/16
Power output (AO%)	This optimizes image quality and allows to reduce beam intensity.	100%

***These examples of recommended values are taken from a GE LOGIQE9 Ultrasound machine and can vary according to the manufacturer (11,33,34,47).**

Supplementary Figure S2. Proforma of ultrasound scan record for patients with suspected or confirmed GCA

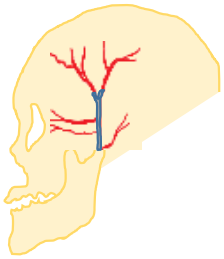
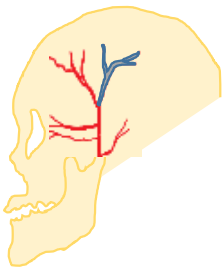
Ultrasound scan record for patients with suspected or confirmed giant cell arteritis

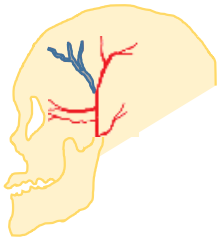
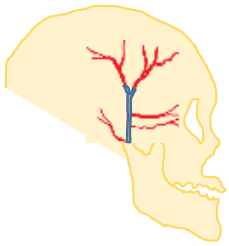
PATIENT ID (1ST)	
PATIENT ID	

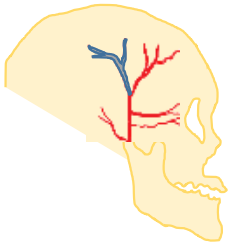
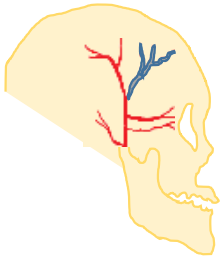
PATIENT ID (Other)	
PATIENT ID	
PATIENT NAME	
PATIENT DOB	
PATIENT DOB	

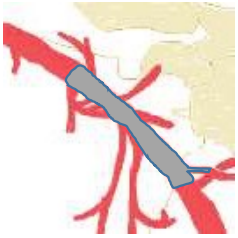
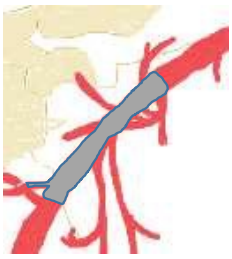
Use this form to document the findings from ultrasound scans in a patient with suspected or confirmed GCA. Complete one of these forms for each assessment of each patient. Make sure that you indicate the date of the assessment in the box below. The order of the anatomical sites follows the usual order of scanning: starting with the left common temporal artery, then the left parietal branch and the left frontal branch; then ask the patient to turn onto their left side so that you can scan the right common temporal artery, then the right parietal branch, right frontal branch; following this the subject will usually lie supine in order to have the left axillary artery scanned and then the right axillary artery.

TIMEPOINT OF SCAN								
DATE OF SCAN (DD/MM/YYYY)					**2**	**0**		

FINDINGS OF SONOGRAPHER		PLEASE TICK (✓)			
Anatomical site 1: Left superficial temporal artery		**Yes**	**No**	**?**	**Biopsied**
	Normal?	☐	☐	☐	☐
	Halo present?	☐	☐	☐	
	Compression positive (halo persists on compression)?	☐	☐	☐	
	Halo extends for the whole length of anatomical site?	☐	☐	☐	
	Is halo concentric (yes=concentric, no=eccentric) at site of measurement of maximum size (see below)?	☐	☐	☐	
	Maximum halo size (measured in mm in longitudinal view; if no halo, record as 0)			☐	
	Significant vessel tortuosity present?	☐	☐	☐	
	Arteriosclerosis present?	☐	☐	☐	
	Have all images been obtained according to the recommended protocol for this site (transverse and longitudinal video and longitudinal still image)?	☐	☐	☐	
Anatomical site 2: Left parietal branch of superficial temporal artery		Yes	No	**?**	**Biopsied**
	Normal?	☐	☐	☐	☐
	Halo present?	☐	☐	☐	
	Compression positive (halo persists on compression)?	☐	☐	☐	
	Halo extends for the whole length of anatomical site?	☐	☐	☐	
	Is halo concentric (yes=concentric, no=eccentric) at site of measurement of maximum size (see below)?	☐	☐	☐	
	Maximum halo size (measured in mm in longitudinal view; if no halo, record as 0)				
	Significant vessel tortuosity present?	☐	☐	☐	
	Arteriosclerosis present?	☐	☐	☐	
	Have all images been obtained according to the recommended protocol for this site (transverse and longitudinal video and longitudinal still image)?	☐	☐	☐	

FINDINGS OF SONOGRAPHER		PLEASE TICK (✓)			
Anatomical site 3: Left frontal branch of superficial temporal artery		Yes	No	?	Biopsied
	Normal?	☐	☐	☐	☐
	Halo present?	☐	☐	☐	
	Compression positive (halo persists on compression)?	☐	☐	☐	
	Halo extends for the whole length of anatomical site?	☐	☐	☐	
	Is halo concentric (yes=concentric, no=eccentric) at site of measurement of maximum size (see below)?	☐	☐	☐	
	Maximum halo size (measured in mm in longitudinal view; if no halo, record as 0)			☐	
	Significant vessel tortuosity present?	☐	☐	☐	
	Arteriosclerosis present?	☐	☐	☐	
	Have all images been obtained according to the recommended protocol for this site (transverse and longitudinal video and longitudinal still image)?	☐	☐	☐	
Anatomical site 4: Right superficial temporal artery		Yes	No	?	Biopsied
	Normal?	☐	☐	☐	☐
	Halo present?	☐	☐	☐	
	Compression positive (halo persists on compression)?	☐	☐	☐	
	Halo extends for the whole length of anatomical site?	☐	☐	☐	
	Is halo concentric (yes=concentric, no=eccentric) at site of measurement of maximum size (see below)?	☐	☐	☐	
	Maximum halo size (measured in mm in longitudinal view; if no halo, record as 0)			☐	
	Significant vessel tortuosity present?	☐	☐	☐	
	Arteriosclerosis present?	☐	☐	☐	
	Have all images been obtained according to the recommended protocol for this site (transverse and longitudinal video and longitudinal still image)?	☐	☐	☐	

FINDINGS OF SONOGRAPHER		PLEASE TICK (✓)			
Anatomical site 5: Parietal branch of right superficial temporal artery		Yes	No	?	Biopsied
	Normal?	☐	☐	☐	☐
	Halo present?	☐	☐	☐	
	Compression positive (halo persists on compression)?	☐	☐	☐	
	Halo extends for the whole length of anatomical site?	☐	☐	☐	
	Is halo concentric (yes=concentric, no=eccentric) at site of measurement of maximum size (see below)?	☐	☐	☐	
	Maximum halo size (measured in mm in longitudinal view; if no halo, record as 0)			☐	
	Significant vessel tortuosity present?	☐	☐	☐	
	Arteriosclerosis present?	☐	☐	☐	
	Have all images been obtained according to the recommended protocol for this site (transverse and longitudinal video and longitudinal still image)?	☐	☐	☐	
Anatomical site 6: Frontal branch of right superficial temporal artery		Yes	No	?	Biopsied
	Normal?	☐	☐	☐	☐
	Halo present?	☐	☐	☐	
	Compression positive (halo persists on compression)?	☐	☐	☐	
	Halo extends for the whole length of anatomical site?	☐	☐	☐	
	Is halo concentric (yes=concentric, no=eccentric) at site of measurement of maximum size (see below)?	☐	☐	☐	
	Maximum halo size (measured in mm in longitudinal view; if no halo, record as 0)			☐	
	Significant vessel tortuosity present?	☐	☐	☐	
	Arteriosclerosis present?	☐	☐	☐	
	Have all images been obtained according to the recommended protocol for this site (transverse and longitudinal video and longitudinal still image)?	☐	☐	☐	

FINDINGS OF SONOGRAPHER		PLEASE TICK (✓)		
Anatomical site 7: Left axillary artery		Yes	No	Not known
	Normal?	☐	☐	☐
	Halo present?	☐	☐	☐
	Halo extends for the whole length of anatomical site?	☐	☐	☐
	Is halo concentric (yes=concentric, no=eccentric) at site of measurement of maximum size (see below)?	☐	☐	☐
	Maximum halo size (measured in mm in longitudinal view; if no halo, record as 0)			☐
	Arteriosclerosis present?	☐	☐	☐
	Have all images been obtained according to the recommended protocol for this site (transverse and longitudinal video and longitudinal still image)?	☐	☐	☐
Anatomical site 8: Right axillary artery		Yes	No	Not known
	Normal?	☐	☐	☐
	Halo present?	☐	☐	☐
	Halo extends for the whole length of anatomical site?	☐	☐	☐
	Is halo concentric (yes=concentric, no=eccentric) at site of measurement of maximum size (see below)?	☐	☐	☐
	Maximum halo size (measured in mm in longitudinal view; if no halo, record as 0)			
	Arteriosclerosis present?	☐	☐	☐
	Have all images been obtained according to the recommended protocol for this site (transverse and longitudinal video and longitudinal still image)?	☐	☐	☐

The sonographer should record images of the findings using the following labels on the images; images should be recorded (either still images or no more than 10 second video clips per site, as indicated below).

FINDINGS OF SONOGRAPHER	PLEASE USE THE LABELLING CONVENTION BELOW AND TICK (✓) THE BOX ON THE RIGHT TO INDICATE THAT ALL IMAGES WERE RECORDED AS DESCRIBED BELOW, OR TICK TO INDICATE WHICH IMAGES WERE NOT RECORDED	TICK THIS BOX IF ALL IMAGES WERE RECORDED ☐

ANATOMICAL SITE	IMAGE	RIGHT LABEL	Tick if not recorded	LEFT LABEL	Tick if not recorded
Superficial temporal artery	Transverse video	Right common temp transv	☐	Left common temp transv	☐
	Longitudinal video	Right common temp long	☐	Left common temp long	☐
	Longitudinal still image	Right common temp long still	☐	Left common temp long still	☐
Parietal branch of superficial temporal artery	Transverse video	Right par transv	☐	Left par transv	☐
	Longitudinal video	Right par long	☐	Left par long	☐
	Longitudinal still image	Right par long still	☐	Left par long still	☐
Frontal branch of superficial temporal artery	Transverse video	Right front transv	☐	Left front transv	☐
	Longitudinal video	Right front long	☐	Left front long	☐
	Longitudinal still image	Right front long still	☐	Left front long still	☐
Axillary artery	Transverse video	Right ax transv	☐	Left ax transv	☐
	Longitudinal video	Right ax long	☐	Left ax long	☐
	Longitudinal still image	Right ax long still	☐	Left ax long still	☐

COMMENTS

NAME OF SONOGRAPHER:								
SIGNATURE OF SONOGRAPHER:	DATE:	D	D	M	M	Y	Y	Y	Y

Glossary definitions

Normal?	Completely normal vessel appearance; there is no evidence of halo, arteriosclerosis or tortuosity. For temporal arteries: Pulsating, compressible artery with anechoic lumen surrounded by mid- to hyperechoic tissue. Using ultrasound equipment with high resolution, the intima-media complex is presenting as an homogenous, hypo- or anechoic structure delineated by two parallel hyperechoic margins ("double line pattern") may be visible. For axillary arteries: Pulsating, hardly compressible artery with anechoic lumen; the intima-media complex presents as a homogenous, hypo- or anechoic echostructure delineated by two parallel hyperechoic margins ("double line pattern"), which is surrounded by mid- to hyperechoic tissue.
Halo present?	A halo appears to be present. This observation should be made before applying the compression test (for the temporal artery and its branches). The halo is defined as homogeneous, hypoechoic wall swelling, well delineated towards the luminal side, visible both in longitudinal and transverse planes; it is most commonly concentric in transverse scans.
Compression positive (halo persists on compression)?	This applies to the temporal artery and its branches. Any apparent halo seen should be confirmed using this technique. The thickened arterial wall remains visible upon compression. The hypoechogenic vasculitic vessel wall thickening contrasts with the mid- to hyperechogenic surrounding tissue.
Halo extends for the whole length of anatomical site?	The halo is visible along the entire length of the segment of artery being scanned
Is halo concentric (yes=concentric, no=eccentric) at site of measurement of maximum size (see below)?	The halo (viewed in transverse plane) is present uniformly surrounding the vessel (or if eccentric, the halo is predominantly present over one area of the artery in the transverse plane). Define this for the site of measurement of the halo size (see below).
Maximum halo size (measured in mm in longitudinal view; if no halo, record as 0)	Record the maximum size of halo measured in mm; use the longitudinal plane of view to document the size of the halo (halo size is most commonly between 0.4 mm and 1.0 mm)
Significant vessel tortuosity present?	This applies to the temporal artery and its branches. Is the artery difficult to visualise in one plane along its course, potentially making it difficult to interpret the presence or absence of halo or arteriosclerosis. Most temporal arteries and their branches are a little tortuous- you do not need to record this. Only record this item if the tortuosity makes it difficult to interpret the other scan findings.
Arteriosclerosis present?	Arteriosclerosis is defined as heterogeneous and in part hyperechoic, irregularly delineated, eccentric vessel wall alteration. This may be present in arteries, independently of the presence or absence of halo.