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# Three dimensional vascular ultrasound imaging in medium and large vessel vasculitis: our experience

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| **Authors:** | M. G. De Gregorio[1], D. Cammelli[1], G. Vitiello[1], B. Brkljacic[2], M. Matucci Cerinic[1], S. Castellani[1]; [1]Florence/IT, [2]Zagreb/HR |
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## Aims and objectives

Giant cell arteritis (GCA) is the most frequent systemic vasculitis in middle-age and elderly caucasian populations. Besides temporal arteries, the disease can mainly involve the subclavian and axillary arteries and the aortic arch. The diagnosis of GCA may be difficult due to clinical heterogeneity. The diagnostic hallmark of GCA is the presence of inflammation in the vessel wall that can be effectively and reliably detected nowadays by the noninvasive technique of Color Doppler ultrasonography (CDUS), as proved by many clinical studies (1) . To the best of our knowledge no data exist about three dimensional (3D) vascular ultrasound imaging in patients affected by GCA. We sought to assess the extension of inflammatory involvement of temporal, subclavian and axillary arteries by 3D vascular ultrasound imaging in patients with confirmed or suspected GCA and to evaluate the relations between inflammation markers abnormalities, clinical symptoms and 3D findings.

## Methods and materials

Since January 2018 patients with confirmed or suspected GCA diagnosis were studied with Siemens Paragon Sequoia, 9L4 4-9 MHz and Logiq9 4.5-16 MHz probes. GCA diagnosis was made by rheumatologists according to clinical and laboratory parameters (2-3) after instrumental confirmation by CDUS and/or PET examination (4). We set a # 1mm diagnostic cut-off value for circumferential, hypoechogenic perivascular halo of the temporal arteries and a # 1.5 mm hypoechogenic wall thickening for the axillary and subclavian arteries (5-6). Clinical and laboratory data were collected. Discrete data are summarized as frequencies while continuous as mean ± SD. #2 test or Fisher exact test when appropriate were used for comparison of categorical variables. Analyses were performed using the software package SPSS 19.

# Results

Twenty two patients were studied. Mean age was 70.4±12 years, 68% were women (Figure 1). Among patients with confirmed GCA diagnosis, 54% had temporal arteritis, while 27% had only subclavian and axillary involvement; among the remaining patients (19%), referred to our centre for high clinical suspicion of GCA, one was affected by systemic lupus erythematosus (SLE), two had polymyalgia rheumatica and one rheumatoid arthritis. Most patients (94%) were on steroid treatment: 12% were on steroids and tocilizumab and 18% on steroids plus methotrexate. At the time of 3D vascular examination, 90% of patients complained at least one symptom: 60% headache, 17% fatigue, 20% fever, 42% polymyalgia, 5% visual loss, 45% jaw claudication (Figure 3). In most patients the inflammation markers were abnormal: erythrocyte sedimentation rate (ESR) was increased in 64%, C reactive protein (CRP) in 66% and fibrinogen in 72%. The halo sign was found in 62% of temporal arteries while a hypoechogenic arterial wall thickening was demonstrated in 54% of axillary arteries and in 78% of subclavian arteries. In only 6% of patients the halo sign involved only the main temporal arteries. A multiple vessel inflammatory involvement was found in 36% of patients. In all cases the 3D US examination confirmed the presence of inflammatory signs in both cranial (temporal arteries) and extracranial (subclavian and axillary) vessels and it clearly defined its inhomogenous and often spotty appearance (Figures 4-6), thus allowing, in each arterial segment, a direct overall quantification of the inflammatory process. Jaw claudication was the only symptom significantly associated with the detection of temporal arteries halo sign ($p=0.043$). At the time of vascular examination the presence of at least one symptom was significantly related with halo sign of temporal arteries ($p=0.042$). Among the inflammatory markers only ESR and fibrinogen elevations were significantly associated with the finding of halo sign of temporal arteries ($p=0.015$ and $p=0.038$, respectively) but not with the detection of hypoechogenic wall thickening of subclavian or axillary arteries (Figure 2).

**Images for this section:**

| All population | |
|---|---|
| Mean age, years | 70.4 ± 12 |
| Female gender | 68 % |
| Smoke | 22 % |
| Hypertension | 55 % |
| Diabetes | 22 % |
| Dyslipidemia | 11 % |
| History of familiar CV disease | 36 % |
| Cranial GCA | 54 % |
| Extracranial GCA | 27 % |
| Rheumatoid arthritis | 4,5 % |
| SLE | 4,5 % |
| Polymyalgia Rheumatica | 9,0 % |

**Fig. 1:** Table 1 describes the general patients characteristics.

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| Variables | p value |
|---|---|
| Increased ESR | p= 0.015 |
| Abnormal fibrinogen | p= 0.038 |
| Presence of at least one symptom | p= 0.042 |
| Jaw claudication | p= 0.043 |

**Fig. 2:** Table 2. Clinical and laboratory findings associated with temporal arteries halo sign.

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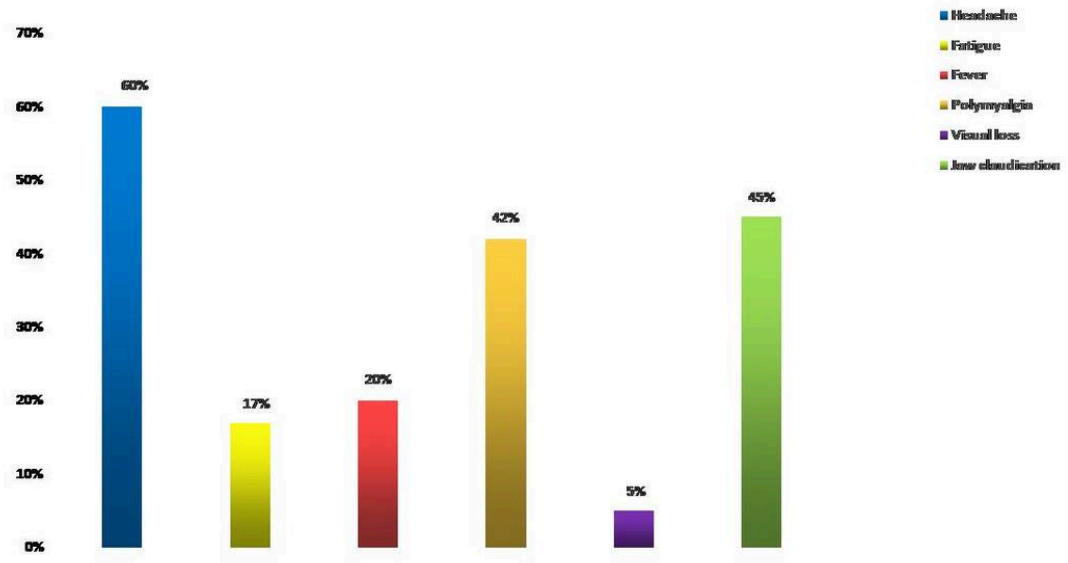


**Fig. 3:** Figure 3 describes the clinical symptoms of the study population

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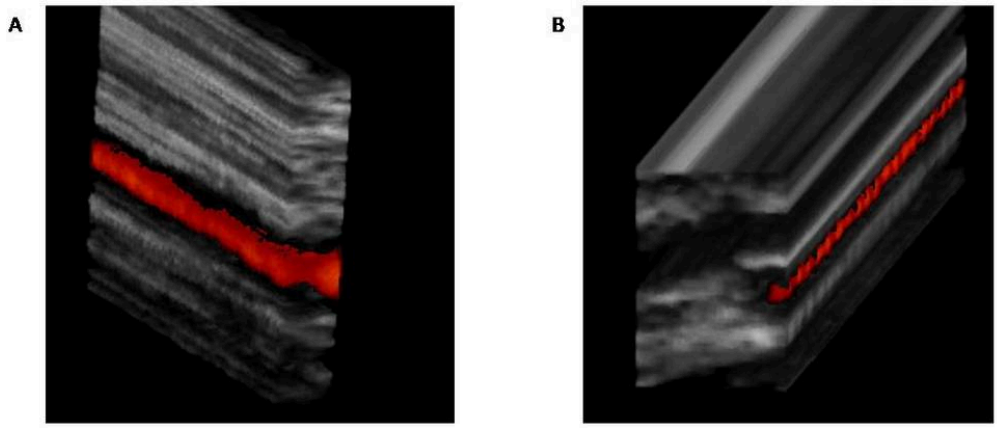


**Fig. 4:** Figure 4 - 3D extended view of the hypoechogenic halo surrounding the main temporal artery (A) and its parietal branch (B).

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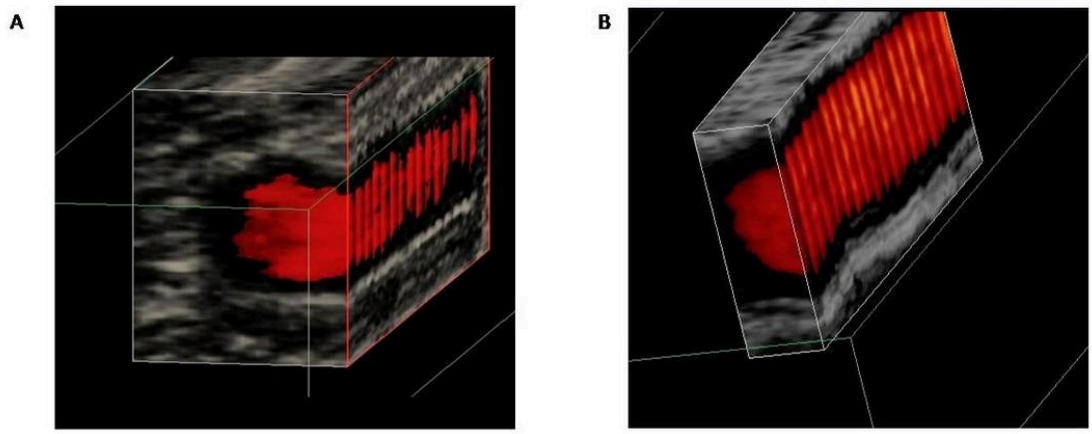


**Fig. 5:** Figure 5 - Extended hypoechogenic inflammatory wall thickening of the left (A) and right (B) subclavian arteries at 3D ultrasound examination.

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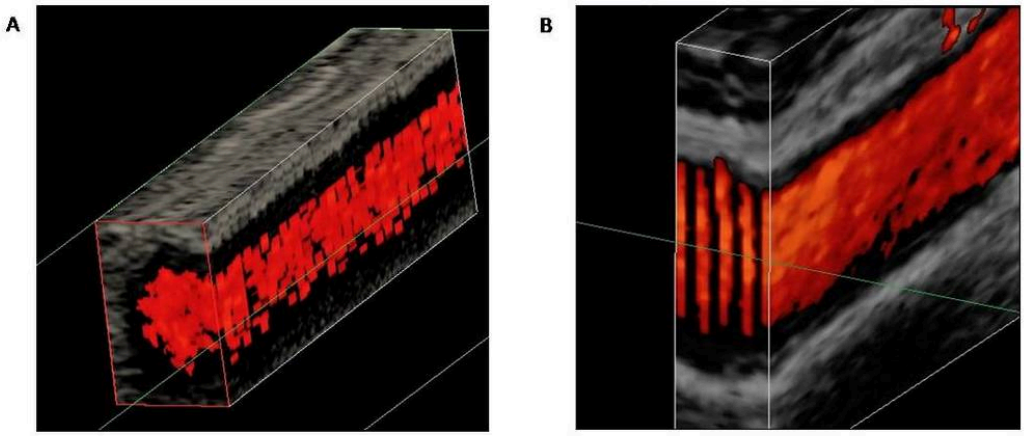

**Fig. 6:** Figure 6 - Extended hypoechogenic inflammatory wall thickening of the left (A) and right (B) axillary arteries at 3D ultrasound examination.

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## Conclusion

Three dimensional vascular ultrasound imaging can demonstrate even spotty abnormalities along the entire vessel thus allowing a full extent detection and precise estimate of the inflammatory process; these findings are especially useful for follow-up purposes. Further studies will be nedeed to test reproducibility and interobserver variability.

## Personal information

Sergio Castellani - Department of Medical and Surgical Critical Care , Florence University of Medicine

scaste.sergio@gmail.com

## References


1. Chrysidis S, Duftner C, Dejaco C et al. Definitions and reliability assessment of elementary ultrasound lesions in giant cell arteritis: a study from the OMERACT Large Vessel Vasculitis Ultrasound Working Group. RMD Open. 2018;4(1):e000598.
2. Fries JF, Hunder GG, Bloch DA. et al. The American College of Rheumatology 1990 criteria for the classification of vasculitis. Summary. Arthritis Rheum 1990;33:1135-6.
3. Jennette JC, Falk RJ, Bacon PA et al. 2012 revised International Chapel Hill Consensus Conference Nomenclature of Vasculitides. Arthritis Rheum 2013 ;65(1):1-11.
4. Dejaco C, Ramiro S, Duftner C et al. EULAR recommendations for the use of imaging in large vessel vasculitis in clinical practice. Ann Rheum Dis. 2018;77(5):636-643.
5. Salvarani C, Silingardi M, Ghirarduzzi A et al. Is duplex ultrasonography useful for the diagnosis of giant-cell arteritis? Ann Intern Med. 2002;137(4):232-8.
6. Schmidt WA, Seifert A, Gromnica-Ihle E, Krause A, Natusch A. Ultrasound of proximal upper extremity arteries to increase the diagnostic yield in large-vessel giant cell arteritis. Rheumatology (Oxford). 2008 ;47(1):96-101.