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Large-vessel vasculitis diagnosed between 50 and 60 years: case-control study based on 183 cases and 183 controls aged over 60 years.

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Key messages:

- LVV between 50 and 60 years have more frequent aorta and peripheral limb vascular involvement
- They also have more refractory disease requiring more frequent use of methotrexate and/or biologics
- LVV between 50 and 60 years should probably be treated more aggressively than LVV over 60 years, and monitored more closely for aortic complications

Abstract

Background. Age at onset of large-vessel vasculitis (LVV) is commonly used to distinguish giant cell arteritis (GCA) and Takayasu arteritis (TA). However, LVV between age 50 and 60 years may be difficult to classify.

Methods. We conducted a retrospective study including LVV aged between 50 and 60 years at onset (LVV₅₀₋₆₀, cases) and compared them to LVV aged over 60 years (LVV_{>60}, controls). LVV was defined histologically and/or morphologically. Controls fulfilled ACR 1990 criteria for GCA or presented isolated aortitis.

Results. We included 183 LVV₅₀₋₆₀ and 183 gender-matched LVV_{>60}. LVV₅₀₋₆₀ had more frequent peripheral limb manifestations (23 vs. 5%), and less frequent cephalic (73 vs. 90%) and ocular signs (17 vs. 27%) than LVV_{>60}. Compared to LVV_{>60}, CT angiography and PET/CT scan were more frequently abnormal in LVV₅₀₋₆₀ (74 vs. 38%, and 90 vs. 72%, respectively), with aorta being more frequently involved (78 vs. 47%). By multivariate analysis, absence of cephalic symptoms, presence of peripheral limb ischemia and aorta involvement, and increased CRP level were significantly associated with LVV₅₀₋₆₀ presentation compared to LVV_{>60}. At last follow-up, compared to LVV_{>60}, LVV₅₀₋₆₀ received significantly more lines of treatment (2 vs. 1), more frequent biologics (12 vs. 3%), had more surgery (10 vs. 0%), and had higher prednisone dose (8.8 vs. 6.5 mg/d) at last follow-up,

Conclusion. LVV onset between 50 and 60 years identifies a subset of patients with more frequent aorta and peripheral vascular involvement and more refractory disease compared to patients with LVV onset after 60.

Introduction

The 2012 International Chapel Hill Consensus Conference (CHCC2012) subdivides vasculitides based on a combination of features, including the type of vessel affected (1). Thereby, primary vasculitides may be distinguished into large vessel vasculitis (LVV), medium vessel vasculitis and small vessel vasculitis (1). Primary LVV, involving the aorta and its major branches, are represented by two major variants, i.e. Takayasu arteritis (TA) and giant cell arteritis (GCA). According to the CHCC2012, histopathologic features of TA and GCA are indistinguishable, and TA is usually considered to predominantly involve young individuals whereas GCA predominantly involve older individuals (2–6). Thus, the age at onset of LVV is commonly used to distinguish both diseases, TA occurring before 50 years and GCA after 50 years (7–9). However, GCA incidence peaks at 70-79 years (2,10,11), and only very few GCA appear before 60 years. In contrast, peak age for TA onset is usually between 20 and 30 years and the disease less commonly occurs after 50 years (6,12). Therefore, patients diagnosed with LVV between 50 and 60 years of age can be difficult to classify.

Treatment of active forms of LVV is based on glucocorticoids, but therapeutic regimens that could be used in case of relapsing or refractory disease may differ between TA and GCA. Tumor necrosis factor (TNF)- α blockers were constantly found to be ineffective in prospective trials in GCA (13–15), whereas they showed some efficacy in retrospective studies in TA (16–19). In contrast, tocilizumab, an anti-interleukin (IL)-6 receptor monoclonal antibody, was shown to be effective in GCA in a large prospective randomized trial (20), whereas data from a small prospective trial failed to achieve the primary endpoint in TA but tended to favour tocilizumab (21,22).

In the present study, we describe the clinical pictures and outcomes of LVV occurring between the ages 50 and 60 (LVV₅₀₋₆₀) years, and compares them to LVV diagnosed after 60 years (LVV_{>60}).

Patients and methods

Patients

We conducted a nationwide retrospective multicenter study from January 2000 to February 2017, supported by the French Vasculitis Study Group (FVSG) and French Giant Cell Arteritis Study Group (GEFA), in 24 French and one Belgian departments of Internal Medicine and Rheumatology. Inclusion criteria for cases were: 1) patients with LVV as defined below, and 2) patients aged between 50 and 60 years (LVV₅₀₋₆₀). This study was conducted in compliance with the Good Clinical Practice protocol and the Declaration of Helsinki principles. The study was approved by local ethics committee, who waived the requirement for informed consent.

LVV definition

LVV was defined histologically (positive temporal artery biopsy, TAB) and/or morphologically (circumferential thickening of large vessels on computed tomography angiography and/or magnetic resonance angiography, or large vessel hypermetabolism on 18F-fluorodeoxyglucose (18F-FDG) positron emission tomography/computed tomography).

Control group

Cases (LVV₅₀₋₆₀) were compared to controls, i.e. patients with LVV as defined above but aged over 60 years (LVV_{>60}). Controls fulfilled the American College of Rheumatology (ACR) 1990 criteria for GCA (8) or presented an isolated aortitis without argument for a secondary aortitis. In case of missing erythrocyte sedimentation rate (ESR), serum C-reactive protein (CRP) levels (> 10 mg/L) was used as a criterion. Controls were taken from databases

of three French Internal Medicine departments (Cochin Hospital in Paris, Dijon Hospital, La Timone Hospital in Marseille) and were randomly matched on gender with a 1:1 ratio.

Clinical, laboratory, radiological and pathological assessment

For each patient, cases and controls, clinical, biological, radiological and pathological data were retrospectively collected from the initial diagnosis of LVV throughout follow-up by physicians in charge of the patients. Clinical and biologic assessments included clinical manifestations, serum CRP levels, blood count, TAB, computed tomography angiography (CTA), magnetic resonance angiography (MRA) and 18F-FDG-PET/CT at time of diagnosis. Diagnosis of LVV variant by physicians in charge (TA or GCA), based on the clinical and morphological presentation, was recorded. Aortitis was defined as thickening greater than 2 mm, parietal contrast enhancement, or large vessel hypermetabolism on 18F-FDG-PET/CT. For patients with TA presentation, extension of the disease was specified as previously described (23). Treatments were also recorded.

Response to therapy and outcome

Response to therapy was evaluated by physicians in charge of the patients during the routine follow-up of these patients and retrospectively reviewed. Remission was defined as the absence of clinical manifestations consistent with active disease, normalization of inflammatory parameters, absence of morphological progression or appearance of new lesions, and a prednisone dose ≤ 0.1 mg/kg/day. Glucocorticoids (GCs) dependency was defined as the need to maintain a prednisone dose > 0.1 mg/kg/day and ≤ 0.5 mg/kg/day to control the disease (absence of clinical manifestations, normalization of inflammatory parameters, absence of morphological progression or appearance of new lesions). GCs resistance was defined as the lack of response with a prednisone dose > 0.5 mg/kg/day. Only patients with a follow-up greater than twelve months were retained for follow-up analysis.

Statistical analysis

Data are presented as the mean \pm standard deviation (SD) or as the median and interquartile range, as appropriate, for continuous variables and frequency (percentage) for qualitative variables. Quantitative variables were compared using Student's *t*-test or the nonparametric Mann-Whitney test, and categorical variables were compared using the chi-square test. Multivariable analysis was performed using a logistic regression. Clinical manifestations with $P \leq 0.20$ in the univariable analysis, CRP level, TAB and the presence of an aortitis on CT scan and/or FDG PET-CT were included in the multivariable logistic regression model to identify independent factors associated with LVV between 50 and 60 years and LVV aged over 60 years. All analyses were performed using the SAS software, version 9.4 and GraphPad Prism version 5.0. All statistical tests were two-sided, and significance was set at the 0.05 level.

Results

We included 183 cases (LVV₅₀₋₆₀) and 183 controls (LVV_{>60}) in this case-control study.

Clinical, biological and morphological characteristics of cases (LVV₅₀₋₆₀)

Clinical, biological and radiological characteristics of the 183 LVV₅₀₋₆₀ patients are indicated in **Table 1**. Median age at LVV diagnosis was 57 (54-58) years and 136 (74%) were female.

Initial vasculitis manifestations were constitutional symptoms in 144 (79%) cases (i.e. asthenia in 65%, weight loss in 45%, fever in 44%, night sweats in 18%), cephalic symptoms in 133 (73%) (i.e., headache in 68%, scalp tenderness in 27%, jaw claudication in 23% and decrease pulse in the temporal artery in 10%), polymyalgia rheumatica in 55 (30%), peripheral limb ischemic manifestations in 42 (23%), ocular manifestations in 32 (17%), stroke in 3 cases (2%) and mesenteric ischemia in 2 cases (1%). Peripheral limb ischemic manifestation consisted in a lack of pulse and/or asymmetric blood pressure in 11% each, upper limb claudication in 6% and lower limb claudication in 5%. Median CRP level was 9.5

mg/dL (0.2-42), including 10 (5%) patients without any biological inflammatory syndrome. Temporal artery biopsy was performed in 132 (72%) and showed evidence of LVV in 78 (59%) cases.

Computed tomography angiography was performed in 102 (56%) cases and was abnormal in 75 (74%) cases. Abnormalities on CTA involved aorta in 62 cases (61%, with thoracic involvement in 29%, abdominal involvement in 8%, and both in 63%), subclavian artery in 26 (25%), iliofemoral artery in 18 (18%) and carotid artery in 14 (14%). Isolated aortitis was noted in 29 (28%) patients. 18F-FDG-PET/CT was performed in 105 (57%) cases, showing evidence of large vessel hypermetabolism in 94 (90%) cases. Abnormalities on 18F-FDG-PET/CT involved aorta in 89 cases (95% of abnormal 18F-FDG-PET/CT and 85% of all 18F-FDG-PET/CT performed, including isolated thoracic involvement in 31 cases, isolated abdominal involvement in 1 case, and both in 57 cases), subclavian artery in 61 cases (58%), carotid artery in 48 (46%) and iliofemoral artery in 32 (30%). Isolated aortitis was noted in 21 (20%) cases. MRA was performed in 15 (8%) cases and was abnormal in all cases. Abnormalities on MRA involved aorta in 9 cases (60%) and its major branches in 11 (73%) cases including carotid artery in 9 (60%), subclavian artery in 7 (47%) and iliofemoral artery in 2 (13%). In 13 cases, CTA and 18F-FDG-PET/CT were also performed and were abnormal. In the 2 remaining cases, MRA was the only imaging performed.

Overall, aortitis was noted on CTA and/or 18F-FDG-PET/CT in 113/145 (78%) cases, without any cephalic symptoms in 41 (28%) patients. Finally, 15 patients had evidence for aortitis on 18F-FDG-PET/CT with no abnormalities on CTA.

Some patients underwent concomitant diagnostic investigations: 101 patients had concomitant TAB and an imaging test, including TAB and CTA in 70, TAB and 18F-FDG-PET/CT in 70, and TAB and MRA in 9. Positive diagnostic contribution in both investigations (TAB and imaging tests) was noted in 25 (36%) with CTA, 35 (50%) 18F-FDG-PET/CT and 3 (33%)

with MRA. Fifty-six patients had both CTA and 18F-FDG-PET/CT, and investigations were concordant in 45 patients (80%), suggesting that TAB could underestimate LVV in patients between 50 and 60 years.

Treatments, response to therapy and outcome of the cases (LVV₅₀₋₆₀)

Among the 183 cases, 179 had at least one follow-up visit and 150 LVV₅₀₋₆₀ patients were followed-up for more than 12 months and were included in the follow-up analysis. All cases received GCs at a dose between 0.5 to 1 mg/kg/day of prednisone, alone in most cases and in combination with immunosuppressive agents in 11 (6%) patients, i.e. methotrexate (n=9), cyclophosphamide (n=1) and mycophenolate mofetil (n=1) as first-line therapy (**Table 2**). Nine patients received methylprednisolone intravenously. After a median follow-up of 43.8 months (range 12-187), 78/150 (52%) patients required at least a 2nd-line therapy. Overall, 52 (35%) patients received methotrexate and 18 (12%) patients received a biological agent (including tocilizumab in 15 patients and TNF-alpha blockers in 6) (**Table 2**). Fifteen (10%) patients required surgery (bypass surgery in 11 cases or angioplasty in 2 cases, and both in 2 cases). At the end of follow-up, only 68 patients (45%) had discontinued GCs and 63 (42%) all LVV-specific treatment.

Case-controls comparisons (LVV₅₀₋₆₀ versus LVV_{>60})

Compared to LVV_{>60} controls, LVV₅₀₋₆₀ cases had significantly more frequent peripheral limb ischemia (23 vs 5%, P<0.0001) and less frequent cephalic symptoms (73 vs 90%, P<0.0001) (including scalp tenderness, jaw claudication and decreased pulse of temporal artery in respectively 27%, 23%, 10% versus 50%, 43% and 18%) and ocular signs (17 vs 27%, P=0.03) (**Table 1**).

Number of imaging tests (i.e. CTA and 18F-FDG-PET/CT) was similar between cases and controls (145 versus 139, respectively; P=0.53). In LVV₅₀₋₆₀ cases, CTA and 18F-FDG PET/CT were more frequently abnormal (74 vs 38%, P<0.0001; and 90 vs 72%, P=0.01,

respectively), and the aorta was more frequently involved (78 vs 47%, $P < 0.0001$). There was also significantly more frequent aortitis without any cephalic symptoms (28% vs 8%, $P < 0.0001$). By multivariate analysis, absence of cephalic symptoms, presence of peripheral limb ischemia and aorta involvement, and increased CRP level were significantly associated with LVV_{50-60} presentation compared to $LVV_{>60}$ (**Table 3**).

Regarding therapeutic management and outcome (**Tables 2 and 4**), LVV_{50-60} , compared to $LVV_{>60}$, received a median number of two lines (range 1-5) of treatment compared to one (range 1-4) ($P = 0.006$). Indication to second line of treatment was relapse, GCs dependency and GCs resistance in 26%, 21% and 4% of LVV_{50-60} , respectively, and 17%, 21% and 2% of $LVV_{>60}$, respectively. Compared to $LVV_{>60}$, LVV_{50-60} required more frequently surgery (10 vs 0%, $P < 0.0001$) and biological agents (12 vs 3%, $P = 0.003$). At last follow-up, LVV_{50-60} had a significantly higher median prednisone dose (8.8 vs 6.5 mg/d, $P = 0.048$) and lower percentage of patients on prednisone < 7.5 mg/d (71 vs 83%, $P = 0.01$) compared to $LVV_{>60}$.

Discussion

To better characterize the spectrum of LVV, especially after 50 years, we analyzed the presentation and outcome of LVV occurring between the ages 50 and 60 years (LVV_{50-60}) compared to those occurring after 60 years ($LVV_{>60}$). Using current classification criteria, LVV_{50-60} may be defined as GCA but lying at the interface with TA, while $LVV_{>60}$ characterize the "classic" form of GCA. In the present study, we identified LVV_{50-60} as a subset of patients with more frequent peripheral limb ischemia and aorta involvement, and less frequent cephalic symptoms, than patients with $LVV_{>60}$, i.e. presenting more like TA than classical GCA. Mainly defined on their age at disease onset, as suggested by ACR classification criteria with an age ≤ 40 years for TA and ≥ 50 years for GCA (9,24), distinction between TA and GCA seems however more complicated in daily practice. To illustrate this

complexity, TA and GCA may share some clinical, histopathologic and radiographic features, and some authors suggested that TA and GCA could be considered as a continuum into the spectrum of the same disease. Also, classification criteria for TA or GCA may be difficult to apply in many patients diagnosed between 40 and 60 years. In classification criteria for TA proposed by Ishikawa (25), 6% of patients were over 40 years, and in another series of LVV (26), among 28 patients aged between 40 and 55 years at disease onset, patients were classified as having TA in 21 and GCA in 7. Similarly, Polachek (27) reported 18 patients with LVV diagnosed after 50 years presenting with vascular involvement typical of TA, and showed that five of these patients fulfilled ACR criteria for GCA, five fulfilled criteria for TA, three fulfilled criteria for both disease, while five patients did not fulfill criteria for either disease. Thereby, distinguishing TA and GCA based on age distribution may be difficult because of the absence of substantial differences in their distribution of vascular involvement (26–28).

Furthermore, studies showed that patients with large vessels presentation of GCA (LV-GCA), compared to those without, were younger while remaining over 60 years old (median age of 66-68 years compared to 72-75 years) (29–31) and more likely affecting women (29), whereas others did not show any difference in age or gender (32). De Boysson (29), Muratore (33) and Assie (34) also showed that LV-GCA patients had less frequent cranial and ophthalmologic symptoms but more frequent extra-cephalic vascular signs than patient with cranial GCA. Also, age at diagnosis may be different from age at onset, and some patients may have an age at onset of symptoms less than 50 years old and, thus, not be classified as GCA. This shows how misleading an age-based classification is. However, in our study, the time between onset of symptoms and diagnosis was systematically less than 1 year. Overall, these conflicting studies suggest that, even if TA and GCA could represent two distinct diseases, cut-offs at age of onset currently used to define the diseases are probably not

totally appropriate in all cases, especially between the age of 50 and 60 years where the two diseases could overlap, as illustrated in **Figure 1** (5).

Identifying LVV_{50-60} patients as a peculiar subset of patients raises the question of its relevance in terms of outcome and therapeutic management. In our study, LVV_{50-60} patients exhibited more frequent aorta involvement, reported in 78% of LVV_{50-60} patients compared to 47% of $LVV_{>60}$. Aorta involvement at diagnosis was shown to be a predictive factor of aortic dilatation (29,33), with a risk ranging from 6% to 47% to develop an aortic complication during follow-up ranging from 6% to 47% (29,35–38). Aortic dilation or aneurysm occurred habitually on an aorta segment shown to be inflammatory on previous imaging in 94% of patients (29). Also, aortic dissection, which is the most severe clinical condition that involves the aorta, occur in 6 to 24% of patients having an aneurysm (33,39–42). Finally, even if aortic complications were shown to be maximal within the first 5 years after diagnosis, it continues to occur over time (35,41,43,44). These findings suggest that LVV_{50-60} , exhibiting more frequent aorta involvement, are at higher risk of aortic complications than $LVV_{>60}$, and should particularly require a periodic evaluation to detect such complications. In our study, no patient presented with aortic dissection or rupture, but younger patients required more surgical procedures for the management of stenosis or vascular aneurysms. Unfortunately, we did not have follow-up CTA allowing us to analyze the frequency of occurrence of aneurysms.

Some patients also underwent various concomitant diagnostic investigations, including TAB, CTA, 18F-FDG-PET/CT and/or MRA. Based on the data from our study, in LVV_{50-60} , vascular imaging was found to be abnormal in majority of cases whereas diagnostic value of TAB was poor, suggesting that TAB could underestimate LVV in patients between 50 and 60 years. CTA and 18F-FDG PET/CT were concordant in 80% of cases, strengthening the performance of these examinations in this age group. The choice between CTA and 18F-FDG-PET/CT was left to the discretion of the clinician (45,46).

Besides this increased risk of aortic complications, LVV₅₀₋₆₀ patients were characterized by more frequent refractory disease (i.e more lines of treatment and more GCs at the last follow-up), requiring more immunosuppressive agents, especially methotrexate and/or biological agents. Given the retrospective nature of our study, it remains unclear if the use of immunosuppressive or biological agents was more related to the refractoriness or to the peculiar presentation of these patients at the time of diagnosis. However, refractoriness could itself be related to the younger age of patients or to their peculiar presentation, especially the higher frequency of extra-cranial manifestations. However, only 6% of LVV₅₀₋₆₀ patients received a combination of GCs and immunosuppressants as first-line, supporting the refractoriness of LVV₅₀₋₆₀. Muratore et al. have shown that LV-GCA experienced more relapses (33), whereas de Boysson and al. (29,47) did not show any difference in relapse rate but the patients were receiving more GCs-sparing agents. Otherwise, as in our study, more patients without aortitis had discontinued GCs, and median GCs duration of these patients was lower (29) or similar (47) than that of those with aortitis. Overall, our study raises the question of treating more aggressively patients aged between 50 and 60 years of age, using combination of GCs and immunosuppressive agents and/or biological agents, to decrease GCs exposure and possibly the incidence of long-term aortic complications. So far, there is no recommendation supporting the use of TNF- α blockers in GCA (13,48), whereas they showed some efficacy in TA (49). Considering patients between 50 and 60 years as an overlapping form between TA and GCA, TNF- α blockers could however be discussed in some situations of refractory disease. Nevertheless, tocilizumab, which demonstrated more evidence of its efficacy in both LVV variants (20,21,50), could be preferentially used in these LVV₅₀₋₆₀ forms, and TNF- α blockers only in case of failure or intolerance of tocilizumab.

Naturally, our study has some limitations, related to its retrospective design that may limit completeness of data, especially during follow-up, the lack of comparable imaging

available for all patients at diagnosis, and the absence of centralized reviewing of imaging tests to look for aortitis. Furthermore, $LVV_{>60}$ patients were followed-up 8 months less than LVV_{50-60} , but this difference was not significant and could not explain, on its own, the difference between the two groups. A recent French study had shown that patients with large vessel involvement were not treated differently than those with cephalic involvement (47). In contrast, we describe here a very large population of LVV diagnosed between 50 and 60 years, and the multicenter study design reflects the wide spectrum of therapeutic management commonly used in France.

In conclusion, primary LVV diagnosed between 50 and 60 years identifies a subset of patients with more frequent aorta and peripheral limb vascular involvement than patients diagnosed after 60 years, and with more refractory disease requiring more frequent use of methotrexate and/or biological agents. Patients with LVV_{50-60} should be probably treated more aggressively in first-line, especially those with large vessels involvements, and be monitored more closely, especially for aortic complications.

Authors contribution

Study conception and design: Delaval, Terrier.

Acquisition of data: Laure Delaval, Aurélie Daumas, Maxime Samson, Mikael Ebbo, Hubert De Boysson, Eric Liozon, Henry Dupuy, Mathieu Puyade, Daniel Blockmans, Ygal Benhamou, Karim Sacré, Alice Berezne, Hervé Devilliers, Grégory Pugnet, François Maurier, Thierry Zénone, Claire de Moreuil, François Lifermann, Laurent Arnaud, Olivier Espitia, Alban Deroux, Vincent Grobost, Estibaliz Lazaro, Christian Agard, Alexandre Balageas, Kevin Bouiller, Cécile-Audrey Durel, Sébastien Humbert, Virginie Rieu, Mélanie Roriz, Odile Souchaud-Debouverie, Stéphane Vinzio, Yann Nguyen, Alexis Régent, Loïc Guillevin, Benjamin Terrier. Analysis and interpretation of data: Delaval, Terrier.

Drafting and writing of the manuscript: Delaval, Terrier

All authors were involved in revising the manuscript, and all authors approved the final version to be published. Dr Terrier has full access to all the data and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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Tables

Table 1. Characteristics of the 183 patients with LVV diagnosed between 50 and 60 years and the 183 controls with LVV aged over 60 years.

| Characteristics | LVV₅₀₋₆₀ (n=183) | LVV_{>60} (n=183) | P value |
|--|--|---|-------------------|
| Demography | | | |
| Female | 136 (74) | 136 (74) | - |
| Age at diagnosis, median(IQR), years | 57 (54–58) | 75 (68–82) | - |
| Clinical manifestations | | | |
| Constitutional symptoms | 144 (79) | 146 (80) | 0.80 |
| Cephalic symptoms | 133 (73) | 164 (90) | <0.0001 |
| Polymyalgia rheumatica | 55 (30) | 71 (39) | 0.08 |
| Peripheral limb ischemia | 42 (23) | 10 (5) | <0.0001 |
| Ocular signs | 32 (17) | 49 (27) | 0.03 |
| Cough | 22 (12) | 22 (12) | 1 |
| Stroke | 3 (2) | 5 (3) | 0.50 |
| Mesenteric ischemia | 2 (1) | 2 (1) | 1 |
| C-reactive protein, median, mg/dL | 9.5 (5.4–14.7) | 7.1 (4.4–135) | 0.09 |
| TAB | | | |
| Positive TAB | 132 (72) | 152 (83) | - |
| | 78 (59) | 109 (72) | 0.03 |
| Imaging tests | | | |
| Abnormal CT-angiography | 75/102 (74) | 44/117 (38) | <0.0001 |
| <i>Aorta involvement</i> | 62 (61) | 42 (36) | 0.0002 |
| <i>Thoracic</i> | 18 | 5 | |
| <i>Abdominal</i> | 5 | 2 | |
| <i>Both</i> | 39 | 35 | |
| <i>Subclavian artery involvement</i> | 26 (25) | 7 (6) | <0.0001 |
| <i>Iliofemoral artery involvement</i> | 18 (18) | 4 (3) | 0.0005 |
| <i>Carotid artery involvement</i> | 14 (14) | 5 (4) | 0.01 |
| <i>Isolated aortitis</i> | 29 (28) | 31 (26) | 0.70 |
| Abnormal 18F FDG PET-CT | 94/105 (90) | 50/69 (72) | 0.01 |
| Aortitis (CT scan and/or FDG PET–CT) | 113/145 (78) | 65/139 (47) | <0.0001 |
| Aortitis without cephalic signs | 41/145 (28) | 11/139 (8) | <0.0001 |

Values are expressed as n (%) of patients or median (interquartile range).
IQR, interquartile range; CT, computed tomography;
PET, positron-emission tomography; TAB: temporal artery biopsy.

Table 2. LVV medical therapeutic management of the 150 patients with LVV diagnosed between 50 and 60 years and the 150 controls with LVV aged over 60 years.

| Characteristics | LVV₅₀₋₆₀ (n=150) | LVV_{>60} (n=150) | P value |
|------------------------------|--|---|----------------|
| 1st-line | | | |
| GCs | 150 (100) | 150 (100) | 1 |
| Methotrexate | 9 | 1 | |
| Cyclophosphamide | 1 | 0 | |
| Mycophenolate mofetil | 1 | 0 | |
| 2nd-line | 78 (52) | 60 (40) | 0.049 |
| Methotrexate | 38 | 37 | |
| Cyclophosphamide | 8 | 0 | |
| Azathioprine | 6 | 0 | |
| Mycophenolate mofetil | 1 | 0 | |
| TNF-alfa blockers | 3 | 0 | |
| Tocilizumab | 3 | 0 | |
| ≥ 3rd-line | 27 (18) | 9 (6) | 0.002 |
| Methotrexate | 13 | 6 | |
| Cyclophosphamide | 2 | 0 | |
| Azathioprine | 2 | 0 | |
| TNF-alfa blockers | 1 | 0 | |
| Tocilizumab | 5 | 1 | |
| Anakinra | 3 | 0 | |
| Leflunomide | 0 | 1 | |
| ≥ 4th-line | 10 (7) | 1 (1) | 0.01 |
| Methotrexate | 6 | 0 | |
| TNF-alfa blockers | 2 | 0 | |
| Tocilizumab | 2 | 1 | |

Values are expressed as n (%) of patients.
GCs, glucocorticoids; IVIg, intravenous immunoglobulin.

Table 3. Factors associated with LVV_{>60} in multivariate analysis

| | OR | CI 95% | P value |
|---------------------------------|--------------|------------------|----------------|
| Cephalic symptoms | 2.28 | 1.14-4.59 | 0.02 |
| Polymyalgia rheumatica | 1.15 | 0.66-2 | 0.6 |
| Peripheral limb ischemia | 0.34 | 0.15-0.79 | 0.01 |
| Ocular signs | 1.25 | 0.64-2.45 | 0.52 |
| C-reactive protein level | 0.996 | 0.99-1 | 0.04 |
| Positive TAB | 1.43 | 0.84-2.43 | 0.19 |
| Aortitis | 0.34 | 0.19-0.6 | 0.0002 |

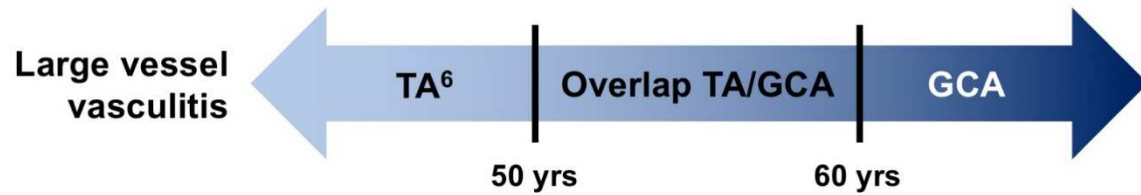
TAB: temporal artery biopsy; OR: Odds ratio; CI: confidence intervals.

Table 4. Therapeutic management and response to therapy of the 150 patients with LVV diagnosed between 50 and 60 years and the 150 controls with LVV aged over 60 years.

| Characteristics | LVV₅₀₋₆₀ (n=150) | LVV_{>60} (n=150) | P value |
|--|--|---|-------------------|
| Number of lines of treatment, median, n | 2 (1–5) | 1 (1–4) | 0.006 |
| Patients with ≥ 2 lines of treatment, n (%) | 78 (52) | 60 (40) | 0.049 |
| Vascular surgery, n (%) | 15 (10) | 0 (0) | <0.0001 |
| Biological agent use, n (%) | 18 (12) | 4 (3) | 0.003 |
| At last follow-up | | | |
| Prednisone dose <7.5 mg/d, n (%) | 106 (71) | 125 (83) | 0.01 |
| Mean prednisone dose (SD) | 8.8 (9.2) | 6.5 (4.4) | 0.048 |
| Median follow-up, (SD), (months) | 43.8 (39.9) | 36.4 (35.5) | 0.051 |

Values are expressed as n (%) of patients or median (range) or standard deviation (SD).

Figure 1. Description of large vessel vasculitis according to age at onset. Descriptive analysis from TA patients was obtained from data of a French cohort (Arnaud and al.⁶). Data from the « Overlap TA/GCA » phenotype are from our LVV₅₀₋₆₀ patients, and those from the « GCA » phenotype are from our LVV_{>60} patients.



| | | | |
|----------------------------|-------------|------------|------------|
| Female | 83 % | 74% | 80% |
| Cranial signs | 40% | 73% | 90% |
| Ocular signs | 22% | 17% | 27% |
| Extra-cranial signs | 100% | 64% | 58% |
| Positive TAB | 0% | 59% | 72% |
| Aortitis | 75% | 78% | 47% |
| Refractory disease | 68% | 52% | 40% |
| MTX or biologics | 68% | 40% | 27% |
| Vascular surgery | 49% | 10% | 0% |