Background: Large-vessel vasculitides comprise Takayasu arteritis (TA) and giant cell arteritis (GCA). Arterial stenosis and dilatation directly affect prognosis but the mechanism(s) underlying remodeling of the vessel wall have not been identified. Microvesicles (MVs) are membrane-enclosed extracellular vesicles released upon cellular activation and stress and as a consequence of environmental inflammation. MVs maintain features and constituents of their parental cells. They have been proposed to serve as potential liquid biopsies in oncology.

Objectives: To verify whether arterial wall-derived MVs are recognizable in the blood of TA patients and express bioactive molecules potentially involved in arterial injury, inflammation and remodeling.

Methods: Platelet was obtained from 112 LVV pts (73 TA, 39 GCA), 42 age and sex-matched healthy controls (HC) and 30 pts with severe carotid atherosclerosis. Plasma flow cytometry was performed with anti-CD14, CD16, anti-CD144 (VE-cadherin, an endothelial marker), anti-CD140a/b (PGDF receptor A/B a vascular stromal marker), anti-HMGOb1, anti-PTX3, mitotracker green (that identifies mitochondrial moieties) and mitosox (that reveals mitochondrial reactive oxygen species). MVs were identified by physical parameters using Gigamix beads. Medium-to-large-sized MVs were defined as MVs with >240nm eq diameter.

Results: Preliminary results are available for 49 LVV (42 TA, 7 GCA), 8 severe carotidatherosclerosis and 14 age- and sex-matched HC. As compared to HC or CA, LVV plasma contains a higher number of MVs and in particular of medium- to large-sized MVs (p<0.001 for all comparisons) (Figure, panels A-B). Next, we evaluated the MVs’ surface expression of markers of leukocytic, endothelial and stromal vascular cell lineages. Total counts of CD14+, CD16+, CD66b+, CD140a, CD140b, CD144+ MVs were increased in LVV plasma with very high level of significance (Figure, panels C-G) while higher percentage of CD16+ and CD140a+ medium-to-large-sized MVs was found in atherosclerosis. Expression of molecules involved in inflammation or repair, PTX3 or HMGOb1 mitochondrial antigens and mitochondrial ROS all were consistently higher in LVV (Figure, panels H-M).

Conclusion: MVs, including those expressing arterial stromal biomarkers, are increased in LVV plasma, suggesting a communication between the vessel wall and peripheral blood. MV express signals that may in turn contribute to persisting vascular inflammation in large vessel vasculitis. Further analysis is required to dissect their potential use as disease biomarkers.