INVESTIGATIONS EXPLAINED

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TEST	DESCRIPTION	RELEVANCE IN VASCULITIS
X-ray	Simple radiology imaging test that can show general abnormalities. Uses a very small amount of radiation.	Easy screening test for assessing lungs in vasculitis and joint disease.
Ultrasound	Imaging test that uses sound waves, not radiation, to produce images of the inside of the body. A technician will apply gel on your skin then press an imaging probe on your skin over the areas of interest to gather the images.	GCA – temporal artery ultrasound performed in certain centres only. Other vasculitis types – can detect enlarged lymph nodes, abnormalities of abdominal and pelvic organs (kidneys, liver, spleen, bladder, gallbladder) Addition of "Doppler" studies can measure blood flow within the arteries and veins to detect blockages. Ultrasound can also be used to guide biopsies of certain organs (eg. lymph node, kidney).
CT scan	Complex imaging technique that combines a series of X-ray images taken from different angles around your body through rapid passages inside a big ring device. CTs provide more detailed information than X-rays.	Commonly used in almost all vasculitis types during the initial diagnostic phase to look for signs of inflammation within the body. Most commonly scanned areas include the head & neck, chest, abdomen and pelvis. Addition of intravenous contrast dye (iodine-based) is often used to visualize blood vessels, organs and other structures better. Use of IV contrast requires precaution and can be contraindicated in the setting of contrast dye allergy or advanced kidney disease.
MRI scan	Complex imaging technique that uses strong magnetic fields and radio waves to generate images taken from different angles around your body through slow passages inside a big tunnel-shape device. There is no radiation exposure.	Commonly used in large vessel vasculitis (ie. GCA and Takayasu) and CNS vasculitis to assess for inflammation within the arteries, and in EGPA to assess the cardiac muscle function and inflammation. Commonly scanned areas in vasculitis include the head & neck, spine, and chest/heart. Addition of intravenous contrast dye (gadolinium-based) is often used to visualize blood vessels, organs and other structures better. Use of IV contrast requires precaution and can be contraindicated in the setting of contrast dye allergy or advanced kidney disease (although the risks are much lower with the newest dye material used).
Angiography (conventional, DSA – digital subtraction angiography)	Imaging technique where a special "contrast" dye is injected into your veins to produce detailed images of your blood vessels. Can be done by catheterization (via the artery of the wrist or groin) and taking a series of X-rays once the dye is injected, or combined with CT or, more rarely, MRI.	Can be used in large vessel vasculitis (ie. GCA and Takayasu), CNS vasculitis, systemic polyarteritis nodosa or any other vasculitis types where there is suspected vessel involvement to assess for inflammation within the arteries. Nowadays, DSA is less often needed since CT and MRI scans provide very good imaging of the blood vessels while being less invasive. Like in CT scans, addition of intravenous contrast dye (iodine-based) is needed to visualize the blood vessels. Use precaution in the setting of contrast dye allergy and kidney disease.

TEST	DESCRIPTION	RELEVANCE IN VASCULITIS
PET scan	Complex imaging test that uses a special dye containing a radioactive "sugar" drug to assess for areas in the body with abnormally increased cellular metabolism. Since inflammation leads to increased cellular metabolism, areas of inflammation light up on the CT scan images. Most commonly used in cancer diagnosis and follow-up.	Early use in GCA and Takayasu, mostly in the United States. Not readily available outside of cancer management in Canada.
ECG	Electrical tracing of heart rhythm to assess for irregular or abnormal rhythms. 12 sticky leads are placed on certain parts of your body to create this tracing. The procedure is totally indolent.	Performed almost systematically, and more specifically when there is suspected heart involvement due to the vasculitis (eg. Takayasu, GCA, EGPA).
Transthoracic echocardiogram ("Echo", TTE)	Essentially an ultrasound of the heart, using similar technique as a regular ultrasound, but with additional testing that allow for measurement of heart function.	Performed very often, but more specifically when there is suspected heart involvement due to the vasculitis (eg. Takayasu, GCA, EGPA).
Pulmonary function test (PFT)	Breathing test that assesses your lungs and how well they are working. The test requires you to follow certain breathing instructions. If abnormal, PFTs are repeated over time to see if your breathing and lung function improves with treatment.	Performed when there is suspected lung involvement due to the vasculitis based on abnormalities on chest imaging or symptoms (eg. coughing, bloody sputum, shortness of breath, wheezing, fibrotic changes on XRay).
Electromyography (EMG, nerve conduction study)	Diagnostic procedure that assesses nerve and associated muscle function by detecting abnormal electrical activity. The procedure involves insertion of tiny needles under the skin with low levels of electrical stimulations.	Performed when there is suspected nerve involvement due to the vasculitis. More commonly ordered in ANCA-associated vasculitis (especially EGPA), polyarteritis nodosa and cryoglobulinemic vasculitis.
Nasolaryngoscopy	Quick in-office exam of the nasal cavity down to the lower throat tissues, performed by otolaryngologists (ENT doctors). Uses a small camera attached to a flexible tube that is inserted into the nose.	Commonly performed in GPA and EGPA to look for nasal involvement (inflammation, ulcers and polyps) and subglottic stenosis in GPA.
Bronchoscopy	More invasive diagnostic procedure where a scope (ie. a camera attached to a long, small flexible tube) is inserted into the mouth and down the throat into the airway pipes (bronchi) to assess for inflammation, masses and bleeding. A bronchoalveolar lavage (BAL) can be done simultaneously to collect samples to send to the lab for analysis. A lung biopsy can also be performed via bronchoscopy – this is called an endobronchial biopsy.	Commonly performed in GPA or MPA (and some other vasculitides) when there is bleeding from the lungs or suspected lung inflammation based on imaging results. Can also be done to help rule out lung infections prior to starting strong immunosuppressive medications like cyclophosphamide or rituximab.
Bone mineral density (BMD)	Imaging test that uses X-rays to assess how strong your bones are. Low bone density can lead to osteoporosis and fractures. The BMD result is used in the FRAX (fracture risk assessment tool) score to calculate your risk of an osteoporotic fracture.	Not directly related to vasculitis. BMD should be considered in those who are over the age of 50 and who have been on prednisone of 5mg or higher for greater than 3 months.