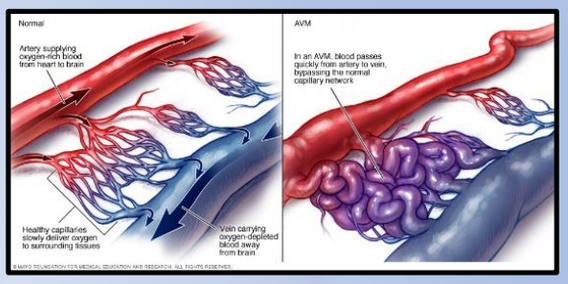
# ARTERIOVENOUS MALFORMATIONS AND SCLEROTHERAPY TREATMENT

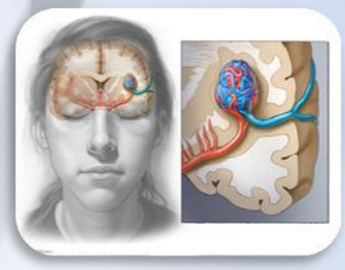
**An <u>Arteriovenous Malformation</u> (AVM) is the term given to describe a tangle (or Nidus) of abnormal blood vessels connecting arteries and veins.**




**Normally, arteries carry oxygen rich blood from the heart to surrounding tissues through capillary beds where the gas exchange occurs, veins carry deoxygenated blood back to the lungs and heart.**

**An AVM is a direct connection between an artery and vein without the presence of the capillary bed, meaning the surrounding tissues do not get the oxygen they require and over time the affected vessels can weaken and rupture.**

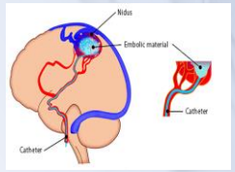
**AVM usually forms spontaneously in-utero, are hereditary or can develop following trauma and can occur anywhere in the body.**



**<u>Diagnosis</u> – AVM is diagnosed through a combination of methods typically including, Ultrasound, CT, MRI and Angiography.**

**<u>Treatment</u> – Treatment of AVM's are dependant on the type and location of the affected vessel but options include surgery, radiation treatment and endovascular embolization (Sclerotherapy).**

**<u>Sclerotherapy</u> - Sclerotherapy is a percutaneous or transcatheter injection of a particular fibrosis inducing chemical (a sclerosant) into the AVM to shrink and eventually obliterate the vessel to effectively seal off the blood supply. Types of Sclerosant used depends on the location and vasculature of the AVM but typical agents include Sodium Tetradecyl Sulphate (STS, Fibrovein), Ethanol, Onyx, Glue & Bleomycin. Sclerotherapy is a relatively low risk procedure and provides good results for patients.**




| Type of Malformation | Sclerosant |
|---|---|
| High Flow - AVM | Onyx, Glue |
| Low Flow – Venous/ mixed Malformations | STS (Fibrovein), Absolute Alcohol |
| Lymphatic | Bleomycin |

**<u>Imaging in the IR Department</u> - Digitally Subtracted Angiography (DSA) is used to map out the flow and supply to the AVM. This also helps in choosing which type of Sclerosant to use. A combination of fluoroscopy and DSA runs are used throughout the procedure to ensure correct positioning for the delivery of the sclerosant and to check the extent of occlusion.**

**This case study shows the imaging of a scalp AVM treated within IR. Initial angiograms were carried out to confirm the supply to the AVM and to ensure there was no intracranial communication. The AVM was then directly punctured and blood aspirated before contrast and DMSO primed Onyx was injected into the early venous side of the nidus. Check angiograms confirmed the increasing occlusion and slowing of flow to the AVM. Embolisation was completed by injecting Onyx through the microcatheter into the feeding artery until complete occlusion occurred.**

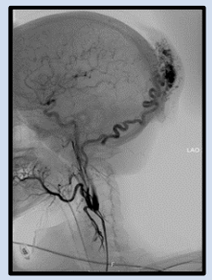


Fig 1. Angiogram showing scalp AVM and feeding artery


Fig 2. Image showing direct puncture of nidus and venous filling

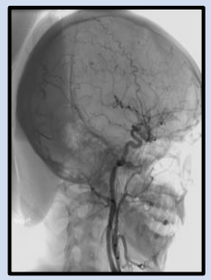


Fig 3. Final angiogram showing complete occlusion of AVM

**More recently Dyna-CT has been used to provide a 3D image to define the location and flow to the AVM. I-Guide technology is then used to show the best path for the needle to follow to directly puncture the Nidus and deliver the sclerosant. This method may become a more standardised approach in future treatment of AVM's.**

References; Dabus, G & Benenati, J. Interventional Treatment Options for Vascular Malformations. Endovascular Today. 2013; 413: 59-64. Legiehn GM, Heran MK. A step-by-step practical approach to imaging diagnosis and interventional radiologic therapy in vascular malformations. Semin Intervent Radiol. 2010;27:209-231. R, Mattassi. The role of Sclerotherapy in vascular malformations , Schattauer, 2017. British Institute of Interventional Radiology, 2017, Mayo Foundation for Medical Education and Research, 1998-2018, Open Osmosis, 2018 With special thanks to Dr A. Diamantopoulos & Dr N. Thulasidasan. Poster by Tienne Lockwood, Senior Radiographer GSTT