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Intracerebral haemorrhage (ICH) typically presents with sudden focal deficit and a reduced conscious level. Following initial resuscitation, these patients will require CT scan to establish the diagnosis and the size and position of the bleed (Figure 48.17). They require reversal of anticoagulation, ongoing hourly neuro-observations and blood pressure monitoring. High blood pressure may be longstanding and associated with adaptations to autoregulation, so attempts at lowering it acutely with intravenous antihypertensives should Christian Johann Doppler , 1803–1853, Professor of Experimental Physics, Vienna, Austria, enunciated the ‘Doppler principle’ in 1842. pressure >130 /uni00A0 mmHg). - Spontaneous ICH accounts for 10–15% of strokes and has a mortality of 40% at 1 year. The majority occur in the context of hypertension or amyloid angiopathy , or as a complica tion of ischaemic stroke. Coagula tion disorders, especially patients being treated with warfarin, are a major risk factor. In younger patients and where the pattern of bleeding is atypical, dedi - cated imaging to rule out an underlying vascular anomaly or tumour is required. For example it is critically important to identify ICH due to aneurysm rupture or A VM befor e consid - ering surgical intervention. Craniotomy and evacuation may be used to alleviate raised ICP . Importantly this surgery may be life-saving by reliev - ing raised ICP but cannot reverse deficits resulting from the haematoma dir ectly . Surgical evacuation would typically be a good option for younger, fitter patients with signs of raised ICP and haematomas close to the cortical surface or in the posterior fossa. Summary box 48.8 Intracerebral haemorrhage /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF -

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Vascular malformations are usually congenital in origin, with certain key exceptions discussed below . They may present with headaches, pulsatile tinnitus, seizures or focal deficit, or else acutely with rupture and haemorrhage. A VMs are responsible for a small proportion of SAHs and ICHs. V essels and calcification may be apparent on CT or MRI and the lesion is confirmed on angiography (Figure 48.18 Depending on the size, location and venous drainage pat terns, surgery or radiosurgery are usually preferred treatment options. In some cases endovascular embolisation with tissue glue may have a role, and for many A VMs there is no treatment with a satisfactory risk–benefit ratio. V ein of Galen malformations are A VMs feeding into an embryological venous remnant dorsal to the brainstem, pre senting in childhood. High-flow malformations may cause car diac failure. They ma y be treated by embolisation. Dural arteriovenous fistulae (DA VFs) are shunts between dural arteries and veins or sinuses. They are proposed to arise as a result of vessel

remodelling in response to dural sinus thrombosis and subsequent r ecanalisation. They may present with subarachnoid, intracerebral or subdural bleeding, or with headache and pulsatile tinnitus. A carotid cavernous fistula is a spontaneous or traumatic DA VF between the internal carotid artery and surrounding cavernous sinus, typically producing eye pain, ocular muscle palsies and exophthalmos. Angiogra phy is diagnostic. Cavernomas (Figure 48.19) are discrete venous anomalies within brain tissue, visible on MRI but not angiography , that can bleed r epeatedly , causing progressive deficit. They can be removed surgically if required. Related lesions, usually clinically silent, include develop mental venous anomalies and capillary telangiectasia. Galen , 130–200, Roman physician, commenced practice as Surgeon to the Gladiators at Pergamum (now Bergama in Turkey) and later became personal physician to the Emperor Marcus Aurelius and to two of his successors. He was a prolific writer on many subjects, among them anatomy , medicine, pathology and philosophy . His work a ff ected medical thinking for 15 centuries after his death. (Gladiator is Latin for ‘swordsman’.)). - - -

Figure 48.18 An arteriovenous malformation supplied by the anterior cerebral, middle cerebral and middle meningeal arteries is demon strated at the 4 o’clock position in this angiogram. Figure 48.19 A brainstem cavernoma (arrow).

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