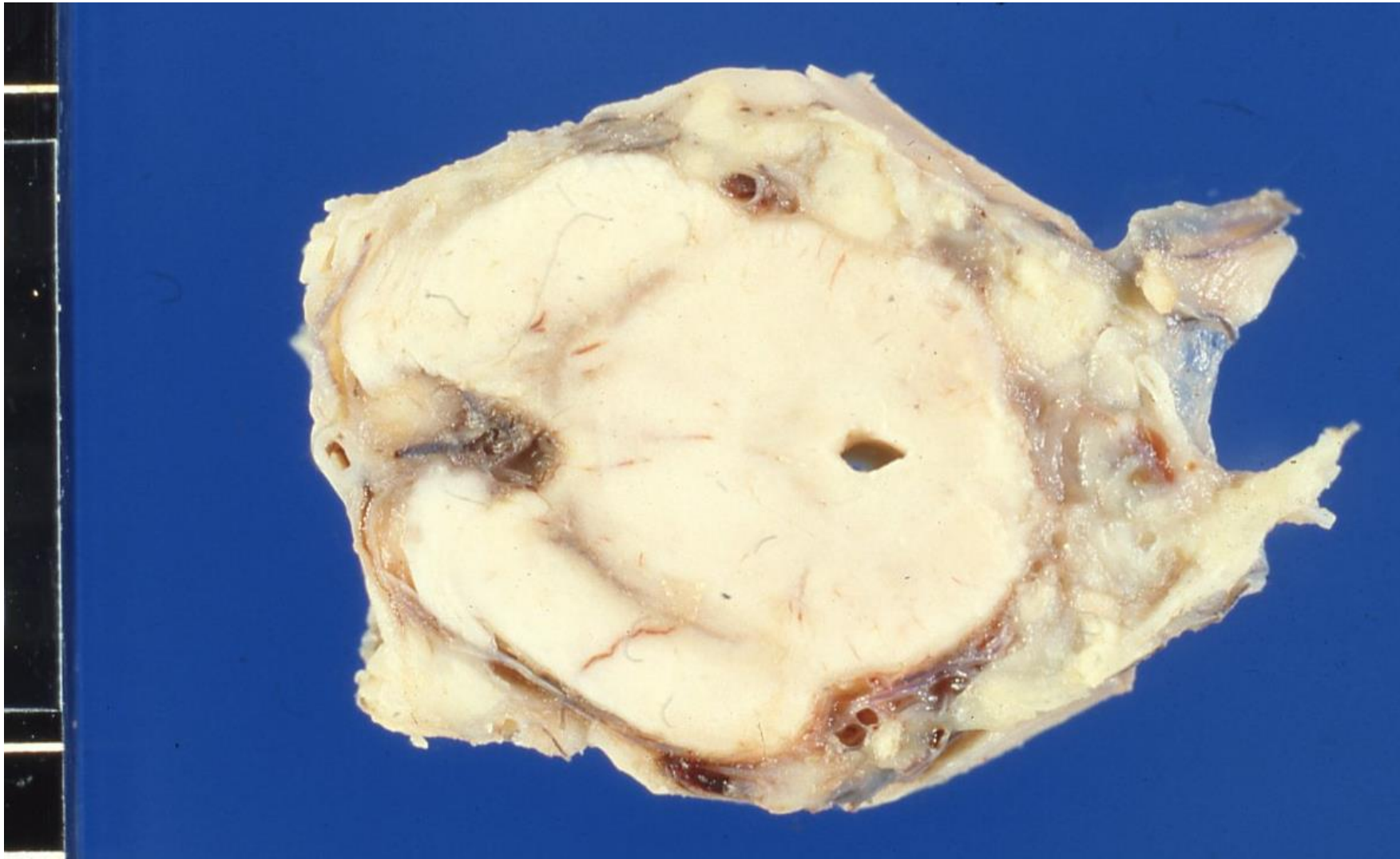


Tuberculous meningitis and necrotizing angiitis of Askanazy type

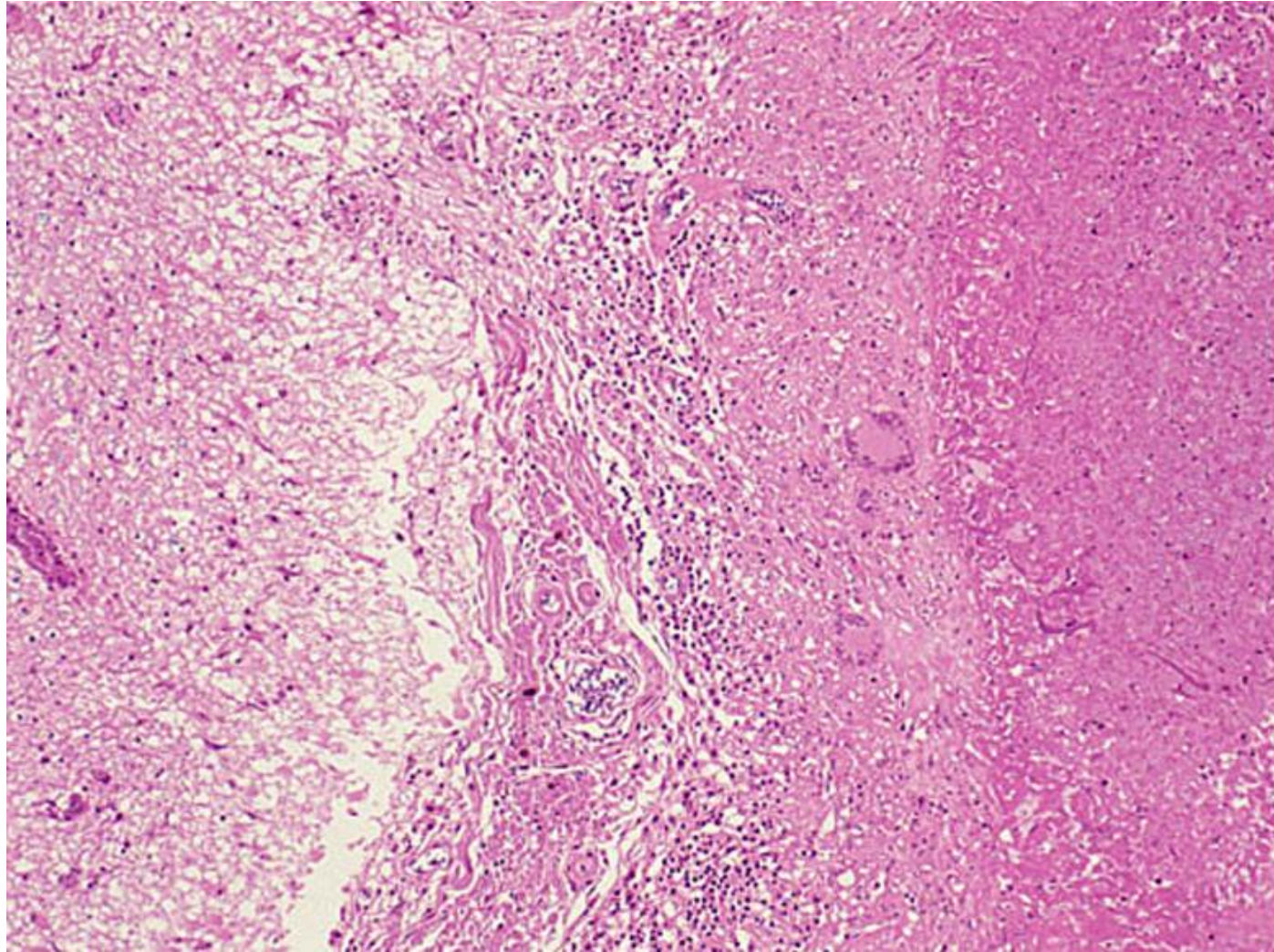
Tuberculous meningitis is a specific type of meningitis caused by *Mycobacterium tuberculosis*. Granulomatous inflammation in the subarachnoid space is concentrated towards the base of the brain. When cranial nerve roots are affected, symptoms mimic those of space-occupying lesions. Spinal cord involvement may provoke paraplegia. In an immunosuppressed state, severe infection (massive growth) of the acid-fast bacilli may entrap blood vessels causing necrotizing vasculitis of Askanazy type. In the case presented, the patient manifested hemiparesis due to multiple brain infarction caused by secondary necrotizing angiitis.



Tuberculous meningitis at the level of the mid-brain in a 43-year-old female patient. The subarachnoid space is massively filled with caseous granulomas.



Tuberculous meningitis at the level of the spinal cord in a 43-year-old female patient. The subarachnoid space is massively filled with caseous granulomas. Secondary syringomyelia is associated.

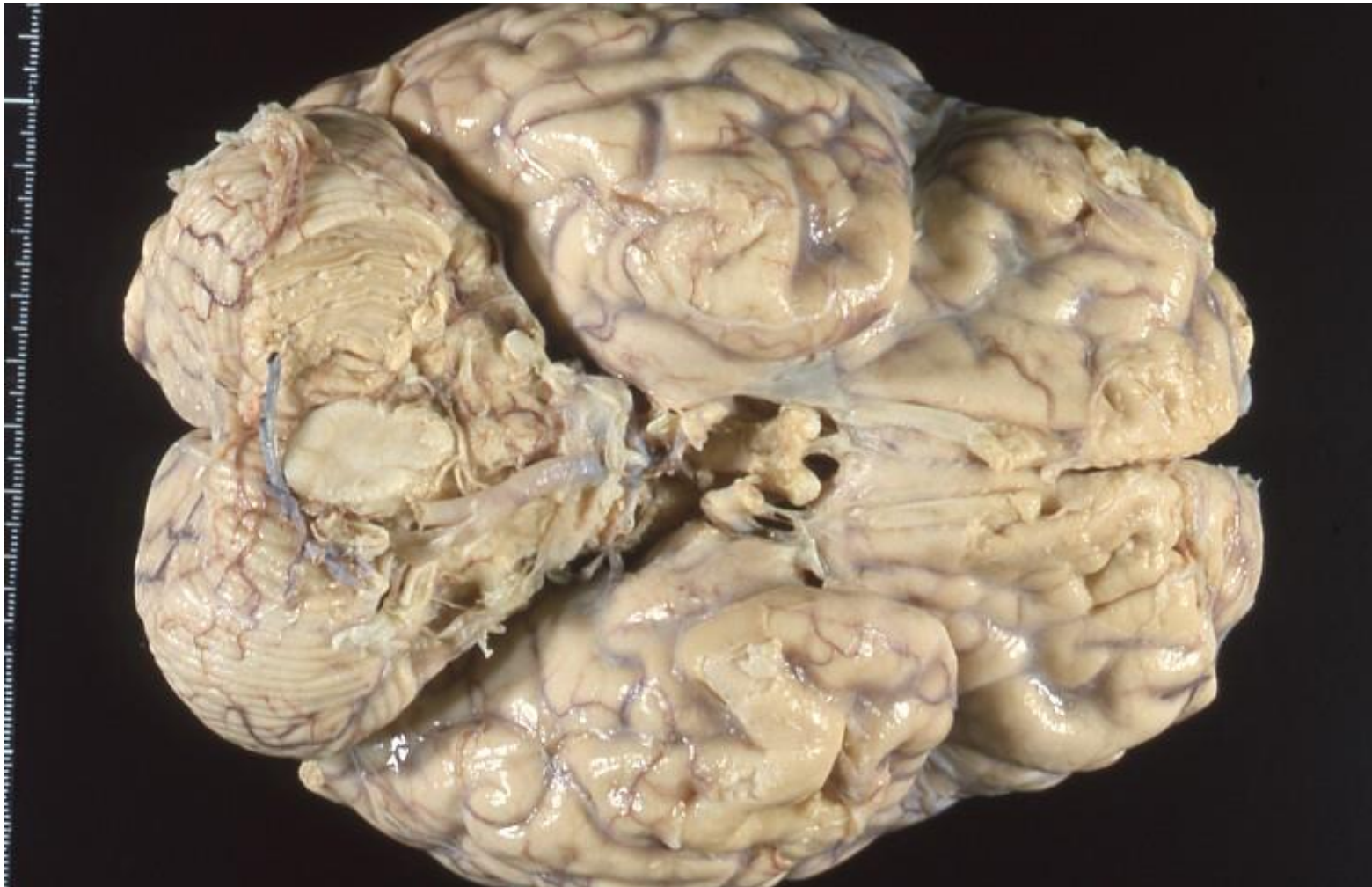


Tuberculous meningitis at the level of the spinal cord in a 43-year-old female patient. Microscopically, the subarachnoid space is replaced by caseous granulomas with multinucleated giant cells of Langerhans type. H&E

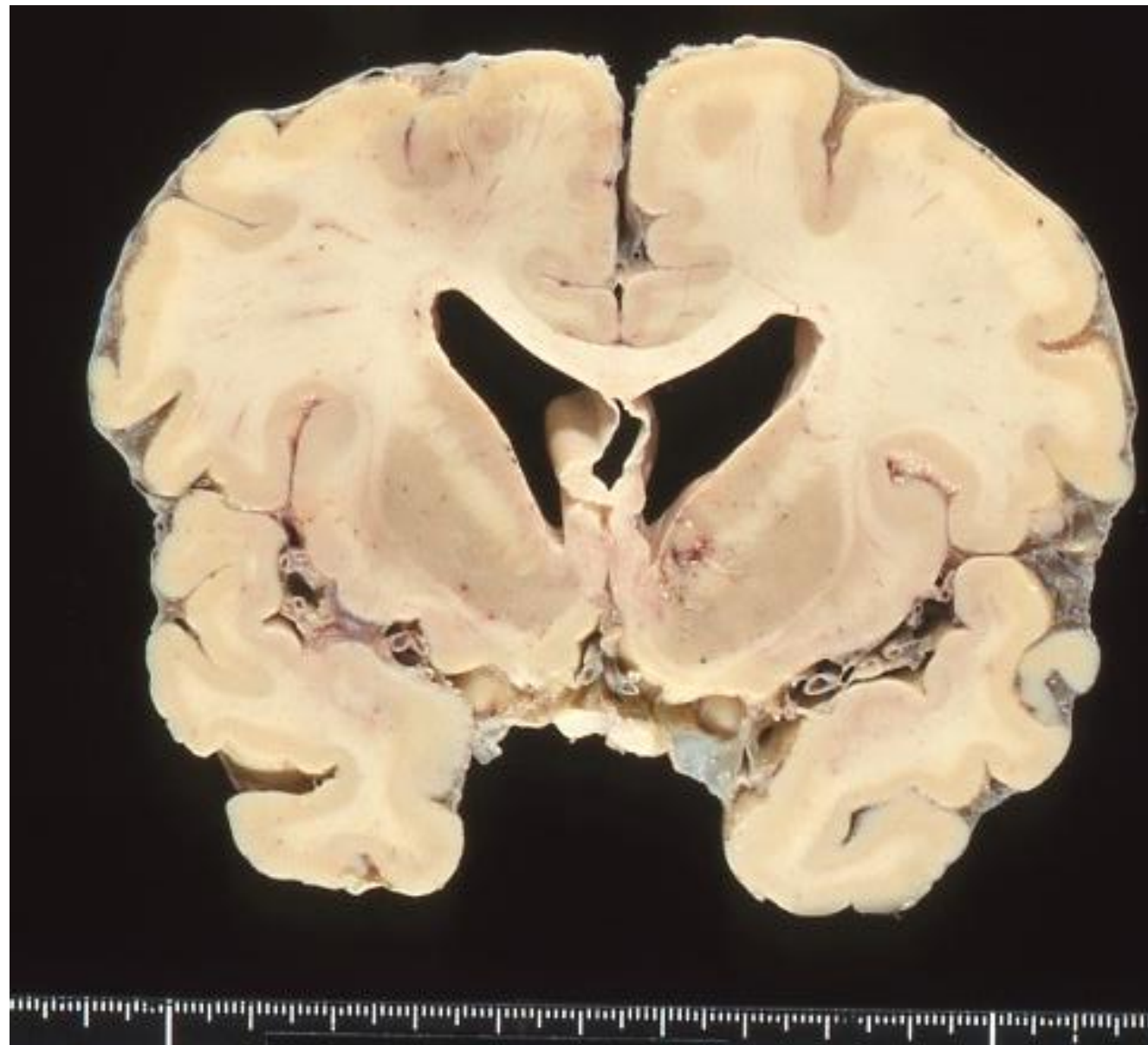
Askanazy-type necrotizing angiitis secondary to tuberculous meningitis

Massive infection of *Mycobacterium tuberculosis* may provoke secondary necrotizing angiitis. This has been called as Askanazy phenomenon. Local cytokine storm is related to the necrotizing inflammation of the vascular wall. In this case, the clinical manifestation was related to brain infarction, caused by multifocal obstruction of cerebral/meningeal arteries.

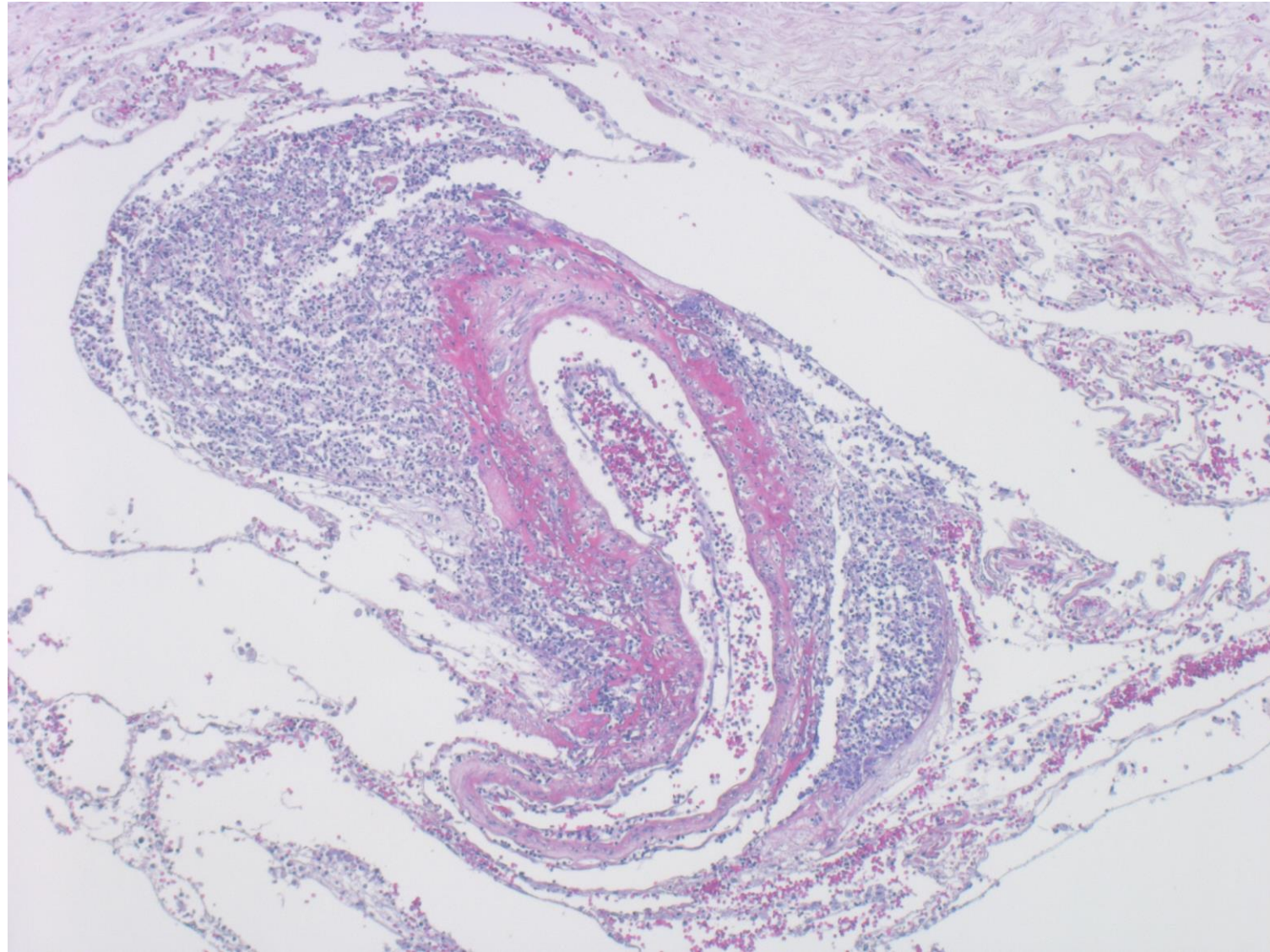
It should be noted that we should face to serious biohazards at autopsy, since macroscopic features were not typical of tuberculous meningitis.



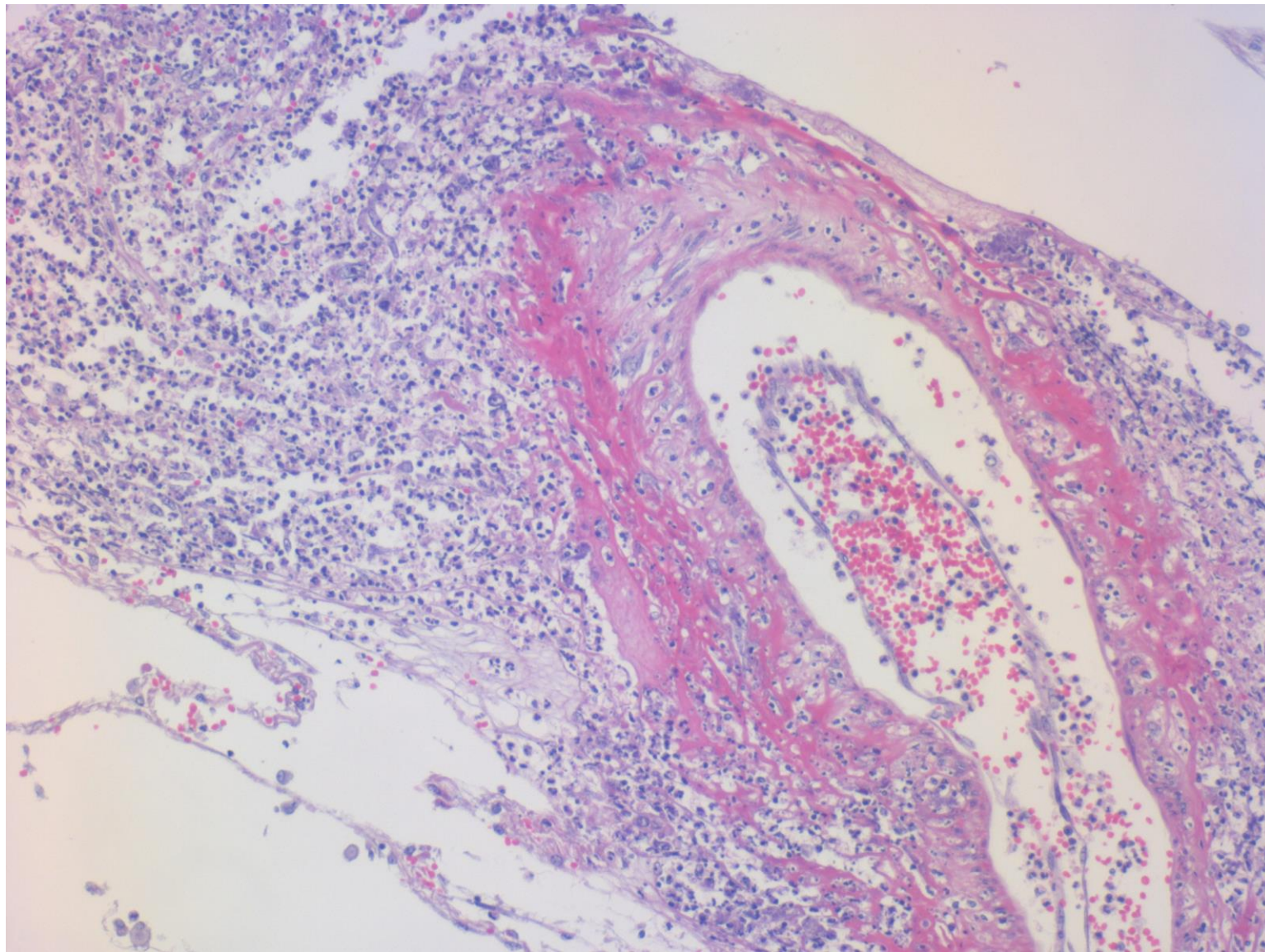
Tuberculous meningitis in a 71-year-old male patient. The meningeal space at the brain base is mildly turbid in appearance.



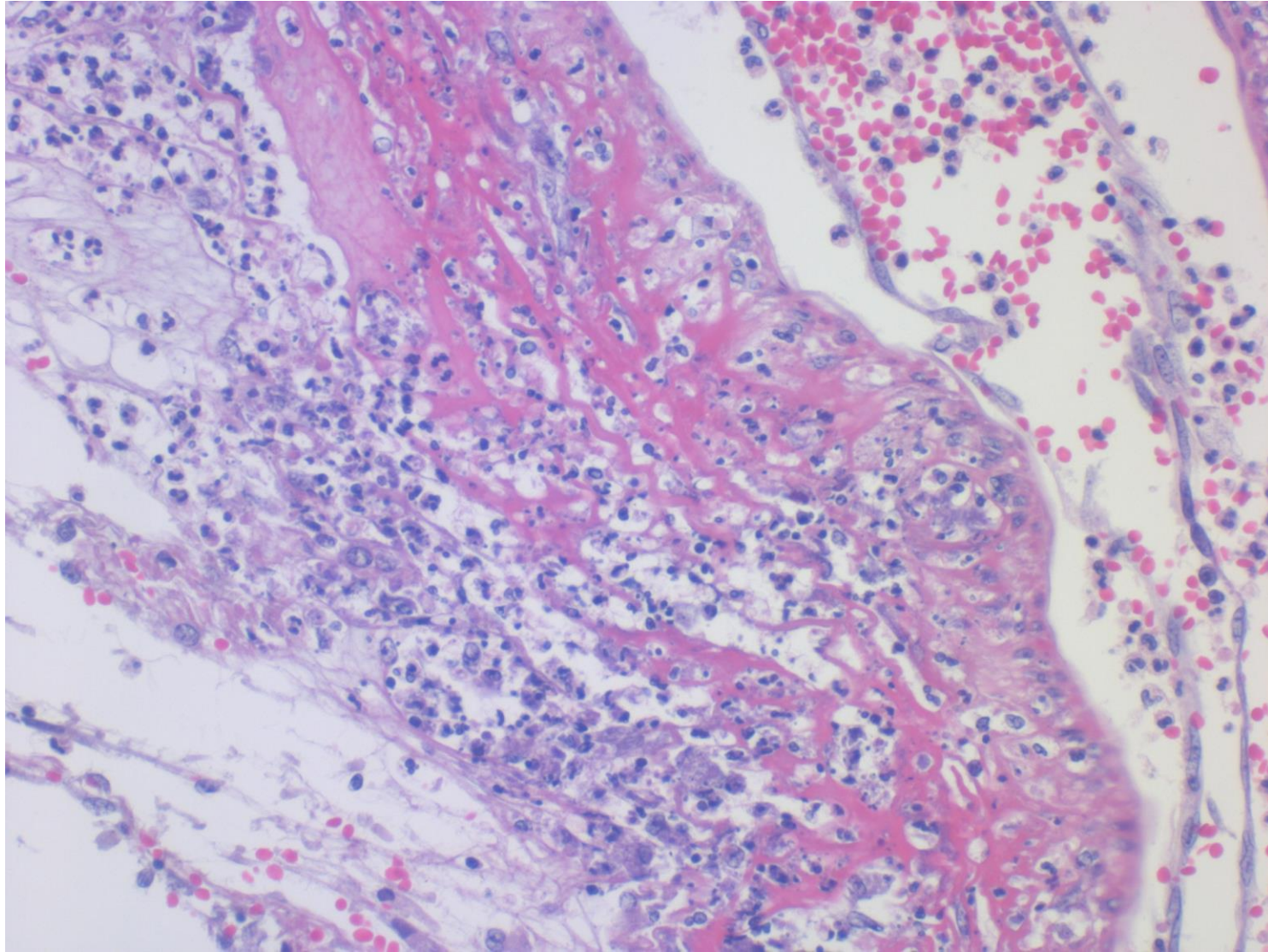
Tuberculous meningitis in a 71-year-old male patient. Fresh brain infarction is seen in the left caudate nucleus. The patient manifested right hemiparesis.



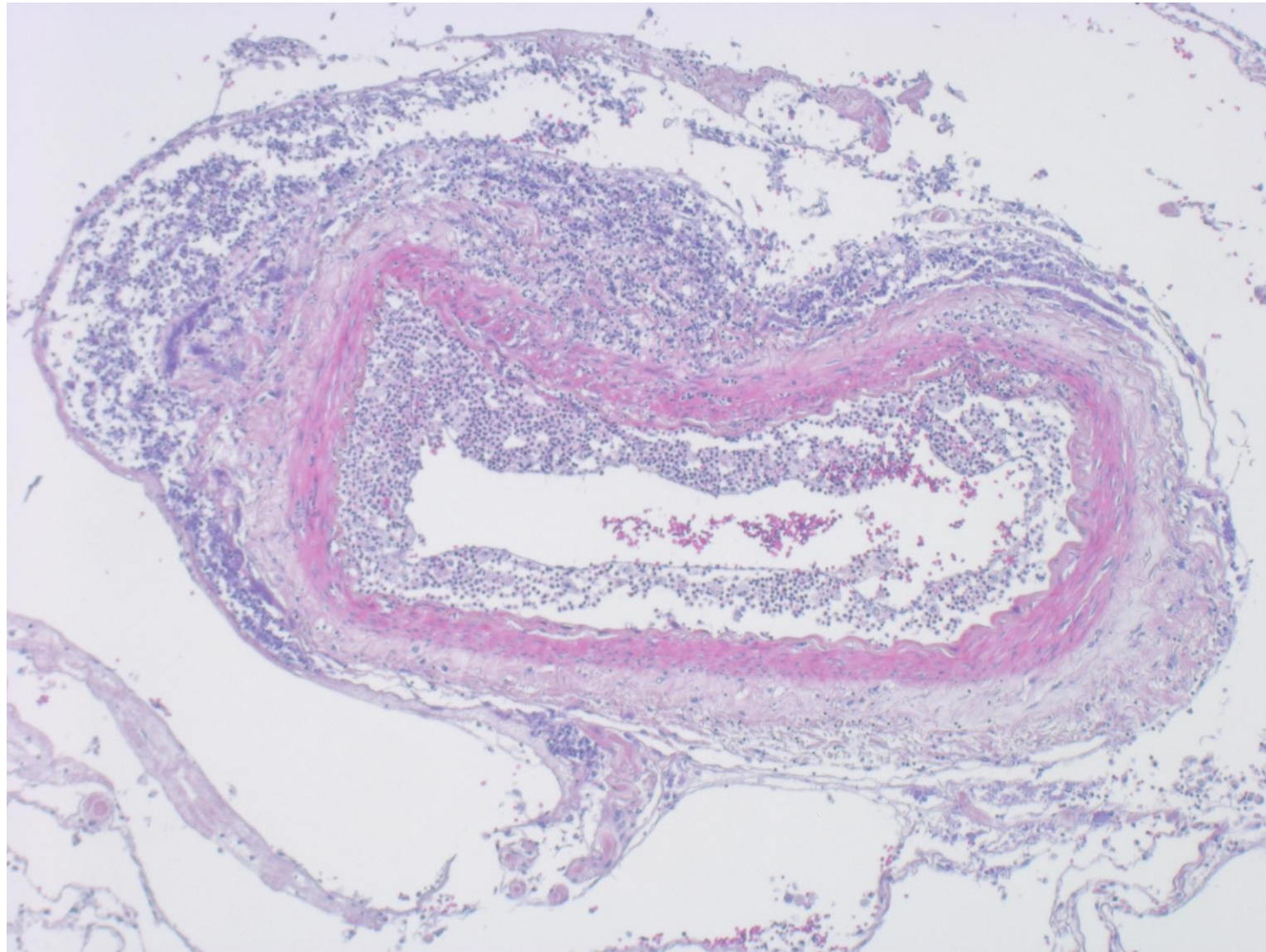
A meningeal artery branch reveals necrotizing angitis with accumulation of macrophages around the involved artery. H&E-2



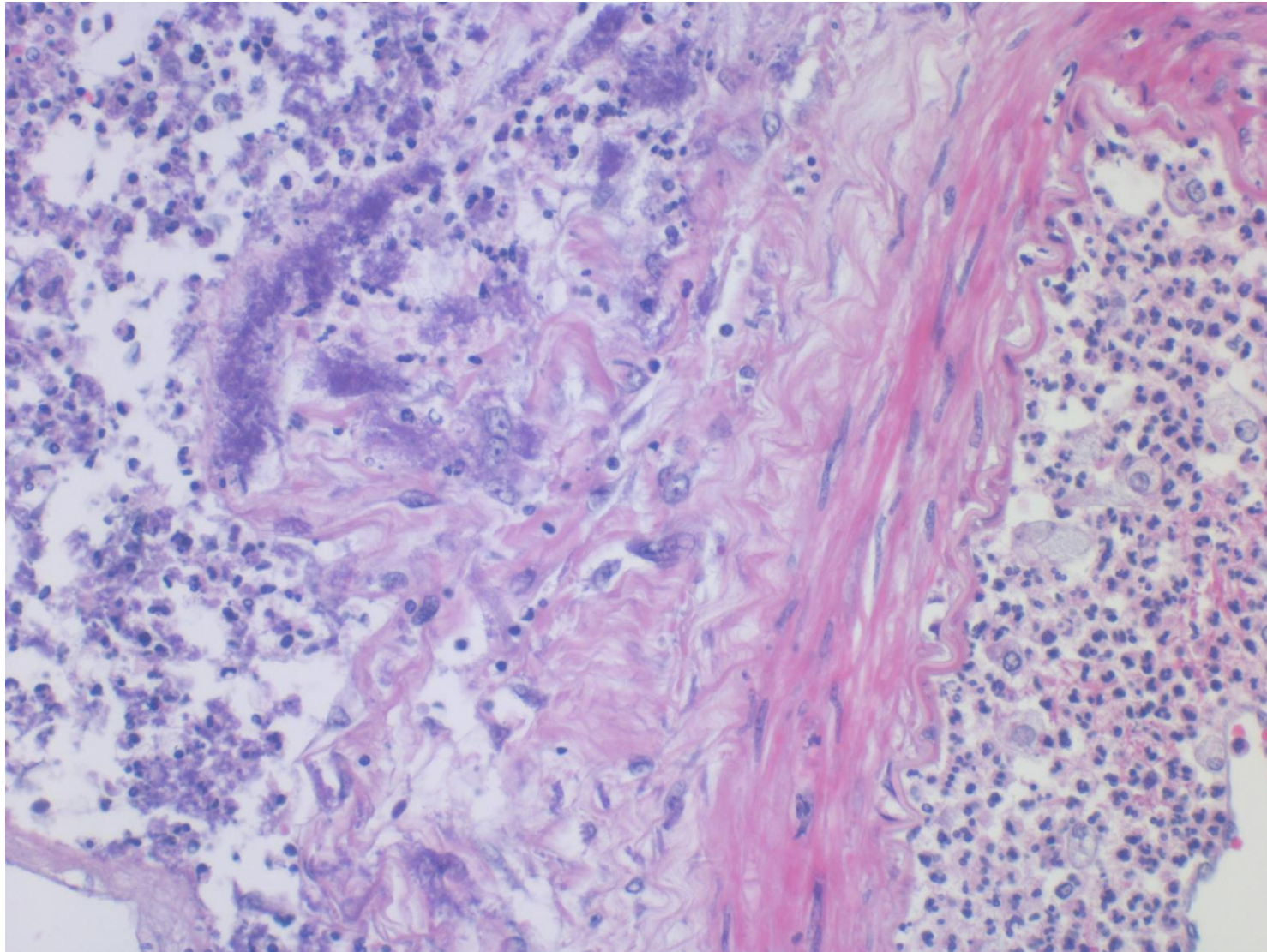
A meningeal artery branch reveals necrotizing angitis with accumulation of macrophages around the involved artery. H&E-3



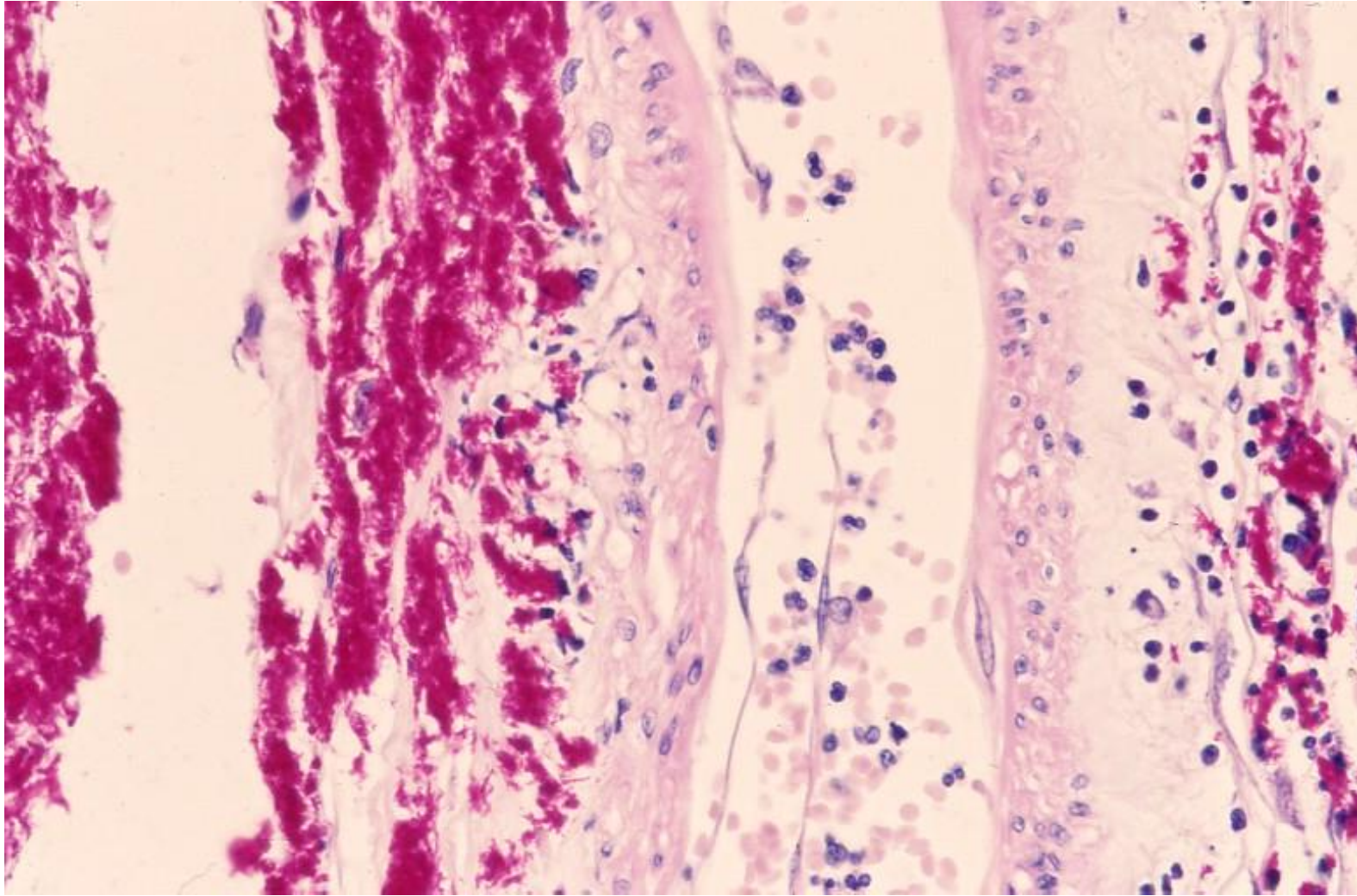
A meningeal artery branch reveals necrotizing angitis with accumulation of macrophages around the involved artery. H&E-3



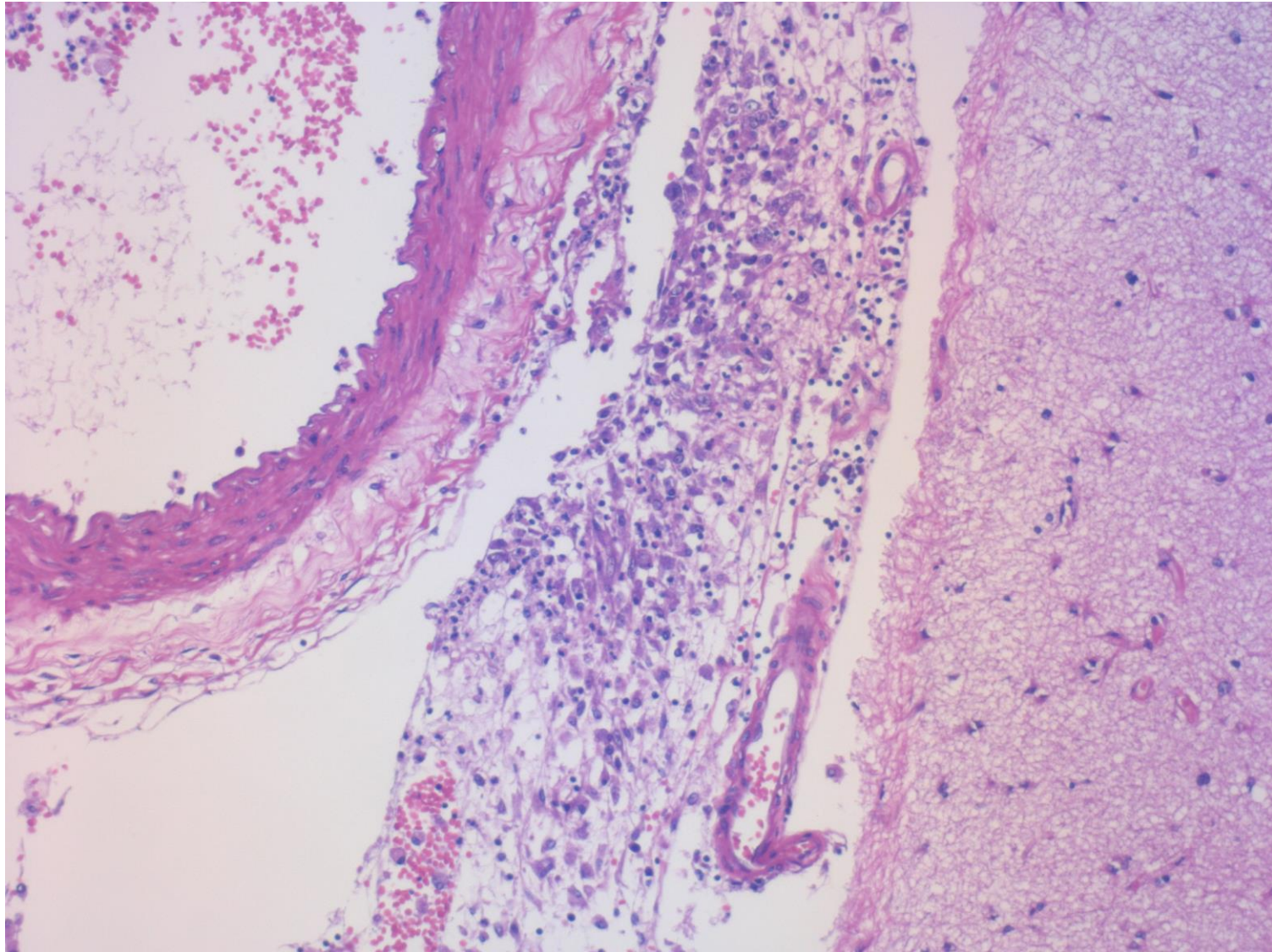
Another meningeal artery branch reveals necrotizing angiitis with accumulation of macrophages along the involved artery. H&E-4



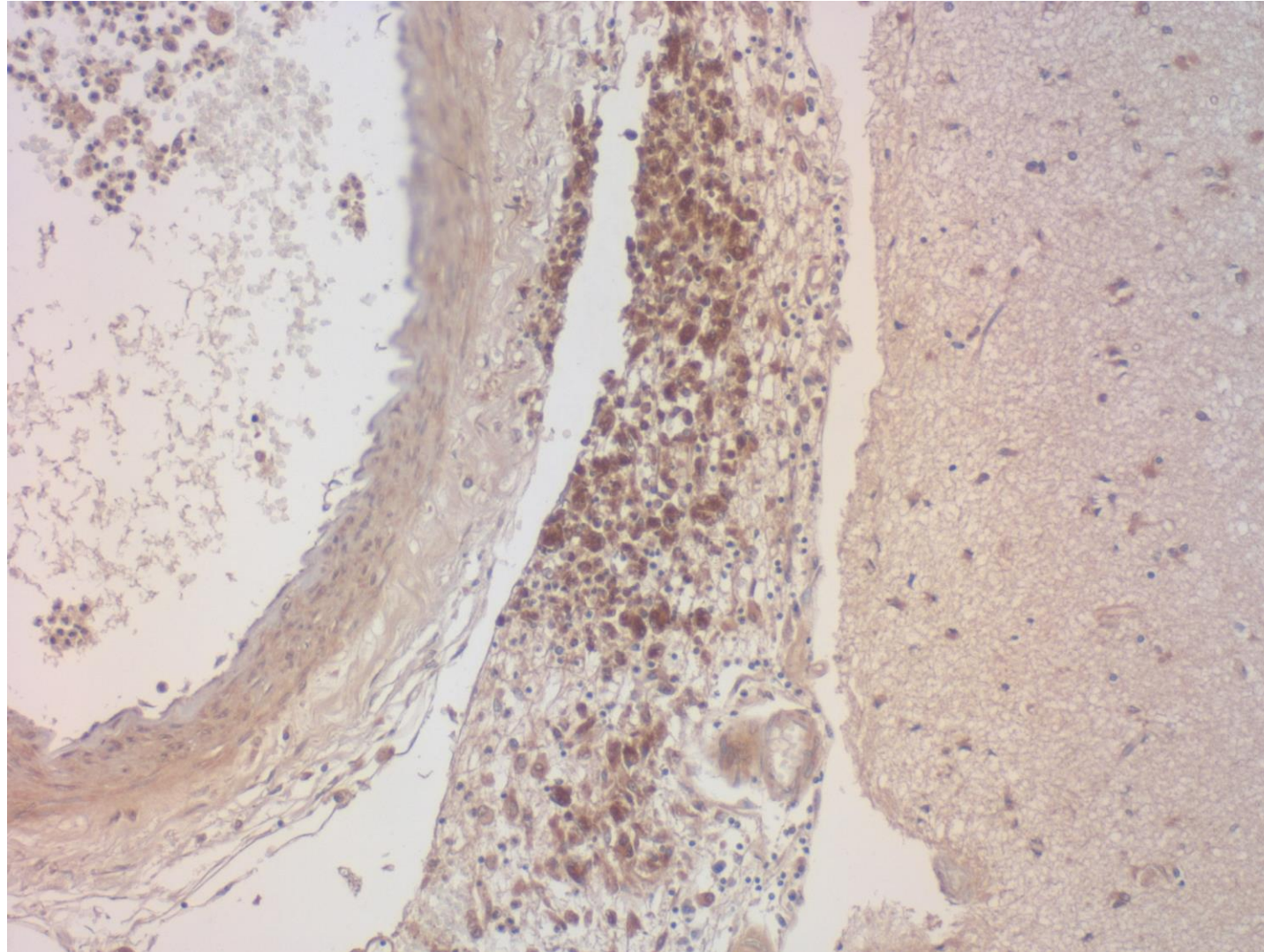
Another meningeal artery branch reveals necrotizing arteritis with accumulation of macrophages along the involved artery. H&E-5



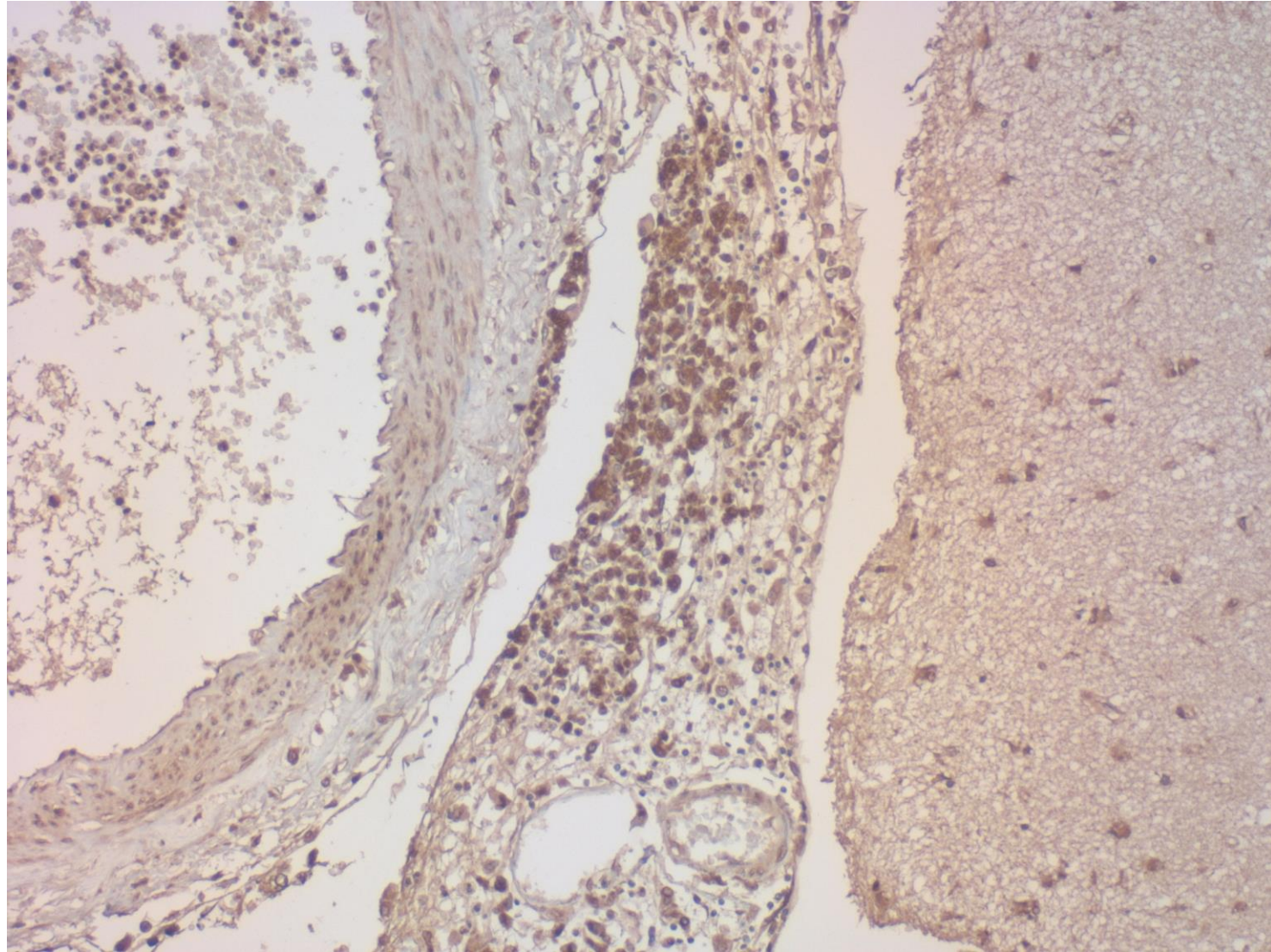
“Askanazy-type” secondary necrotizing angitis was caused by massive infection of *Mycobacterium tuberculosis* around the arterial branch. The acid-fast bacilli are phagocytized by macrophages. Ziehl-Neelsen’s staining



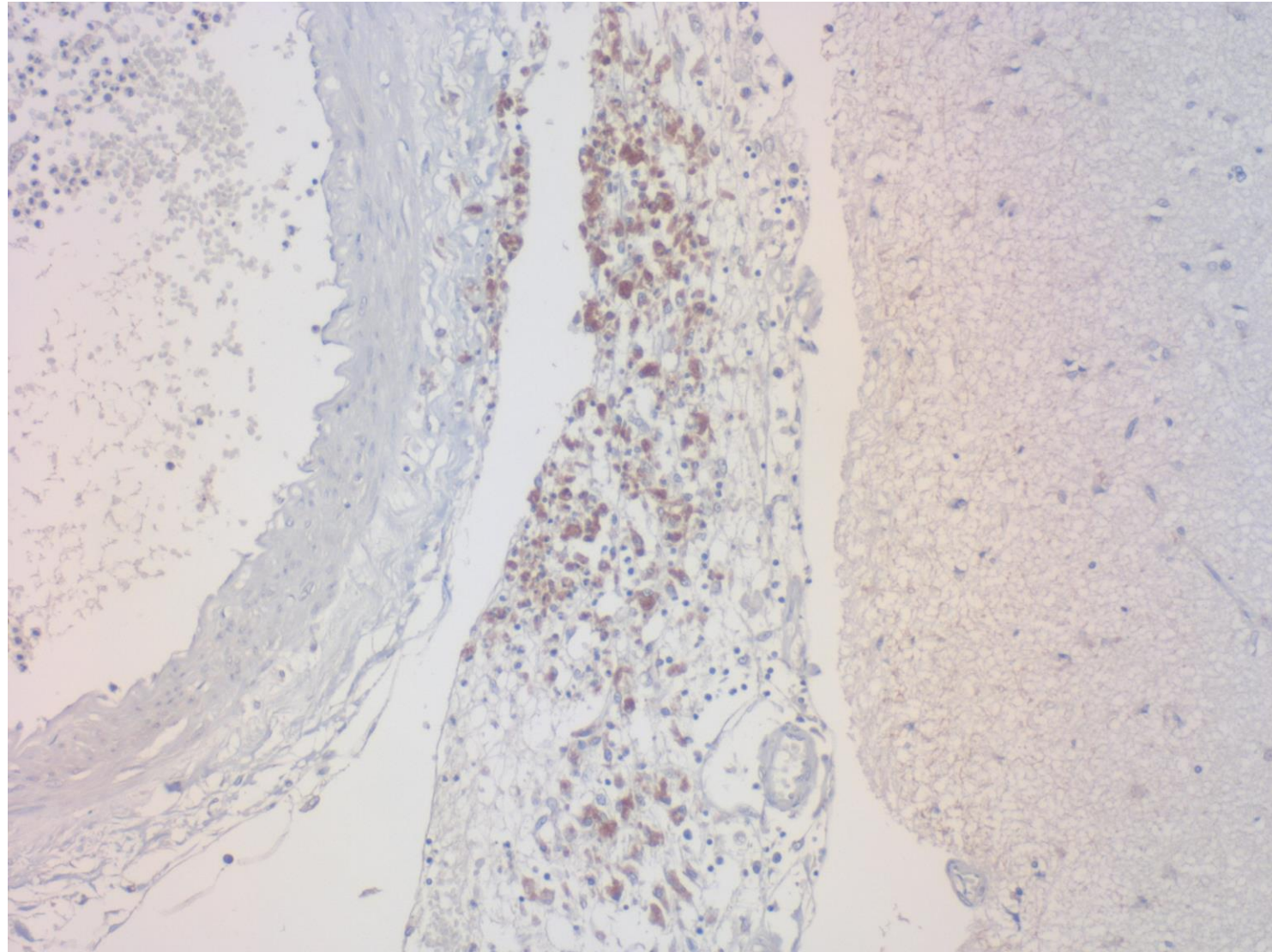
Accumulation of macrophages is seen in the subarachnoid space around the meningeal artery. Compare the same area for immunohistochemical staining for *M. tuberculosis*. H&E-a



The macrophages accumulating around the meningeal artery are labeled for BCG antigens. Immunostaining for BCG antigens



The macrophages accumulating around the meningeal artery are labeled for mycobacterial LAM (lipoarabinomannan) antigen. Immunostaining for LAM antigen



The macrophages accumulating around the meningeal artery are labeled for MPT64 (a 24-kDa secretory protein of *M. tuberculosis*) antigen. Immunostaining for MPT64 antigen