Cerebrovascular disorders represent one of the major causes of morbidity and mortality in adult populations by directly impacting the functional integrity of the CNS. This chapter will focus on three major aspects of the cerebrovascular system: anatomy, pathology, and neurobehavioral syndromes. As one cannot fully discuss the functional anatomy of the central nervous system without reviewing the vascular system that supplies it, the first priority will be to review the sources and patterns of distribution of the arterial blood supply to the brain. While it is not imperative for most clinicians to be able to name all the vessels, it is important to at least come away with a mental map of the spheres of influence for each of the major arterial groups. As the venous system was covered...
in the preceding chapter in conjunction with the discussion of the meninges, it will not be discussed in the same detail here.

Being under substantially greater pressure than venous blood and not having the benefit of the “filtering” action of the capillaries, the arterial system is prone to a wider range of pathology compared to the venous system. Also being responsible for the constant nourishment and oxygenation of the brain, any disruption of the system will have almost immediate and potentially catastrophic consequences. It is important for the clinician to have a general appreciation of the more common pathological conditions that can affect the cerebral arteries, including their premorbid risk factors, typical clinical presentation, effects on nervous tissue, and expected course over time. To this end, the major types of ischemic deficits, hemorrhagic events, and structural anomalies associated with cerebrovascular disease will be discussed.

Although there is obviously a significant interaction between the nature and severity of the specific pathological condition and the particular arterial system involved (anatomical locus or vascular distribution), the latter is clearly a major determinant of the nature of the neurobehavioral deficits or changes that will likely be manifested. As suggested earlier in this text, with the advances in neuroimaging over the past quarter century, the physical localization of lesions, including vascular, has become much less of a challenge. But as clinical neuroscientists our interest transcends the physical localization of the lesion. We want to understand the potential or probable behavioral consequences of such lesions in order to most effectively manage and care for our patients. Thus, the latter part of this chapter will be devoted to a review of the signs and symptoms or neurobehavioral syndromes commonly associated with lesions of the major cerebral arterial systems.

ANATOMY OF THE ARTERIAL SYSTEMS OF THE BRAIN

There are four ascending arteries that contribute to the cerebral circulation; two carotid arteries and two vertebral arteries. Although there is occasionally some variation in these vessels, Figure 10–1 represents the most common arrangement. The left common carotid