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**Prevention:** Although there is no conclusive evidence, most stroke experts believe that the treatment of hypertension is probably the most effective means of preventing the majority of intraparenchymal hemorrhages. Reducing excessive alcohol consumption including binge drinking and the use of drugs like cocaine and amphetamines is also important. In addition, careful control of anticoagulation levels in patients receiving warfarin and careful selection of patients for fibrinolytic therapy (whether for acute MI or stroke) should decrease the rate of intraparenchymal hemorrhage.

In the case of nontraumatic **subarachnoid hemorrhage** due to a ruptured saccular aneurysm, an early CT scan will usually detect blood locally or diffusely in the subarachnoid spaces or extending into the ventricular system. In a number of cases, subarachnoid hemorrhage is rapidly fatal in a matter of a few hours. The hemorrhage increases intracranial pressure to a level that approaches arterial pressure, causing a sudden drop in cerebral blood flow and leading to loss of consciousness, coma, and death. If the patient survives the initial period, there is continued danger of rebleeding. Cerebral vasospasm (constriction of cerebral arteries in response to presence of blood in the subarachnoid space), may diminish blood flow to parts of the brain causing an ischemic stroke. Currently most aneurysms are treated by inserting tiny thrombogenic metal coils into the aneurysm using an endovascular (via an angiography catheter) approach. Surgery to occlude the neck of a balloon-shaped aneurysm with a metallic clip is now a far less common approach. Repair is usually undertaken as soon as possible because untreated, ruptured aneurysms will often rebleed.

**Prevention:** Most aneurysms reflect developmental abnormalities. However their rupture may be associated with smoking or hypertension. If an unruptured aneurysm is detected, it is often recommended that it be repaired although the decision to repair should be individualized depending on the size and location of aneurysm. However, routine screening of at-risk individuals (positive family history or disorders associated with high risk of aneurysms) is not currently recommended.

## Stroke Rehabilitation

Rehabilitation of stroke patients begins in the acute care hospital. Patients with mild strokes whose condition is stabilized may leave the hospital for home in less than a week, and may receive outpatient or home physical and occupational therapy. Other patients may be sent to a rehabilitation facility where more extensive and comprehensive care involving physicians, nursing, and therapists is available.

Recovery from an ischemic stroke may begin in a few days although it may be delayed and slow in some patients. Early recovery most likely results from restoration of function in uninfarcted brain. Physical therapy may include constraint-induced movement therapy in patients with arm weakness (immobilizing their *unaffected* side to force the use of the affected side, and requiring use of the affected arm repetitively and intensely for several weeks). This novel therapeutic approach can sometimes improve the functional use of the affected arm to carry out activities of daily living. Over time, apparently other brain areas can take on some of the functions previously carried out by the infarcted regions (neural plasticity). Patients may also “work around” their disabilities by figuring out different ways of doing things.

In a hemorrhagic stroke, brain tissue surrounding the hemorrhage is displaced and compressed but not necessarily infarcted. Therefore in a patient who survives a hemorrhagic stroke, reabsorption of the hematoma is often associated with a return of function in the adjacent tissue – and a remarkable decrease in the patient’s deficits.