NEUROLOGICAL COMPLICATIONS

People with diabetes mellitus have a significantly greater risk of atherosclerosis than the general population. Not only do people with diabetes tend to have less HDL cholesterol to protect against oxidative damage, but their LDL particles are also smaller and more dense than normal, making these particles more vulnerable to oxidation and thus more capable of contributing to atherosclerotic plaques. Atherosclerosis in cerebral arteries can lead to brain tissue infarction, or ischemic stroke, from the obstruction of blood flow and subsequent brain tissue death. Stroke is a major cause of morbidity and mortality among people with diabetes.

History:
Depending on the location of an ischemic stroke, any number of symptoms may be manifested in the patient history. Some of the more common presenting complaints (depending on the area of brain affected) include loss of speech capabilities, cognitive changes, unilateral weakness, or unilateral loss of vision.

Physical Exam:
Profound unilateral weakness is readily apparent on exam. Subtler weakness, changes in speech ability, milder cognitive deficits, etc. are found by a careful neurological exam.

Information about conducting a thorough neurologic examination can be found at the following website: http://www.neuroexam.com/

Tests:
A head CT scan is the preferred imaging study because stroke is an emergency and these scans can be done very quickly. Although a head CT may not reveal the area of ischemia in the first 24 hours, it helps to rule out a hemorrhagic stroke, which would be a contraindication to thrombolytic therapy. An MRI typically provides more information, but this test can be hard to arrange urgently and is thus reserved for patients for whom questions remain after the acute presentation.

The figure at right shows a head CT scan of a patient who has suffered an ischemic stroke.

Treatment:
In the acute management of stroke, intracranial hemorrhage is ruled out as soon as possible by obtaining a head CT scan. If no hemorrhage is present, some patients may benefit from thrombolytic therapy. In addition, there are several experimental agents that might provide some neuroprotection to ischemic (not yet totally infarcted) neurons; large clinical trials for such drugs are pending.

During recovery from stroke, treatment is highly multidisciplinary. Initial recovery in a stroke unit has been associated with better long-term outcomes, as have the rapid initiation of physical activity, and the close involvement of family members in the patient’s care. An enormous amount of the recovery from stroke takes place in the first three months, so prevention of secondary complications and encouragement in all aspects of functioning are especially critical at this stage.

In terms of prevention of further strokes, first and foremost, the doctor and patient must work together to gain control of the diabetes and any concomitant modifiable cardiovascular risk factors (hypertension, hyperlipidemia, smoking). For those patients with atherosclerotic plaques that occlude greater than 70% of the internal carotid artery, surgical removal of the plaque (carotid endarterectomy) may be indicated.

More information about the prevention of future strokes in diabetic patients is discussed in the following article:

Which of the following is MOST CORRECT about a head CT scan in the evaluation of stroke?

A. It helps to rule out an intracranial hemorrhage
B. It typically takes much longer to obtain than an MRI
C. It can immediately confirm the location of ischemic stroke
D. It is obtained only if the patient presents with profound unilateral weakness

Explanations:
A. Correct! This is the primary reason for using a head CT scan in management of stroke. Only after intracranial hemorrhage has been ruled out can a patient be considered for thrombolytic therapy to treat their ischemic stroke.
B. Incorrect. Head CT scan is extremely fast, with results in minutes. MRI takes much longer to perform and most hospitals do not staff MRI machines around the clock.
C. Incorrect. It takes several hours (typically 24 hours, though subtle changes may be seen as early as 6 hours) before the infarcted area in an ischemic stroke becomes visible in a head CT scan.
D. Incorrect. Unilateral weakness is only one symptom of stroke. Other symptoms (such as loss of speech capabilities, unilateral loss of vision, and sudden cognitive changes) are also concerning for stroke; anytime the doctor suspects a stroke, a head CT scan should be ordered as soon as possible.