Acute Brain Injury

Clients who survive an acute brain injury will require long-term physical care and rehabilitation. Although recovery is highly individualized, many clients who regain consciousness require life-long care; others remain in a coma or vegetative state. The family often expects the client to recover fully after the coma subsides, and they need information about the real possibility of residual deficits in self-care, emotional responses, cognition, communication, and movement. Topics that should be addressed for home care include:

- The need to encourage self-care and independence as much as possible.
- Positioning, movement, and skin care to prevent contractures and pressure ulcers.
- Safety issues.
- Equipment needs, such as a wheelchair and hospital bed.
- Vocational counseling and services.
- Referral to community resources and support groups.
- Helpful resources:
  - National Head Injury Foundation
  - Brain Trauma Foundation
  - International Center for Individuals with Disabilities

Wong Lee is a 50-year-old tug boat mechanic who is married and has three sons. Although Mr. Lee has been through rehabilitation twice for alcoholism, he has not been able to quit drinking. His physician has explained the physical consequences and the possible interaction between alcohol and the anticoagulant Mr. Lee is taking for chronic atrial fibrillation. While attending a family reunion, during which he eats a large meal and drinks several beers, Mr. Lee joins a game of softball. Mrs. Lee is concerned that Mr. Lee has consumed too much alcohol to play ball in the heat, but Mr. Lee is adamant and states that he wants to pitch. During the end of the second inning, the batter hits a ball that strikes Mr. Lee in the head. Mr. Lee stumbles and drops to the ground, holding his head. He does not lose consciousness and gets up on his own. His sons and wife try to persuade him to go to the hospital, but Mr. Lee insists he feels fine.

Two weeks later, after an evening of consuming several mixed drinks, Mr. Lee develops a headache. He attributes the headache to a hangover, but instead of improving the next day, the headache becomes steadily worse. He becomes confused and disoriented. His wife, concerned that his drinking is increasing again, calls the physician, who admits Mr. Lee to the detoxification center at the local hospital. A CT scan is performed. The diagnosis of a subdural hematoma is made, and Mr. Lee is transferred to the neurosurgical unit.

ASSESSMENT

When Saundra Knight, the nurse on the neurosurgical unit, enters the room, she notices that Mr. Lee is sitting in bed, laughing and giddy. As she begins to talk to Mr. Lee, he states, “Don’t ask me anything—I can’t think. My headache is getting worse.” Over the next few hours, the giddiness subsides, and Mr. Lee becomes drowsy. Ms. Knight reports a Glasgow Coma Scale score of 11. An

(continued)
THE CLIENT WITH A CENTRAL NERVOUS SYSTEM INFECTION

The central nervous system (CNS), including the meninges, neural tissues, and blood vessels, may be directly affected by bacteria, viruses, fungi, protozoans, and rickettsiae. The CNS may also be affected by toxins from bacterial infections. The major CNS infections include meningitis, encephalitis, and brain abscesses.

INCIDENCE AND PREVALENCE

The most common infection of the meninges is bacterial meningitis. The mortality rate is 25% in adults. Brain abscess occur 2 times more often in men than in women, with the median age for abscess formation 30 to 40 years (McCance & Huether, 2002). Meningococcal meningitis may occur in epidemics among people who are in close contact with one another, such as military recruits and students living in dormitories. Pneumococcal meningitis, in contrast, primarily affects the very young and very old.

The incidence of pathogenic infections of the CNS increases with the onset of AIDS. Clients who are HIV positive may have CNS infections caused by toxoplasmosis, cryptococcus, tuberculosis, herpes simplex, cytomegalovirus, or a polyoma virus (resulting in progressive multifocal leukoencephalopathy).

Risk Factors

Those at highest risk are the young, frail older adults, those with debilitating diseases, and the immunosuppressed (such as clients having radiation therapy or chemotherapy treatments). Other risk factors are having AIDS, having an infection elsewhere in the body, and having a skull fracture or invasive neurosurgery (King, 1999).

PATHOPHYSIOLOGY AND MANIFESTATIONS

When pathogens enter the CNS and the meninges, an inflammatory process results. The pathology of CNS infections includes the invading pathogens, the subsequent inflammation, and the increase in intracranial pressure that may result from the inflammatory processes. Both the pathogenic damage and the increased ICP may result in brain damage and life-threatening complications.

Meningitis

Meningitis is an inflammation of the pia mater, the arachnoid, and the subarachnoid space. Inflammation spreads rapidly throughout the CNS because of the circulation of CSF around the brain and spinal cord. Infection is the usual cause of meningitis, although chemical meningitis may also occur (Porth, 2002). Meningitis may be acute or chronic, and it may be bacterial, viral, fungal, or parasitic in origin.

In meningitis, the infecting organisms usually reach the CNS in one of two ways: by direct extension, such as can occur after cranial trauma or invasive procedures (e.g., ICP monitoring devices or neurosurgery); or through the bloodstream secondary to another infection in the body.

The organism responsible for meningitis must overcome nonspecific and specific host defense mechanisms to invade and replicate in the CSF. These defenses include the skin barrier, the blood-brain barrier, the nonspecific inflammatory response, and the immune response. Host response to the partic-