# Communications

# Occult Hydrocephalus in the Elderly

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The elderly patient who presents with disordered mental function is often relegated to institutional care facilities whenever he or she is unable to render his own personal care. Labeled as "senile" or "demented," the patient is often neglected by both family and physician because of the assumption that the aging process is associated with a natural decline in mental function. Dementia can be defined as an acquired and persistent impairment of intellectual function with compromise in at least three of the following areas: language, memory, visual-spacial skills, personality, and cognition.[1] The etiology of dementia can be diagnosed in approximately 50 percent of cases, and potentially reversible lesions can be found in up to 30 percent of cases. Occult hydrocephalus represents one of the most frequent forms of reversible dementia, diagnosis of which is readily made by computerized axial tomography (CT scanning).[2]

## Case Reports

### *Case 1*

A 79-year-old white man presented with weakness in both legs and incoherent speech. The family had noticed a gradual decline in function for three to four months, which included difficulty in ambulating and mild, progressive confusion. In his gait, he had deteriorated from being ambulatory to using a cane, then a walker, until finally he had difficulty walking even with assistance. He had increased difficulty with incontinence, primarily because he was unable to reach the bathroom quickly enough when the urge to void was present. The patient had been maintained on aspirin and dipyridamole (Persantine) following a right carotid endarterectomy five years ago. One year previously, the patient had been treated for congestive heart failure. He smoked three to four packs of cigarettes per day and consumed two to four ounces of alcohol each evening.

On examination, the patient was confused, agitated, and disoriented. He followed verbal commands if they were given persistently. The speech was unintelligible and inappropriate. Truncal gait, ataxia, and apraxia were present. Fundoscopic examination was normal. Bilateral carotid bruits were present, and no jugular venous distention was noted. The lungs were clear. Cardiac rhythm was regular with an occasional irregular beat. Otherwise, the physical examination was normal.

Abnormal laboratory studies included 2+ proteinuria, serum creatinine of 1.9 mg/100 ml, and blood urea nitrogen of 42 mg/100 ml. Chest x-ray studies demonstrated a calcified aortic arch with mild enlargement of the heart. Electrocardiogram demonstrated first degree arterioventricular block with ST-T wave changes and an old inferior myocardial infarction. Complete blood count, cardiac enzymes, and thyroid profile were normal. A CT scan demonstrated obstructive hydrocephalus with a circular high density lesion and obstruction of the third ventricle at the foramen of Monroe (Figure 1). The patient was taken to surgery and a colloid cyst removed. Postoperatively, the patient's neurologic status did not change remarkably. Six months later the patient died from aspiration pneumonia.

### *Case 2*

A 75-year-old white man presented with three to four episodes of memory loss, tingling of the right arm, and episodes of moaning as if he were in pain. No seizure activity had been noted. In addition, the patient had exertional chest pain consis-

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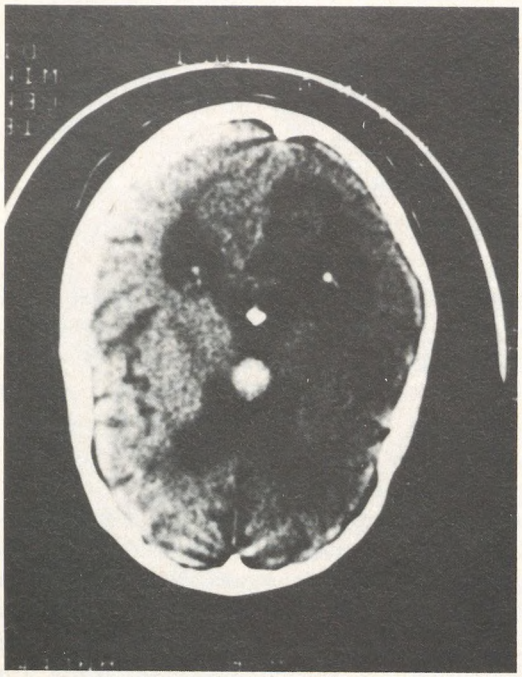

Figure 1. Occult hydrocephalus in a 79-year-old white man

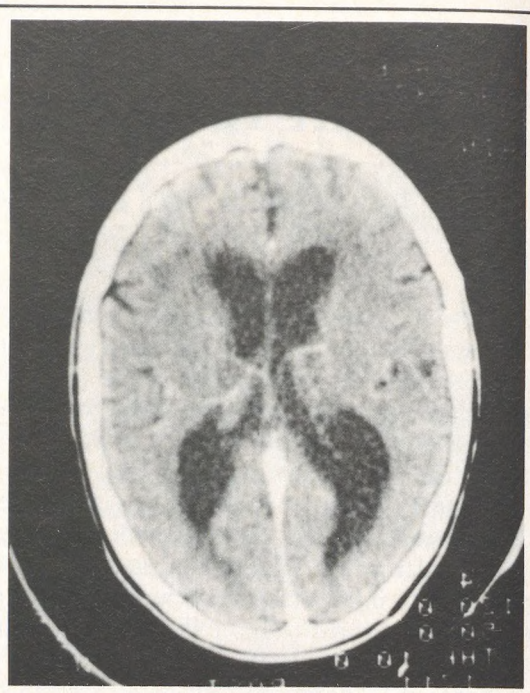

Figure 2. Occult hydrocephalus in a 75-year-old white man

tent with angina pectoris, orthostatic dizziness, and instability. The patient was noted to have a shuffling unstable gait which required the use of a cane. The patient was alert and responsive but did have memory loss for recent events.

Physical examination revealed normal visual fields. Fundoscopic examination proved normal and no carotid bruits were noted. A grade II systolic ejection murmur was heard, maximum over the second right intercostal space with radiation throughout the pericardium and toward the carotids bilaterally. Blood pressure was 160/76 mmHg, sitting and standing. Otherwise, the physical examination was normal. Electrocardiogram was normal. An echocardiogram demonstrated moderate aortic stenosis with ventricular hypertrophy and paradoxical movement of the ventricular septum. A CT scan demonstrated marked ventricular enlargement of the ventricular system with prominent sulci consistent with a communicating normal pressure hydrocephalus (Figure 2). Electroencephalogram was normal. Over the past six months the symptoms have not been progressive. Memory and gait have not deteriorated and the patient has not developed incontinence.

## Discussion

Hydrocephalus is generally subdivided according to whether increased intracranial pressure is present. When clinical signs, such as papilledema and Cushing's blood pressure reflex, are absent, the term *normal pressure hydrocephalus* is clinically defined. Furthermore, normal pressure hydrocephalus is subdivided into communicating and noncommunicating types to indicate the ease of flow of the cerebral spinal fluid through the cortical subarachnoid channels. Normal pressure hydrocephalus is associated with multiple clinical conditions including subarachnoid hemorrhage, intracranial surgery for benign tumor, head trauma, and cerebral and subdural hematoma; however, the majority of cases are of unknown etiology. The primary symptoms are dementia, gait disorders, headache, and urinary incontinence. Of these, dementia is usually the most prominent feature. Patients often present with defects in memory, orientation, slow cerebration, or lack of emotional spontaneity. The adaptation of many patients to disordered mental function can at times be striking, and many may

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function in an apparently normal manner. The severity of the dementia can be quite variable even from day to day. Apathy and inattentiveness are usually the first symptoms to appear. Gait disturbances generally occur later than the dementia, often several months after the onset of mental symptoms. Commonly, a spastic gait with increased tendon reflexes and extensor plantar signs are present. At times the gait is shuffling or may mimic parkinsonism. The patients frequently fall, and in advanced cases walking, sitting, and standing become increasingly difficult. Urinary incontinence completes the triad of symptoms and may not be noticed by the patient. Often a detailed history from both the patient and family members is necessary to arrive at the correct diagnosis.[2-5]

A diagnosis of hydrocephalus in the elderly patient is difficult to obtain by clinical criteria. Dementia may be produced by drug toxicity, electrolyte disturbance, brain tumor, and metabolic or endocrinologic disorders. Separating patients into etiologic groups may require a comprehensive battery of tests. CT scanning is a safe, noninvasive technique that has greatly facilitated the diagnosis of hydrocephalus and eliminated the need for other invasive procedures.

The prognosis of hydrocephalus is poor if left untreated. Approximately one half of the patients die within the first eight to ten years after diagnosis.[6] The response of patients to cerebrospinal fluid diversion is variable. Those with symptoms of less than six months' duration, without structural etiology or cortical atrophy, whose symptoms improve after cerebrospinal fluid pressure is lowered and who have abnormal saline infusion and radionuclear cisternography have the best prognosis. Sixty percent of patients improve after shunting, with an operative mortality of five to ten percent.[7,8]

In summary, occult hydrocephalus in the elderly can present with a varied clinical format and may suggest diseases of a vascular or degenerative basis. The triad of dementia, gait disturbances, and urinary incontinence should lead one to suspect this disorder. However, it is important to realize that the clinical manifestations may be subtle; therefore, patients who show disordered mental function should receive a thorough workup to explain their dementia.

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# Carbon Monoxide Poisoning

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Carbon monoxide, a hazard in many industries, manufacturing processes, and places of work, is considered the most common cause of industrial poisoning in man. It is odorless, tasteless, colorless, nonirritating, and gives no warning of its presence. In addition, the symptoms associated with its toxicity may be mild and nonspecific.[1] As it has about the same density as air, it mixes readily without stratification.[2] It is produced from the incomplete combustion of organic materials and is a prominent constituent of exhaust fumes from automobile and other engines and from furnaces. Some industries with a greater risk of carbon monoxide exposure include iron and steel foundries, pulp paper mills, petroleum refineries, sintering mills, and plants manufacturing formaldehyde and coke.[1] Carbon monoxide's ubiquity and its avidity for combining with hemoglobin at the expense of oxygen make it a major environmental

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