# Practical Psychiatry in Medicine
## Part 11. Organic Brain Syndrome

Organic brain syndrome (OBS) refers to those conditions characterized by changes in mental functioning, particularly cognition, which result from diffuse or local destruction of brain tissue or from an alteration of metabolism that affects all or part of the brain. These syndromes are etiologically associated with a wide variety of disorders: trauma, intoxication, metabolic disorders, neoplasms, vascular insufficiency, infections, degenerative neurologic diseases, and occult hydrocephalus. In view of the extremely broad range of etiologic factors, diagnosis and management rest upon the physician's knowledge of general medicine and neurology. In this chapter, we will describe the mental and behavioral characteristics of the various types of OBS and some broadly applicable principles of management.

### General Considerations

In most organic brain syndromes, the cognitive functions of the mind are the most severely affected. Cognition refers to all those mental processes involved in the acquisition and utilization of knowledge: conscious awareness, interpretation of sensory stimuli or perception, attention, concentration, memory, reasoning, and judgment. Any one or all of the components of cognition may be affected in varying degrees in OBS. Each component of cognition is functionally related to every other component. For example, memory underlies all of the highest integrative functions of the brain. To reason; to establish orientation in time, place, or person; to decide on a goal and keep it in mind; to exercise judgment (which requires assessment of the present in the light of past experience); to speak coherently; all require the constant use of memory.

Disorders of memory are extremely common in OBS and can generally be classified into two types: anterograde amnesia and retrograde amnesia. The former refers to impairment in the ability to acquire new memories, ie, learning. Retrograde amnesia refers to difficulty in recalling information that has already been learned, ie, memories from the past. In retrograde amnesia it is common for more recently acquired information to be lost before older information is forgotten, ie, "recent memory" is usually affected more than is "remote memory." Most patients with OBS with memory impairment have a combination of anterograde and retrograde amnesia.

Affect and various aspects of behavior are also commonly affected in OBS. In fact, it is not rare for an early manifestation of organic brain disease to consist of a slowly progressive change in personality associated with emotional blunting or indifference, apathy, and inappropriate social behavior which is "out of character" for the patient. These personality changes may be extremely distressing and bewildering to the patient's family.

Finally, part of the clinical picture presented by the patient with OBS is a function of the patient's psychologic reaction to his own cerebral deficit, especially when confronted with an environmental challenge that highlights an intellectual deficit.

### Classification of OBS

A time-honored system of classification considers the organic brain syndromes as falling into two groups: acute brain syndrome and chronic brain syndrome. The essential difference between these two groups is that the former is reversible and the latter is irreversible. The simplicity of this classification scheme and its emphasis on the critical issue of reversibility (and hence treatability) are its major virtues. However, not all brain syndromes that have an acute mode of onset are reversible, nor are all brain syndromes that develop slowly over a long period of time irreversible. Further, this simple dichotomous scheme does not do justice to the various subtypes of organic brain syndromes.

Lipowski[6] has proposed a tentative classification of OBS which makes allowance for the diversity of syndromes encountered by the clinician. While early assessment of potential reversibility and treatability is of the greatest importance, it is nonetheless true, as Lipowski has commented, that reversibility can only be established with certainty retrospectively, that

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there are degrees of reversibility, and therefore the use of that one characteristic as the basis for classification is of dubious validity.

Lipowski groups organic brain syndromes as follows:

1. OBS with global cognitive impairment
2. OBS with selective psychologic deficit or abnormality
3. Symptomatic functional syndromes

The last group includes psychotic states in which there is a toxic factor and which may resemble functional emotional disorders, an example being the schizophrenia-like syndrome sometimes seen with amphetamine intoxication.

**OBS with Global Cognitive Impairment**

The three syndromes in this category have in common an impairment of many cognitive functions.

### *Delirium*

In delirium, a rapidly developing confusional state, the basic features of impaired cognition are typically present, namely, defective memory (retrograde and anterograde), disorientation, faulty judgment, and difficulty in concentration, comprehension, and reasoning.

Some delirious patients, though quite confused, may remain relatively quiet, inactive, and depending upon the nature and progression of the underlying disease process, may slip into deeper levels of impaired consciousness, stupor, or coma. The EEG of this type of patient is apt to show high amplitude, slow background activity.[4]

Other delirious patients exhibit marked excitement and hyperactivity. These features are apt to be associated with visual and auditory hallucinations, often of a frightening nature, and fragmented, changing paranoid delusions. The patient may talk excitedly and in a rambling, incoherent manner.

Delirious patients, whether excited, quiet, or in between these two extremes, may pose considerable danger to themselves because of their disorientation and poor judgment. The panicky, excited, confused patient is a particular danger to himself and sometimes to others. The patient may disconnect intravenous tubing, walk off the ward, or jump out the window.

Delirious states characteristically wax and wane during the 24-hour period, tending to get worse at night. This fluctuation in the patient's condition may be fairly marked, so that if he is seen during one of his better periods (which may occur in midday) the diagnosis may be missed. If there is a history (usually from the evening nursing staff) that the patient has been irritable, unreasonable, or otherwise has exhibited periods of troublesome behavior, it is wise to suspect delirium and to examine the patient at various times in the 24-hour cycle, especially in the evening.

The causes of delirium are manifold and include drug intoxication, drug or alcohol withdrawal, head trauma, infections, vascular disease, and metabolic disorders.

### *Subacute Amnestic-Confusional State*

Subacute amnestic-confusional state, sometimes referred to as "reversible dementia," is intermediate between delirium and dementia. The mode of onset is related to the underlying cause; the condition is apt to develop slowly and insidiously when it is etiologically associated with such conditions as slowly progressive hepatic or renal failure; hypothyroidism; chronic intoxication with barbiturates, bromides, or lead; a slowly growing intracranial neoplasm; normal pressure hydrocephalus; and so forth. The syndrome may follow an acute organic affection of the CNS such as that produced by trauma, infection, intracranial hemorrhage, cerebrovascular occlusion, and intracranial neoplasma.

The syndrome is characterized by diffuse impairment of cognitive function: patients do poorly in tasks of memory, especially of recent events, learning new facts, orientation, abstract reasoning, concentration, and comprehension. Unlike delirium, the course is usually protracted.

Of great importance is the potential, sometimes complete, reversibility of subacute amnestic-confusional states. Therefore the timely diagnosis of this syndrome is of considerable importance, since effective treatment of the underlying disorder can reverse some or all of the mental deficit and can prevent the progression to irreversible dementia.

### *Dementia*

Dementia refers to organic brain syndromes associated with cerebral cortical damage and characterized by widely varying degrees of impairment of cognitive function. The condition usually, but not always, has a slow and insidious onset. Depending upon the nature of the underlying disorder, the state of dementia may be static or progressive. Most patients with dementia, even those in whom the condition is progressive, show a considerable fluctuation in intellectual

functioning, having moments of relative lucidity and periods in which cognitive functions are particularly severely impaired.

In considering etiology of the dementias it is necessary to bear in mind that the intellectual processes, which Hughlings Jackson called "the highest integrative" functions, cannot be precisely localized in the cerebral cortex. The degree of impairment of memory and other cognitive functions in the dementias is better correlated with the amount of cortex involved by the disease process than with the precise location of the lesion. Chapman and Wolff[3] reported that loss of as little as 30 gm of cerebral tissue from neurosurgery could result in measurable deficits on formal psychologic testing. Patients who had lost 30 to 60 gm of cerebral tissue were slowed down, tended to avoid new or challenging tasks, and fatigued easily. The same correlation between quantity of tissue lost and loss of mental capacities was observed when the former was estimated by measurement of enlarged ventricular spaces.[3]

Any process which results in substantial destruction of cortical tissue, therefore, can result in some degree of dementia; if the destructive process is progressive, the dementia also will be progressive. The dementias are thus associated with a wide variety of causative factors, including head trauma; space-occupying intracranial lesions; and condition producing sustained anoxia such as vascular narrowing or occlusion, apnea, profound shock, and carbon monoxide poisoning; CNS infections; occult hydrocephalus; and degenerative neurologic diseases. Among the latter group, the most common disorder is senile dementia. Presenile dementia or Alzheimer's disease is pathologically identical with senile dementia and is arbitrarily distinguished from it by its onset before the age of 60 years. Pick's disease is a rare form of presenile dementia which produces distinctive changes in the cortex, but is clinically indistinguishable from Alzheimer's disease.[12]

Since the demonstration of a "slow virus" infection in kuru, a dementia-producting disease affecting the natives of eastern New Guinea, three other dementias have become suspected of being the result of chronic viral infection, namely, progressive multifocal leukoencephalopathy, inclusion body encephalitis, and Creutzfeld-Jakob disease.

### Clinical Characteristics and Course

The clinical features of dementia are the result of:

1. Impairment of cognitive functions.
2. Behavior related to disinhibition resulting from destruction of CNS centers or systems.
3. Compensatory mechanisms.
4. Adverse psychologic reactions to the disease itself and to incidental life events.

When the disorder develops insidiously, as is typically the case with senile or presenile dementia, the initial manifestations may consist of changes in personality which may or may not be subtle. Friends and relatives note that the patient no longer seems like himself; he lacks a certain sparkle or involvement with life or concern and interest in others that he customarily possesses; perhaps his personal habits begin to deteriorate so that he is careless about dress and grooming, is late for appointments; and does not show his usual sense of responsibility, acumen, and judgment. At first the patient's friends and relatives may react to these "personality changes" with irritation but as the patient's condition worsens they become dismayed and seek ways to obtain medical attention for the patient. In other cases, the dementia initially manifests itself not by personality changes but by memory loss, especially for recent events, which may be first noticed by the patient himself.

*Impairment of Cognitive Functions.* Usually the earliest intellectual loss involves memory. Almost invariably recent memory is more severely affected than is memory for events of the remote past, but the latter also deteriorates as the disease progresses. Anterograde amnesia is present also and as this progresses the patient loses his ability to learn new facts, concepts, or skills. As retrograde and anterograde amnesia worsens, the patient cannot keep track of spatial and temporal data; he becomes disoriented, usually first in time and later in place but rarely in personal identification. Deterioration of all other intellectual faculties ensues, eg, marked impairment of abstract reasoning, inability to communicate ideas coherently, and faulty judgment.

*Disinhibition Phenomena.* Behavior resulting from poor control of impulses may occur early in the course of dementia or may not be observed until the disease is more advanced. It is often difficult in a particular instance to determine if a given behavior is due to lack of intact inhibitory neural systems, or if it is related to emotional blunting (lack of concern) or to grossly impaired judgment secondary to cognitive loss. It may be that all three of these factors operate together in most cases. The sorts of behavior to which we are referring are those

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which are inappropriate for the individual patient in the light of his particular personality and his situation in life. Thus newly acquired vulgarity of speech, uninhibited and inappropriately displayed sexual behavior, open expressions of hostility in unusual degree or fashion, spending money "foolishly," disregarding the sensitivities or needs of others, all of these and more reflect, at least in part, a markedly decreased ability to control social behavior in a manner customary and appropriate for the patient.

*Compensatory Mechanisms.* Patients compensate for cognitive loss in many ways. Early in the illness, the patient may openly accept his memory loss and attempt to help himself by writing things down. As the illness progresses, many patients tend to avoid situations in which the memory loss is apt to be revealed and to avoid changes and new or unfamiliar experiences. The patient's range of activities thus becomes narrowed and he becomes more isolated socially. It is not uncommon for patients with organic brain disease to be seemingly unaware of their intellectual deficits, as if they are able to deny (to some extent) the reality of their condition.

*Adverse Psychologic Reactions.* The brain-damaged patient, when confronted (especially repeatedly) with an intellectual task in which he cannot succeed, may lose emotional control and exhibit tantrum-like behavior. Some patients, whether at home or in the hospital, develop paranoid ideas as they become more demented. Paranoid ideas in dementia are usually fragmented and changeable rather than systematized and fixed as in paranoid schizophrenia. Hallucinations, more often auditory than visual, may occur. The demented patient's paranoia may buttress his denial of intellectual deficit, such as was the case with a forgetful older woman who accused the shopkeeper of cheating her when actually she had forgotten that she gave only a $5 bill and not a $10 one. Depression, either in reaction to the loss of intellectual function or to some other loss in the patient's life, may occur and may substantially intensify impairment of cognitive function.

**OBS with Selective Psychologic Deficit**

OBS with selective psychologic deficit is the result of focal rather than diffuse brain damage and is characterized by relatively restricted rather than global impairment of mental functioning.

## *Amnestic Syndromes*

In amnestic syndromes memory loss is the predominant symptom. These syndromes may or may not be accompanied by unawareness of the memory loss and confabulation. In the Wernicke and Korsakoff syndromes the memory difficulty is characterized by both anterograde and retrograde amnesia; this condition, which is sometimes reversible, is associated with bilaterally symmetric lesions in the diencephalon. Anterograde amnesia, without significant retrograde amnesia, is associated with bilateral lesions of the hippocampus.[11]

## *Hallucinosis*

Hallucinosis refers to an organic brain syndrome with recurrent or persistent hallucinations in a patient with clear consciousness and no other evidence of a functional psychosis (loosened associations, mood disorder). It can be seen in alcohol withdrawal and with intoxication from drugs such as cocaine, bromides, and hallucinogens. Migraine syndromes can occasionally give this, and optic nerve or auditory nerve compression may lead to hallucinations in the respective sensory channel. A further distinction relates to the patient's insight, or belief in the reality of his hallucinatory experiences. Some patients acknowledge the hallucinations as a disease process, and therefore would not be considered psychotic. Other patients firmly believe that the hallucinations represent reality; they are by definition psychotic.

## *Frontal Lobe Syndromes*

Frontal lobe damage probably has to be bilateral to produce the classic picture. The symptoms include poor modulation of mood with irritability, indifference, euphoria, depressionlike inactivity or apathy, loss of motivation and goal-directed behavior, poor control of impulses, and lack of initiative or spontaneity. The patient may have difficulty in maintaining attention during the interview and in abstract thinking. Recent memory may be impaired.

A basic deficit according to Oppenheimer[7] is that the patient with frontal lobe damage cannot see into the future, ie, cannot anticipate the consequences of his behavior. This concept can account for such silly behavior as that of the man who put a slice of bread smeared with jam into a toaster, and was totally surprised by the resulting mess. Similar lack of foresight may have more serious results. Oppenheimer mentions a man who decided to retrieve the cigar he had just dropped from a window; he sustained a leg fracture after jumping out to catch the cigar. He later said: "I just wanted

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to get it, I couldn't see what would happen to me."[7]

### Temporal Lobe Syndromes

Temporal lobe dysfunction can lead to various deficits. Bilateral amputation of temporal lobes in man or other primates results in the Klüver-Bucy syndrome with loss of appropriate fear and anger, continuous anterograde amnesia, compulsive oral behavior, and indiscriminate sexual activity.

Irritative lesions from any cause may give rise to psychomotor seizures ("temporal lobe epilepsy"). These are characterized by (1) various subjective manifestations such as feelings of depression, anxiety; distortions of perception, eg, macropsia and micropsia; depersonalization and déjà vu or jamais vu experiences; auditory and gustatory hallucinations; abdominal pain and other sensations; and (2) various motor manifestations such as repetitive activities or automatisms including lip-smacking, chewing, or engaging in some other action repeatedly; rarely there are outbursts of aggressive behavior. There is amnesia for the events of the seizure and often there is impairment of recall for events of the preictal and postictal periods.

### Parietal Lobe Syndromes

Parietal lobe syndromes involve language function, with the patient unable to name objects (aphasia) or to know how to use them (apraxia) or both. A man was brought to the emergency psychiatric unit by his wife who insisted he was depressed since he was no longer able to perform as a foreman in a sheet metal works. On careful examination, it was noted that he called a hamburger a "ham sandwish." Further history indicated that the actual problem at work was that he could not tell the other men which tool to use for a particular operation, though he could show them what to do. He subsequently received irradiation for a large parietal lobe glioma, and much of his aphasia and apraxia abated.

Body image representation also requires the parietal lobes, and lesions of the nondominant parietal lobe lead to disregard of the opposite side of the body. A 57-year-old woman was admitted to psychiatric hospital for depression; in the ward she put on a sweater, leaving her left arm out of the sleeve, and denied anything was amiss when asked about it. She had a meningioma compressing her right parietal area.

### Anosognosia

Anosognosia refers to a particular type of deficit in self-representation. Denial of illness, especially denial or disregard of such neurologic conditions as hemiplegia or hemianopsia, can be extremely disturbing to family and to nursing-medical staff caring for the patient. This denial or, more properly speaking, disregard, may represent a neurologic deficit, and should be given serious attention. Anosognosia is not a localizing symptom, as the condition may result from lesions in frontal, parietal, or other areas.[13]

### Depersonalization

Depersonalization may be due to psychologic causes or may result from organic brain dysfunction. Again, it is not a localizing symptom, but may accompany epilepsy, temporal lobe disease, as well as neurotic or psychotic illnesses. The patient feels an uncanny sense that things are not quite right, not real, and that he may be a changed person or even someone else. Apparently what is lacking is a sense of participation, as if there is a failure to integrate cognitive and affective aspects of experience. Most patients who experience depersonalization describe it as strangely alien, and they retain insight in the sense that the experience is regarded as a symptom of some sort even though its origin is not understood. In schizophrenia, however, depersonalization may lead to delusional explanations of the phenomenon. Depersonalization usually is a transient or paroxysmal symptom.

### Symptomatic Functional Syndromes

Symptomatic functional syndromes include psychoses which arise in the course of an organic brain disorder, improve as the organic condition resolves, and which closely resemble or are even clinically indistinguishable from schizophrenic, paranoid, and affective syndromes. There may or may not be accompanying cognitive deficits.

An occult abdominal neoplasm such as carcinoma of the pancreas or carcinoma of the colon may be associated with severe depression; the explanation for this phenomenon is not known. It is also noted that depression can be associated with a variety of drugs such as reserpine and methyldopa. Mood alteration of a manic or depressive

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