Catatonia: How to identify and treat it

Features that overlap with other syndromes make the diagnosis easy to overlook

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Is catatonia a rare condition that belongs in the history books, or is it more prevalent than we think? If we think we don't see it often, how will we recognize it? And how do we treat it? This article reviews the evolution of our understanding of the phenomenology and therapy of this interesting and complex condition.

History of the concept

In 1874, Kahlbaum[1,2] was the first to propose a syndrome of motor dysfunction characterized by mutism, immobility, staring gaze, negativism, stereotyped behavior, waxy flexibility, and verbal stereotypies that he called catatonia. Kahlbaum conceptualized catatonia as a distinct disorder,[3] but Kraepelin reformulated it as a feature of dementia praecox.[4] Although Bleuler felt that catatonia could occur in other psychiatric disorders and in normal people,[4] he also included catatonia as a marker of schizophrenia, where it remained from DSM-I through DSM-IV.[3] As was believed to be true of schizophrenia, Kraepelin considered catatonia to be characterized by poor prognosis, whereas Bleuler eliminated poor prognosis as a criterion for catatonia.[3]

In DSM-IV, catatonia was still a subtype of schizophrenia, but for the first time it was expanded diagnostically to become both a specifier in mood disorders, and a syndrome resulting from a general medical condition.[5,6] In DSM-5, catatonic schizophrenia was deleted, and catatonia became a specifier for 10 disorders, including schizophrenia, mood disorders, and general medical conditions.[3,5-9] In ICD-10, however, catatonia is still associated primarily with schizophrenia.[10]

A wide range of presentations

Catatonia is a cyclical syndrome characterized by alterations in motor, behavioral, and vocal signs occurring in the context of medical, neurologic, and psychiatric disorders.[8] The most common features are immobility, waxy flexibility, stupor, mutism, negativism, echolalia, echopraxia, peculiarities of voluntary movement, and rigidity.[7,11] Features of catatonia that have been repeatedly described through the years are summarized in *Table 1*[8,12,13] (*page 19*). In general, presentations of catatonia are not specific to any psychiatric or medical etiology.[13,14]

Catatonia often is described along a continuum from retarded/stuporous to excited,[14,15] and from benign to malignant.[13] Examples of these ranges of presentation include[5,12,13,15-19]:

Stuporous/retarded catatonia (Kahlbaum syndrome) is a primarily negative syndrome in which stupor, mutism, negativism, obsessional slowness, and posturing predominate. Akinetic mutism and coma vigil are sometimes considered to be types of stuporous catatonia, as occasionally are locked-in syndrome and abulia caused by anterior cingulate lesions.

Excited catatonia (hyperkinetic variant, Bell's mania, oneirophrenia, oneroid state/syndrome, catatonia raptus) is characterized by agitation, combativeness, verbigeration, stereotypies, grimacing, and echo phenomena (echopraxia and echolalia).

Malignant (lethal) catatonia consists of catatonia accompanied by excitement, stupor, altered level of consciousness, catalepsy, hyperthermia, and autonomic instability with tachycardia, tachypnea, hypertension, and labile blood pressure. Autonomic dysregulation, fever, rhabdomyolysis, and acute renal failure can be causes of morbidity and mortality. Neuroleptic malignant syndrome (NMS)—which is associated with dopamine antagonists, especially antipsychotics—is considered a form of malignant catatonia and has a mortality rate of 10% to 20%. Signs of NMS include muscle rigidity, fever, diaphoresis, rigor, altered consciousness, mutism, tachycardia, hypertension, leukocytosis, and laboratory evidence of muscle damage. Serotonin syndrome can be difficult to distinguish from malignant catatonia, but it is usually not associated with waxy flexibility and rigidity.

Several specific subtypes of catatonia that may exist anywhere along dimensions of activity and severity also have been described:

Periodic catatonia. In 1908, Kraepelin described a form of periodic catatonia, with rapid shifts from excitement to stupor.[4] Later, Gjessing described periodic catatonia in schizophrenia and reported success treating it with high doses of thyroid hormone.[4] Today, periodic catatonia refers to the rapid onset of recurrent, brief hypokinetic or hyperkinetic episodes lasting 4 to 10 days and recurring during the course of weeks to years. Patients often are asymptomatic between episodes except for grimacing, stereotypies, and negativism later in the course.[13,15] At least some forms of periodic catatonia are familial,[4] with autosomal dominant transmission possibly linked to chromosome 15q15.[13]

A familial form of catatonia has been described that has a poor response to standard therapies (benzodiazepines and electroconvulsive therapy [ECT]), but in view of the high comorbidity of catatonia and bipolar disorder, it is difficult to determine whether this is a separate condition, or a group of patients with bipolar disorder.[5]

Late (ie, late-onset) catatonia is well described in the Japanese literature.[10] Reported primarily in women without a known medical illness or brain disorder, late catatonia begins with prodromal hypochondriacal or depressive symptoms during a stressful situation, followed by unprovoked anxiety and agitation. Some patients develop hallucinations, delusions, and recurrent excitement, along with anxiety and agitation. The next stage involves typical catatonic features (mainly excitement, retardation, negativism, and autonomic disturbance), progressing to stupor, mutism, verbal stereotypies, and negativism, including refusal of food. Most patients have residual symptoms following improvement. A few cases have been noted to remit with ECT, with relapse when treatment was discontinued. Late catatonia has been thought to be associated with

Table 1

Features of catatonia

Feature	Description
Stupor	Extreme hypoactivity and immobility. Absence of movement or reaction when awake; not actively relating to environment
Excitement	Purposeless hyperactivity. Agitation not influenced by external stimuli
Mutism	Extreme verbal unresponsiveness in the absence of aphasia
Logorrhea	Excessive, monotonous speech
Staring	Fixed gaze at a distance, often with limited tracking, little eye contact, and poor blinking to threat
Posturing	Spontaneous, active maintenance of rigid postures against gravity
Grimacing	Contortion of facial features
Rigidity	Maintaining stiff position despite efforts to move patient
Psychological pillow	Type of posturing involving a reclined position with head and shoulders raised as if on a pillow, maintained for extended periods
Mannerisms	Repetitive, idiosyncratic, purposeful caricatures of movements or gestures, such as using hands when talking
Ambitendency	Alternation between cooperation with and resistance to instructions
Waxy flexibility	Patient can be positioned in uncomfortable positions that patient maintains for long periods with slight resistance to examiner
Automatic obedience	Exaggerated cooperation with a request or excessive continuation of a requested movement
Mitgehen	Type of automatic obedience in which patient can be positioned in any posture with minimal effort, even when told to resist, but unlike in waxy flexibility, body part immediately returns to original position
Mitmachen	Variant of automatic obedience in which body can be put into any posture despite instructions to resist
Catalepsy	Maintenance of fixed sitting or standing position against gravity that appears uncomfortable with minimal movement in response to external stimuli, including pain
Motor perseveration	Persistence of a movement after the original intent or command has ceased
Echopraxia	Mimicking another's movements
Echolalia	Nearly simultaneously mimicking another's speech
Stereotypy	Involuntary, coordinated, rhythmic, and repetitive but purposeless movement or behavior, such as chewing, rocking, grimacing, shrugging, hand waving, opening and closing eyes, mouth and jaw movements; may involve self-injurious behaviors, such as self-hitting, biting, scratching; phonic stereotypies include sniffing, clicking, snorting, moaning, and other meaningless sounds
Verbigeration	Verbal stereotype consisting of continuously repeating (perseverating) meaningless words or phrases
Aversion	Avoidance of examiner when called
Grasp	Automatic grasping of examiner's hand
Obstruction	Sudden block of a movement
Gegenhalten	Motiveless resistance to movement by examiner of part of patient's body with equal and opposite force to that of examiner
Negativism	Opposition or no response to instructions or external stimuli. Resistance to manipulation of limbs involving doing the opposite of what is asked, as opposed to simple resistance of gegenhalten
Social negativism (withdrawal)	Turning away when addressed, refusing to open eyes, closing mouth when offered food or liquids
Combativeness	Undirected aggression unprovoked by environmental threat and followed by no or a facile explanation
Autonomic abnormalities	Dysregulation of blood pressure, pulse, respiration, temperature

Source: References 8,12,13

Clinical Point

Periodic catatonia refers to recurrent, brief hypokinetic or hyperkinetic episodes lasting 4 to 10 days

Catatonia

Table 2
Medical and neurologic causes of catatonia
Structural CNS disease
Infectious and anti-NMDAR encephalitis
Other CNS infections (including HIV)
Seizure disorders
Neurocognitive/neurodegenerative disorders (eg, Lewy body dementia, Wilson disease, Huntington disease)
Normal pressure hydrocephalus
Hypoxic brain damage
Stroke
Subdural hematoma
Hypertensive encephalopathy
Delirium
Parkinsonism
Bilateral globus pallidus disease
Lesions of thalamus, parietal lobe, frontal lobe
Down syndrome
Tertiary syphilis
Endocrinopathies
Autoimmune/inflammatory disorders (eg, SLE, MS)
Takotsubo cardiomyopathy
Electrolyte disorders
G6PD deficiency
Pernicious anemia
Thrombotic thrombocytopenic purpura
Liver or kidney transplantation
Burns
Wasp sting
Pregnancy/postpartum
Deep brain stimulation complication

Source: References 5,13,15

G6PD: glucose-6-phosphate dehydrogenase; HIV: human immunodeficiency virus; MS: multiple sclerosis; NMDAR: *N*-methyl-D-aspartate receptor; SLE: systemic lupus erythematosus

late-onset schizophrenia or bipolar disorder, or to be an independent entity.

Untreated catatonia can have serious medical complications, including deep vein thrombosis, pulmonary embolism, aspiration pneumonia, infection, metabolic disorders, decubitus ulcers, malnutrition, dehydration, contractures, thrombosis, urinary retention, rhabdomyolysis, acute renal failure, sepsis, disseminated intravascular coagulation, and cardiac arrest.[11,12,16,20,21] Mortality approaches 10%.[12] In children and adolescents, catatonia increases the risk of premature death (including by suicide) 60-fold.[22]

Not as rare as you might think

With the shift from inpatient to outpatient care driven by deinstitutionalization, longitudinal close observation became less common, and clinicians got the impression that the dramatic catatonia that was common in the hospital had become rare.[3] The impression that catatonia was unimportant was strengthened by expanding industry promotion of antipsychotic medications while ignoring catatonia, for which the industry had no specific treatment.[3] With recent research, however, catatonia has been reported in 7% to 38% of adult psychiatric patients, including 9% to 25% of inpatients, 20% to 25% of patients with mania,[3,5] and 20% of patients with major depressive episodes.[7] Catatonia has been noted in .6% to 18% of adolescent psychiatric inpatients (especially in communication and social disorders programs),[5,8,22] some children,[5] and 6% to 18% of adult and juvenile patients with autism spectrum disorder (ASD).[23] In the medical setting, catatonia occurs in 12% to 37% of patients with delirium,[8,14,17,18,20,24] 7% to 45% of medically ill patients, including those with no psychiatric history,[12,13] and 4% of ICU patients.[12] Several substances have been linked to catatonia; these are discussed later.[11] Contrary to earlier impressions, catatonia is more common in mood disorders, particularly mixed bipolar disorder, especially mania,[5] than in schizophrenia.[7,8,17,25]

Pathophysiology/etiology

Conditions associated with catatonia have different features that act through a final common pathway,[7] possibly related to the neurobiology of an extreme fear response called tonic immobility that has been conserved through evolution.[8] This mechanism may be mediated by decreased dopamine signaling in basal ganglia, orbitofrontal, and limbic systems, including the hypothalamus and basal forebrain.[3,17,20] Subcortical reduction of dopaminergic neurotransmission

appears to be related to reduced $GABA_A$ receptor signaling and dysfunction of *N*-methyl-ᴅ-aspartate (NMDA) receptors with glutaminergic excess in striato-cortical or frontal cortico-cortical systems.[13,20,26,27]

Up to one-quarter of cases of catatonia are secondary to medical (mostly neurologic) factors or substances.[15] *Table 2*[5,13,15] (*page 20*) lists common medical and neurological causes. Medications and substances known to cause catatonia are noted in *Table 3*.[5,8,13,16,26]

Catatonia can be a specifier, or a separate condition

DSM-5 criteria for catatonia are summarized in *Table 4*.[28] With these features, catatonia can be a specifier for depressive, bipolar, or psychotic disorders; a complication of a medical disorder; or another separate diagnosis.[8] The diagnosis of catatonia in DSM-5 is made when the clinical picture is dominated by ≥3 of the following core features[8,15]:

• motoric immobility as evidenced by catalepsy (including waxy flexibility) or stupor

• excessive purposeless motor activity that is not influenced by external stimuli

• extreme negativism or mutism

• peculiarities of voluntary movement such as posturing, stereotyped movements, prominent mannerisms, or prominent grimacing

• echolalia or echopraxia.

DSM-5 criteria for the diagnosis of catatonia are more restrictive than DSM-IV criteria. As a result, they exclude a significant number of patients who would be considered catatonic in other systems.[29] For example, DSM-5 criteria do not include common features noted in *Table 1*[8,12,13] (*page 19*), such as rigidity and staring.[14,29] If the diagnosis is not obvious, it might be suspected in the presence of >1 of posturing, automatic obedience, or waxy flexibility, or >2 of echopraxia/echolalia, gegenhalten, negativism, mitgehen, or stereotypy/vergiberation.[12] Clues to catatonia that are not included in formal diagnostic systems and are easily confused with features of psychosis include whispered or robotic speech, uncharacteristic foreign accent, tiptoe walking, hopping, rituals, and odd mannerisms.[5]

Table 3

Medications and substances that induce catatonia

CNS depressant intoxication and withdrawal, including alcohol
Antipsychotics
Abrupt withdrawal of antipsychotics, including clozapine
Withdrawal of benzodiazepines and dopaminergic drugs
Lithium toxicity
Corticosteroids (eg, dexamethasone)
Opiates
Interferon
Quinolones
Levetiracetam
Azithromycin
Disulfiram
Methylphenidate
Gamma hydroxybutyric acid
Cannabinoids
Cocaine
Amphetamines
Mescaline
Phencyclidine

Source: References 5,8,13,16,26

Table 4

DSM-5 criteria for catatonia

Stupor
Catalepsy
Waxy flexibility
Mutism
Negativism
Posturing
Mannerism
Stereotypy
Agitation
Grimacing
Echolalia
Echopraxia

Source: Reference 28

Clinical Point

Up to one-quarter of cases of catatonia are secondary to medical (mostly neurologic) factors or substances

There are several catatonia rating scales containing between 14 and 40 items that are useful in diagnosing and following treatment response in catatonia (*Table 5*,[8,13,15,29] *page 22*). Of these, the Kanner Scale is primarily applied in neuropsychiatric settings, while the Bush-Francis Catatonia Rating

Catatonia

Table 5

Catatonia rating scales

Bush-Francis Catatonia Rating Scale
Modified Rogers Scale
Northoff Catatonia Rating Scale
Braunig Catatonia Rating Scale
Kanner Scale

Source: References 8,13,15,29

Table 6

Differential diagnosis of catatonia

Autism
Dystonia
Tardive dyskinesia
Akathisia
Tic disorders
Neuroleptic withdrawal dyskinesias
Neuroleptic malignant syndrome
Akinetic Parkinsonism/Parkinson's disease
Locked-in syndrome
Stiff man syndrome
Partial complex seizures
Nonconvulsive status epilepticus
Delirium
Frontotemporal dementia
Metabolic stupor
Malignant hyperthermia
Serotonin syndrome
Paratonia
Vegetative state (coma vigil)
Mania
Conversion disorder

Source: References 5,8,12,19,26,30

Scale (BFCRS) has had the most widespread use. The BFCRS consists of 23 items, the first 14 of which are used as a screening instrument. It requires 2 of its first 14 items to diagnose catatonia, while DSM-5 requires 3 of 12 signs.[29] If the diagnosis remains in doubt, a benzodiazepine agonist test can be instructive.[9,12] The presence of catatonia is suggested by significant improvement, ideally assessed prospectively by improvement of BFCRS scores, shortly after administration of a single dose of 1 to 2 mg lorazepam or 5 mg diazepam IV, or 10 mg zolpidem orally. Further evaluation generally consists of a careful medical and psychiatric histories of

patient and family, review of all medications, history of substance use with toxicology as indicated, physical examination focusing on autonomic dysregulation, examination for delirium, and laboratory tests as suggested by the history and examination that may include complete blood count, creatine kinase, serum iron, blood urea nitrogen, electrolytes, creatinine, prolactin, anti-NMDA antibodies, thyroid function tests, serology, metabolic panel, human immunodeficiency virus testing, EEG, and neuroimaging.[8,15,16]

A complex differential diagnosis

Manifestations of numerous psychiatric and neurologic disorders can mimic or be identical to those of catatonia. The differential diagnosis is complicated by the fact that some of these disorders can cause catatonia, which is then masked by the primary disorder; some disorders (eg, NMS) are forms of catatonia. *Table 6*[5,8,12,19,26,30] lists conditions to consider.

Some of these conditions warrant discussion. ASD may have catatonia-like features such as echolalia, echopraxia, excitement, combativeness, grimacing, mutism, logorrhea, verbigeration, catalepsy, mannerisms, rigidity, staring and withdrawal.[8] Catatonia may also be a stage of deterioration of autism, in which case it is characterized by increases in slowness of movement and speech, reliance on physical or verbal prompting from others, passivity, and lack of motivation.[23] At the same time, catatonic features such as mutism, stereotypic speech, repetitive behavior, echolalia, posturing, mannerisms, purposeless agitation, and rigidity in catatonia can be misinterpreted as signs of ASD.[8] Catatonia should be suspected as a complication of longstanding ASD in the presence of a consistent, marked change in motor behavior, such as immobility, decreased speech, stupor, excitement, or mixtures or alternations of stupor and excitement.[8] Freezing while doing something, difficulty crossing lines, or uncharacteristic persistence of a particular behavior may also herald the presence of catatonia with ASD.[8]

Catatonia caused by a neurologic or metabolic factor or a substance can be difficult to distinguish from delirium complicated

by catatonia. Delirium may be identified in patients with catatonia by the presence of a waxing and waning level of consciousness (vs fluctuating behavior in catatonia) and slowing of the EEG.[12,15] Antipsychotic medications can improve delirium but worsen catatonia, while benzodiazepines can improve catatonia but worsen delirium.

Among other neurologic syndromes that can be confused with catatonia, locked-in syndrome consists of total immobility except for vertical extraocular movements and blinking. In this state, patients attempt to communicate with their eyes, while catatonic patients do not try to communicate. There is no response to a lorazepam challenge test. Stiff man syndrome is associated with painful spasms precipitated by touch, noise, or emotional stimuli. Baclofen can resolve stiff man syndrome, but it can induce catatonia. Paratonia refers to generalized increased motor tone that is idiopathic, or associated with neurodegeneration, encephalopathy, or medications. The only motor sign is increased tone, and other signs of catatonia are absent. Catatonia is usually associated with some motor behaviors and interaction with the environment, even if it is negative, while the coma vigil patient is completely unresponsive. Frontotemporal dementia is progressive, while catatonia usually improves without residual dementia.[30]

Benzodiazepines, ECT are the usual treatments

Experience dictates that the general principles of treatment noted in *Table 7*[12,15,23,31] apply to all patients with catatonia. Since the first reported improvement of catatonia with amobarbital in 1930,[6] there have been no controlled studies of specific treatments of catatonia.[13] Meaningful treatment trials are either naturalistic, or have been performed only for NMS and malignant catatonia.[5] However, multiple case reports and case series suggest that treatments with agents that have anticonvulsant properties (benzodiazepines, barbiturates) and ECT are effective.[5]

Benzodiazepines and related compounds. Case series have suggested a 60% to 80% remission rate of catatonia with

Table 7
Principles of treatment of catatonia
Early treatment is important
Treat pressure ulcers in stupor and fever in excited catatonia
Treat underlying illnesses and withdraw unnecessary medications
Avoid high-potency antipsychotics; second-generation antipsychotics are sometimes used for comorbid psychosis
Restart recently discontinued dopamine agonists
Reverse hyperthermia
Monitor for autonomic instability
Ensure adequate hydration to prevent kidney injury
Maintain nutrition
Initiate deep vein thrombosis/pulmonary embolism prophylaxis
Prevent contractures and aspiration

Source: References 12,15,23,31

benzodiazepines, the most commonly utilized of which has been lorazepam.[7,13,32] Treatment begins with a lorazepam challenge test of 1 to 2 mg in adults and 0.5 to 1 mg in children and geriatric patients,[9,15] administered orally (including via nasogastric tube), IM, or IV. Following a response (≥50% improvement), the dose is increased to 2 mg 3 times per day. The dose is further increased to 6 to 16 mg/d, and sometimes up to 30 mg/d.[9,11] Oral is less effective than sublingual or IM administration.[11] Diazepam can be helpful at doses 5 times the lorazepam dose.[9,17] A zolpidem challenge test of 10 mg orally or via nasogastric tube has also been utilized.[15] Response is brief and is usually followed by lorazepam, although zolpidem up to 40 mg/d has been used for ongoing treatment.[9]

One alternative benzodiazepine protocol utilizes an initial IV dose of 2 mg lorazepam, repeated 3 to 5 times per day; the dose is increased to 10 to 12 mg/d if the first doses are partially effective.[16] A lorazepam/diazepam approach involves a combination of IM lorazepam and IV diazepam.[11] The protocol begins with 2 mg of IM lorazepam. If there is no effect within 2 hours, a second

Clinical Point

Treatment with agents that have anticonvulsant properties (benzodiazepines, barbiturates) and ECT are effective

Table 8

Alternatives to benzodiazepines and electroconvulsive therapy

Medication	Details
Amobarbital	Response rate up to 60%
NMDA antagonists	Amantadine (also dopaminergic) 100 to 600 mg
	Memantine 10 to 20 mg
Dopaminergic agents	Carbidopa/levodopa (levodopa dose 25 to 100 mg)
	Methylphenidate 10 to 40 mg
Anticonvulsants	Valproate (possible GABAergic mechanism) 600 to 4,000 mg
	Topiramate (anti-glutaminergic) 200 mg
	Carbamazepine (unknown mechanism) 100 to 1000 mg
Dantrolene	Occasionally helpful
Anti-glutaminergic drugs	Minocycline
	Dextromethorphan/quinidine
	Lithium (multiple actions)
SSRIs	Fluoxetine
	Fluvoxamine
Anticholinergic agents	Benztropine
	Trihexyphenidyl
Second-generation antipsychotics	Aripiprazole 3 to 30 mg
	Olanzapine 2.5 to 20 mg
	Risperidone 0.5 to 8 mg
	Ziprasidone 40 to 160 mg
	Clozapine 150 to 800 mg
Repetitive transcranial magnetic stimulation	Fast rTMS (may be GABAergic); 10 Hz

Source: References 13,15,17,20,25

GABA: gamma-aminobutyric acid; NMDA: *N*-methyl-D-aspartate; rTMS: repetitive transcranial magnetic stimulation; SSRIs: selective serotonin reuptake inhibitors

2 mg dose is administered, followed by an IV infusion of 10 mg diazepam in 500 ml of normal saline at 1.25 mg/hour until catatonia remits.

An Indian study of 107 patients (mean age 26) receiving relatively low doses of lorazepam (3 to 6 mg/d for at least 3 days) found that factors suggesting a robust response include a shorter duration of catatonia and waxy flexibility, while passivity, mutism, and auditory hallucinations describing the patient in the third person were associated with a poorer acute response.[31] Catatonia with marked retardation and mutism complicating schizophrenia, especially with chronic negative symptoms, may be associated with a lower response rate to benzodiazepines.[20,33] Maintenance lorazepam has been effective in reducing relapse and recurrence.[11] There are no controlled studies of maintenance treatment with benzodiazepines, but clinical reports suggest that doses in the range of 4 to 10 mg/d are effective.[32]

ECT was first used for catatonia in 1934, when Laszlo Meduna used chemically induced seizures in catatonic patients who had been on tube feeding for months and no longer needed it after treatment.[6,7] As was true for other disorders, this approach was replaced by ECT.[7] In various case series, the effectiveness of ECT in catatonia has been 53% to 100%.[7,13,15] Right unilateral ECT has been reported to be effective with 1 treatment.[21] However, the best-established approach is with bitemporal ECT with a suprathreshold stimulus,[9] usually with an acute course of 6 to 20 treatments.[20] ECT has been reported to be equally safe and effective in adolescents and adults.[34] Continued ECT is usually necessary until the patient has returned to baseline.[9]

ECT usually is recommended within 24 hours for treatment-resistant malignant catatonia or refusal to eat or drink, and within 2 to 3 days if medications are not sufficiently effective in other forms of catatonia.[12,15,20] If ECT is initiated after a benzodiazepine trial, the benzodiazepine antagonist flumazenil is administered first to reverse the anticonvulsant effect.[9] Some experts recommend using a muscle relaxant other than succinylcholine in the presence of evidence of muscle damage.[7]

Alternatives to benzodiazepines and ECT. Based on case reports, the treatments described in *Table 8*[13,15,17,20,25] (*page 24*) have been used for patients with catatonia who do not tolerate or respond to standard treatments. The largest number of case reports have been with NMDA antagonists, while the presumed involvement of reduced dopamine signaling suggests that dopaminergic medications should be helpful. Dantrolene, which blocks release of calcium from intracellular stores and has been used to treat malignant hyperthermia, is sometimes used for NMS, often with disappointing results.

Whereas first-generation antipsychotics definitely increase the risk of catatonia and second-generation antipsychotics (SGAs) probably do so, SGAs are sometimes necessary to treat persistent psychosis in patients with schizophrenia who develop catatonia. Of these medications, clozapine may be most desirable because of low potency for dopamine receptor blockade and modulation of glutamatergic signaling. Partial dopamine agonism by aripiprazole, and the potential for

Drug Brand Names

Amantadine • Symmetrel	Flumazenil • Romazicon
Amobarbital • Amytal	Fluoxetine • Prozac
Aripiprazole • Abilify	Fluvoxamine • Luvox
Azithromycin • Zithromax	Levetiracetam • Keppra
Baclofen • Lioresal	Lithium • Eskalith, Lithobid
Benztropine • Cogentin	Lorazepam • Ativan
Carbamazepine • Carbatrol, Tegretol	Memantine • Namenda
	Methylphenidate • Ritalin
Carbidopa/levodopa • Sinemet	Minocycline • Minocin
	Olanzapine • Zyprexa
Ciprofloxacin • Cipro	Risperidone • Risperdal
Clozapine • Clozaril	Succinylcholine • Anectine
Dantrolene • Dantrium	Topiramate • Topamax
Dexamethasone • Decadron	Trihexyphenidyl • Artane
Dextromethorphan/ quinidine • Neudexta	Valproate • Depakote
	Ziprasidone • Geodon
Diazepam • Valium	Zolpidem • Ambien
Disulfiram • Antabuse	

increased subcortical prefrontal dopamine release resulting from serotonin 5HT2A antagonism and 5HT1A agonism by other SGAs, could also be helpful or at least not harmful in catatonia. Lorazepam is usually administered along with these medications to ameliorate treatment-emergent exacerbation of catatonia.

There are no controlled studies of any of these treatments. Based on case reports, most experts would recommend initiating treatment of catatonia with lorazepam, followed by ECT if necessary or in the presence of life-threatening catatonia. If ECT is not available, ineffective, or not tolerated, the first alternatives to be considered would be an NMDA antagonist or an anticonvulsant.[20]

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Clinical Point

Most experts would recommend initiating treatment of catatonia with lorazepam, followed by ECT if necessary

Bottom Line

Much more common than many clinicians realize, catatonia can be overlooked because symptoms can mimic or overlap with features of an underlying medical or neurologic disorder. Suspect catatonia when one of these illnesses has an unexpected course or an inadequate treatment response. Be alert to characteristic changes in behavior and speech. A benzodiazepine challenge can be used to diagnose and begin treatment of catatonia. Consider electroconvulsive therapy sooner rather than later, especially for severely ill patients.

Catatonia

Course varies by patient, underlying cause

The response to benzodiazepines or ECT can vary from episode to episode[11] and is similar in adults and younger patients.[22] Many patients recover completely after a single episode, while relapse after remission occurs repeatedly in periodic catatonia, which involves chronic alternating stupor and excitement waxing and waning over years.[11] Relapses may occur frequently, or every few years.[11] Some cases of catatonia initially have an episodic course and become chronic and deteriorating, possibly paralleling the original descriptions of the natural history of untreated catatonia, while malignant catatonia can be complicated by medical morbidity or death.[4] The long-term prognosis generally depends on the underlying cause of catatonia.[5]

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