Chapter 1

Dementia at the bedside

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Overview

While Alzheimer's disease is one of the most common disorders to afflict older individuals, one should not assume that every individual with cognitive and/or behavioral changes suffers from this illness. There are dozens of causes of and contributors to cognitive and/or behavioral changes – including some which can become manifest at almost any age – and most of these causes/contributors are discussed in this text. Clinicians must consider these causes and contributors and design the diagnostic evaluation based on the history, examination, and patient's and/or family's wishes. Once a diagnosis is established, management with drug and non-drug approaches, prognostication and future planning can be tailored to the particular circumstances. A primary goal of this text is to assist clinicians to optimize the diagnostic and management approaches to patients with cognitive and/or behavioral changes using up-to-date knowledge and tools.

Terminology

One can view encephalopathy as an overarching term applied to a disturbance in brain functioning with cognitive, behavioral, motor, etc., manifestations. Encephalopathies can be subgrouped based on the time course over which the features evolve – the acute encephalopathies have features evolving over hours or days, the subacute encephalopathies with features evolving over days or weeks or months, and the chronic encephalopathies evolving over months or years. The term delirium is often used interchangeably with the acute and subacute encephalopathies, and the term dementia is likewise used to represent the chronic encephalopathies. In a strict sense, the term delirium refers to impaired cognition in the setting of impaired arousal/consciousness, but altered arousal/consciousness is not always affected in the spectrum of encephalopathies.

The term dementia was classically applied to those with a slowly progressive cognitive and functional impairment. In many textbooks, the terms encephalopathy, delirium, and dementia are used with varying stated or implied definitions. Sometimes dementia is implied to be clearly distinguishable from delirium, or that dementia implies that an incurable degenerative process is at play. For purposes of this chapter and the entire text, we are purposefully avoiding rigid applications of definitions and use the term dementia in a very broad sense to represent a clinical syndrome with changes in cognition and/or behavior sufficient to affect social and occupational functioning. The terms cognitive impairment, behavioral changes, etc., will also be used when applicable.

Diagnostic evaluation

History

While some individuals with cognitive symptoms seek medical attention on their own, many individuals with impaired cognition and/or altered behavior agree to see a clinician on the insistence of a close relative or friend (henceforth termed the "informant"). Obtaining a complete history from the patient and an informant is critical. In some instances the patient's history is unreliable making the informant particularly valuable. Sometimes an accurate and reasonably complete description of a patient's changes can only be obtained by interviewing the informant separately from the patient. Some clinicians find that a written summary (one to three pages) by the patient and/or the informant(s) is particularly enlightening and time-efficient. Whenever possible it is important for the

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clinician to be able to imagine what sorts of problems emerged with the disease, and with examples should be able to picture the day-to-day difficulties experienced by the patient and family. A list of the key components of the history should include:

- *What was the first symptom?* One particularly important aspect of the history is determining the first symptom as this is often a clue to where the disease began.
- *Onset of cognitive and/or behavioral changes*. The clinician should note even subtle changes that may have been dismissed at the time of occurrence as being due to "stress" or "depression" or "getting old." Included in this assessment would be the mode of onset being sudden/acute (i.e., occurring over minutes or hours), subacute (i.e., occurring over days or weeks) or chronic (i.e., occurring over months or years) realizing the time frames associated with acute, subacute and chronic are a bit arbitrary.
- *Evolution of changes*. The clinician should attempt to characterize the evolution of changes over time. Examples would include a slowly but progressively worsening course (suggesting a degenerative etiology), or a rapid course over weeks or months (suggesting an infectious, metabolic, autoimmune/inflammatory, neoplastic, paraneoplastic, prion, etc. etiology), or a sudden onset with mild but definite improvement +/− plateau (suggesting a vascular etiology). Fluctuations in cognition and/or behavior over hours or days superimposed on a more chronic course are also important to note.
- *Affected cognitive domains*. Questions covering the major cognitive domains should be posed (see Table 1.1). Some examples include asking about changes in episodic/declarative memory (such as problems with forgetfulness for recent events or upcoming appointments or social engagements), executive functioning (such as problems with problem-solving, complex decision-making, multitasking, completing sequential tasks), language functioning (such as problems with stating names of objects or people, comprehending sentences expressed by others orally or in writing, articulating thoughts in a coherent fashion to others orally or in writing), visuospatial functioning (such as problems with spatial/geographic orientation), and praxis (such as using tools/utensils, turning doorknobs). The presence/absence of problems in these domains provides insights into the likely topography of neural network dysfunction.
- *Non-cognitive domains*. These domains could be subgrouped into neuropsychiatric features (e.g., presence of apathy, social disinhibition, hallucinations, delusions, depression), motor features (e.g., tremor, slowness of movement, poor balance/falls, poor coordination of the limbs, limb weakness), autonomic features (e.g., constipation, erectile dysfunction, orthostatic hypotension), and primary sensory features (e.g., decreased smell/taste, vision, hearing or tactile sensation). It is important to remember that psychiatric symptoms are typically the heralding symptoms of frontal and frontal–subcortical disorders like behavioral variant frontotemporal dementia (bvFTD), progressive supranuclear palsy (PSP), and Huntington's disease.
- *Comorbid medical conditions*. Known medical disorders (e.g., hypertension, diabetes, sleep apnea, hypothyroidism) should be noted.
- *Exposures*. These include head injuries (number with and without loss of consciousness, duration of loss of consciousness when known), insect or animal bites, prior blood transfusions, prior tissue transplants (e.g., dura, cornea), hormone replacement (e.g., growth hormone), smoking history, alcohol intake, illicit drug use, etc.
- *Medications*. Current use of prescription and over-the-counter medications should be recorded, paying particular attention to those with psychoactive properties.
- *Family history*. The variable phenotypes associated with some genetically mediated neurologic disorders require clinicians to inquire not only about dementia in relatives, but also about parkinsonism, motor neuron disease, multiple sclerosis, depression, psychosis, alcohol abuse, autoimmune disease, cancer, etc. Data on first- and second-degree relatives are key, and if data are available in more distant relatives, all the better. For relatives with dementia, additional questions focused on the cardinal features of the major dementia syndromes are important – these include presence of hallucinations, delusions, early personality changes, early memory impairment. Furthermore, the approximate age of onset for

each affected relative, and age of death for deceased relatives, are all potentially informative.

- *Review of systems*. The standard review of systems across organ systems is important. This inquiry should include questions about sleep and sleep disorders, such as usual sleep onset and wake onset times, perceived sleep quality, snoring, snorting/choking, apneic pauses, restless legs syndrome features, periodic leg jerks during sleep, degree of daytime sleepiness, etc. (see chapter on sleep disorders for more information). Sleep disorders can be the first manifestation of Parkinsonian–dementia syndromes, and can also be the cause of cognitive complaints.

The importance of obtaining a comprehensive history from the patient and at least one informant cannot be over-emphasized. In many of the dementing conditions, the patient's insight into the onset, course, and severity is limited. The history should be approached with an anatomical perspective, as symptoms are often the strongest clue as to where the disease began and to where it has progressed. These details usually provide key diagnostic clues and also set the stage for prioritizing which issues to target for management.

Physical examination

The physical examination should include, at a minimum, a focused general medical examination, a screening mental status examination +/− supplemental cognitive scales, and a comprehensive general neurologic examination.

Table 1.1 Sample questions for assessing topographic distribution of cerebral dysfunction

Cognitive domain	Corresponding localization	Sample questions
Memory	Mesial temporal lobes Medial thalamus, basal forebrain, and other elements of Papez's circuit	Does he/she recall the details of recent events or upcoming appointments or social engagements? Tend to repeat questions?
Attention/ Concentration	Frontal +/− temporal lobes and subcortical connections	Does he/she struggle to maintain attention or focus?
Executive functions	Frontal +/− temporal lobes and subcortical connections	Does he/she have difficulties planning and reasoning? Managing multiple tasks around the same time? Completing multistep sequential tasks?
Social cognition	Frontal +/− temporal lobes and subcortical connections	Does he/she demonstrate poor judgment? Behave in a socially inappropriate, overly joyful, or markedly sedentary manner? Behave as if he/she does not have empathy for others?
Language	Dominant hemisphere (usually left) frontotemporoparietal	Does he/she struggle to recall the names of individuals or objects? To express his/her thoughts? To understand oral or written information?
Limb praxis	Dominant hemisphere (usually left) parietal or mesial frontal	Is he/she able to use eating utensils or tools correctly? Move the limb in a coordinated manner?
Dressing praxis	Nondominant hemisphere (usually right) parietal	Does he/she have trouble putting clothes on correctly?
Visuospatial functions	Non-dominant hemisphere (usually right) parietal	Does he/she get lost in the home, stores, or while driving?
Vision, reading	Parieto-occipital (ensure no ocular pathology accounts for impaired reading or vision)	Does he/she have trouble reading? Trouble with depth perception? Trouble seeing objects in his/her peripheral fields?
Speed of thought	Frontosubcortical circuits	Does he/she seem to think much slower?

- *Focused general medical examination*. Standard vital signs, oropharynx patency, neck circumference, heartbeat regularity/irregularity, carotid and cardiopulmonary auscultation, peripheral pulse strength, peripheral edema assessment, etc., should be performed in most patients.
- *Screening mental status examination*. A screening mental status examination such as the Mini Mental State Examination or MMSE [1] (note that there are now charges associated with the use of this test, which now limit its desirability), Montreal Cognitive Assessment or MoCA scale [2], Kokmen Short Test of Mental Status (STMS) [3, 4], the Addenbrooke Cognitive Exam-III or ACE-III [5] (there are many others [6]) is imperative, and scores below the cut-off of the norms for any screening exam should raise suspicion of a cognitive disorder. It is important to realize that clinicians should *not* make conclusive decisions based primarily on any screening mental status examination score, as some patients with an early/mild neurocognitive syndrome can score in the "normal" range whereas others with limited education can score in the "abnormal" range despite functional independence. As with the history, the clinician should always be thinking about what the cognitive deficits say about the anatomy of the patient's disorder.
- *Supplemental cognitive scales*. Based on the patient's symptoms and clinician's expertise, additional cognitive measures can be performed in the office to assess domains of interest (screening for aphasia, apraxia, Balint's syndrome, etc.); some of these measures are discussed in more detail in subsequent chapters in this text.
- *General neurologic examination*. A comprehensive general neurologic examination should obviously be completed in every patient as well, and the clinician should look for signs of nuchal rigidity, papilledema, gaze palsy, dysarthria, verbal and non-verbal oral apraxia, focal facial or limb weakness, asymmetric deep tendon reflexes, rest and/or postural tremor, bradykinesia, limb rigidity, postural instability, limb spasticity, limb apraxia, myoclonus, cortical sensory loss, dystonia, alien limb phenomenon, frontal release signs, gait apraxia, and fasciculations.

Initial diagnostic formulation

Based on the historical and physical findings, an initial formulation and differential diagnosis can be generated. There are many acronyms and formulations in use by clinicians to ensure all etiologic categories are considered, especially in complex cases, and one such approach is presented in Table 1.2 using the "DDD VITAMINS PHS" acronym.

The presentation and course of cognitive decline, and presence or absence of associated features, are critical elements of the history; clues suggestive of a non-Alzheimer's disease etiology of cognitive impairment are listed in Table 1.3. In many instances a seasoned clinician can surmise which etiologic

Table 1.2 Differential diagnosis of etiologic causes of cognitive/behavioral changes

DDD VITAMINS PHS
Developmental (e.g., inborn errors of metabolism)
Demyelinating
Degenerative
Vascular (e.g., stroke, CADASIL, etc.)
Infectious/prion (includes CJD as well as various microbes)
Toxic (e.g., drugs, heavy metals) and **T**raumatic (e.g., head injury)
Alcohol (never forget thiamine when appropriate!)
Metabolic and **M**itochondrial
Inflammatory/autoimmune (includes a wide array of autoimmune etiologies as well as central nervous system vasculitis)
Neoplastic/paraneoplastic (includes primary and metastatic malignancies, meningeal carcinomatosis, intravascular lymphoma, and paraneoplastic processes)
Systemic disorders (includes disorders not classically viewed as metabolic, autoimmune, etc., such as hormonal/endocrinologic)
Paroxysmal (e.g., cognitive/behavioral manifestations of seizures or migraine)
Hydrocephalus (communicating and non-communicating)
Sleep disorder (e.g., obstructive sleep apnea, narcolepsy, Klein–Levin syndrome, etc.)

category of disease is likely at play, and a syndromic diagnosis can be made with relative confidence [7, 8]. For example, in an elderly individual with a slowly progressive disorder which has evolved over at least a year, manifested primarily with anterograde memory impairment with additional features of language and/or visuospatial dysfunction, and relatively normal general physical and neurologic examinations, a degenerative process is highly likely with Alzheimer's disease dementia being the most fitting syndromic diagnosis [9]. Problematic executive and visuospatial impairment along with complex delusions and hallucinations, recurrent dream enactment behavior during sleep suggesting REM sleep behavior disorder, fluctuations in cognition and arousal, and parkinsonism all evolving over one or more years in an older patient suggests dementia with Lewy bodies [10]. Changes in behavior/personality and/or language – particularly social disinhibition, loss of empathy, apathy, food preference alterations, etc., with relative preservation of memory, visuospatial functioning, and praxis suggest behavioral variant frontotemporal dementia [11]. Such individuals can appear normal in the office setting and on mental status examination, yet their informants (especially when questioned separately) describe features uncharacteristic of their prior behavior. Vascular dementia is characterized by cognitive changes temporally associated with stroke(s), with clinical and/or radiologic evidence of cerebral infarcts [12].

Cognitive impairment and/or behavioral changes that begin abruptly, markedly fluctuate, or progress over weeks or months are suggestive of a non-degenerative process, some of which are potentially treatable. Likewise, associated symptoms such as headache, fever, skin lesions, significant weight loss, limb paresthesias or weakness, parkinsonism, falls, gait impairment, delusions, visual hallucinations, and incontinence are all features that should raise suspicion against Alzheimer's disease. Clues suggesting the presence of depression should be sought. While the literature would suggest differentiating pseudodementia (cognitive impairment resulting from depression, personality disorder, malingering, etc.) from a degenerative dementing illness is rather straightforward, in actual practice this is often not the case. A trial of an antidepressant with few cognitive side effects can provide diagnostic and

Table 1.3 Clues suggesting a non-Alzheimer's disease etiology of cognitive/behavioral changes

Feature	Consider these etiologies
Presence of *atypical course*, such as rapidly progressive, waxing and waning, or series of abrupt changes in clinical course	Vascular, infectious, inflammatory/autoimmune, toxic, metabolic processes Multiple sclerosis DLB, FTD, vascular dementia, CJD
Presence of *systemic symptoms*, such as headache, fever, dry eyes/mouth, myalgias, arthralgias, weight loss, or skin lesions	Infectious, inflammatory/autoimmune, neoplastic, paraneoplastic processes
Presence of a *sleep disorder*, such as excessive daytime somnolence, loud snoring, observed apnea, motor restlessness/insomnia, or leg jerks while sleeping	Obstructive sleep apnea, central sleep apnea, restless legs syndrome, periodic limb movement disorder. If REM sleep behavior disorder is suggested, consider DLB
Presence of *neuropsychiatric symptoms*, such as behavioral/personality change, apathy, visual hallucinations, delusions, agitation	DLB, FTD, infectious, inflammatory/autoimmune, toxic, metabolic, paraneoplastic processes
Presence of *neurologic symptoms or signs*, such as diplopia, dysphagia, face or limb weakness or numbness, gait unsteadiness	Neoplastic, abscess
Presence of *parkinsonian signs*, such as masked facies, abnormal gait, stooped posture, tremor, rigidity	Parkinson's disease, DLB, NPH, parkinsonism associated with FTD/CBS/PSP, vascular disease

Abbreviations: CBS=corticobasal syndrome, CJD=Creutzfeldt–Jakob disease, DLB=dementia with Lewy bodies, FTD=frontotemporal dementia, NPH=normal pressure hydrocephalus, PSP=progressive supranuclear palsy.

therapeutic information by virtue of the response to an adequate trial; such a diagnosis and empiric trial have often already been carried out without satisfactory results by the time primary care clinicians or patients/family members initiate referrals to dementia specialists.

Investigations

The initial objective of the clinician is to identify and effectively treat all reversible causes or contributors of cognitive impairment. If no such causes or contributors are found, or if the individual continues to experience cognitive impairment once all causes and contributors are addressed, the clinician must then determine (to the extent possible within the context of the patient's/family's wishes) which irreversible cause or contributor of impairment is present for management and prognostic purposes. The challenge for the clinician is to determine which diagnostic studies and consultations are necessary for each particular patient who presents with changes in cognition and/or behavior.

Several diagnostic studies available for clinical purposes are shown in Table 1.4. The minimal diagnostic work-up is appropriate for most individuals. A computed tomography (CT) scan of the head with and without contrast is necessary to visualize some tumors and discriminate hemorrhage versus other lesions. A magnetic resonance imaging (MRI) scan of the head offers several advantages over CT for demonstrating numerous types of intracranial abnormalities. Contrast enhancement allows visualization of tumors, meningeal processes, and infectious and inflammatory disorders. The standard MRI scan includes sagittal and axial images; coronal images offer additional information as topography and degree of hippocampal and cerebral cortical atrophy are best shown on coronal slices. While arguments are sometimes made against the performance of these minimal investigations – particularly for a CT or MRI scan – in every patient with cognitive impairment on the basis of being too costly, the clinician must weigh the costs of these studies for each patient against the potential for identifying a disorder which could impact management and prognosis. Yet not imaging the organ of interest in those with cognitive/behavioral changes can miss important structural etiologies, some of which are treatable – a worthy example is shown in Figure 1.1.

Table 1.4 Diagnostic studies for investigating changes in cognition and/or behavior

Neuropsychological testing
The battery should adequately assess the key cognitive domains
Minimal diagnostic laboratory and imaging battery
• Electrolytes, renal/liver function tests: sodium, potassium, calcium, magnesium, creatinine, urea, bilirubin, alkaline phosphatase, liver enzymes • Complete blood count • Thyroid function tests (TSH often sufficient) • Vitamin B12 and folate • Syphilis serology • Sedimentation rate • Computed tomography (CT) scan of the head or more preferably: • Magnetic resonance imaging (MRI) scan of the head
Addtional laboratory studies in select cases
• Many to consider based on blood, urine and CSF – see suggestions in chapters relevant to the syndrome/disorder of interest • Genetic testing
Additional neuroimaging studies in select cases
• Perfusion single photon emission computed tomography (SPECT) (available for clinical use) • Dopamine transporter SPECT imaging (DaTscan) (available for clinical use) • Fluorodeoxyglucose positron emission tomography (FDG-PET) (available for clinical use) • Amyloid PET (several ligands available for research +/− clinical use) • Tau PET (ligands available for research)

The selection of the additional studies and consultations depends on the circumstances of each particular patient. Neuropsychological testing can be very helpful in characterizing the topography and severity of cerebral dysfunction, and should be considered in most patients – particularly in those with mild symptoms, and in those who are young or have atypical features.

Diagnostic criteria

The diagnostic classification schemes for mild cognitive impairment and the major dementia syndromes are discussed in detail in the pertinent chapters.

Table 1.5 Principles of management of individuals with dementia

- Ensure infections, sleep disorders, dehydration, metabolic disturbances, pain, and constipation are being effectively treated
- Correct hearing or visual loss to the extent possible
- Avoid agents with anticholinergic properties
- Minimize psychoactive medications with possible adverse cognitive side effects to the fewest agents at the lowest effective doses
- Promote regular sleep–wake times and daily routine
- Regular light exercise
- Caregiver support – support groups, respite care, etc.
- Consider participating in research, clinical trials

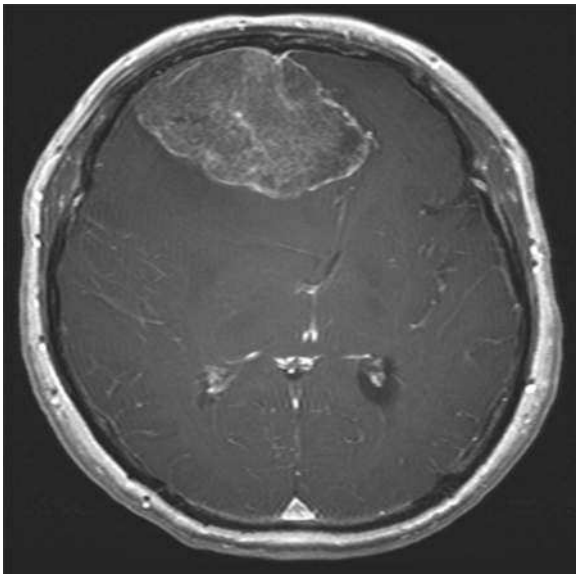

Figure 1.1 Gadolinium-enhanced T1-weighted axial MR image in a 54-year-old woman with an 18-month history of cognitive and behavioral changes who had been treated with sertraline for presumed "pseudodementia" for over 12 months without any improvement in symptoms. A gross total resection of the tumor was performed (histology revealed meningioma) with complete resolution of cognitive/behavioral changes.

Table 1.6 Dementia-related resources*

Alzheimer's Disease
Alzheimer's Association
www.alz.org/
Alzheimer Society of Canada
http://www.alzheimer.ca/en
Alzheimer Society of the United Kingdom
http://www.alzheimers.org.uk/
Alzheimer's Australia Dementia Research Foundation
http://dementiaresearchfoundation.org.au/
National Institute on Aging – Information on AD
http://www.nia.nih.gov/alzheimers
Dementia with Lewy Bodies/Lewy Body Dementia
Lewy Body Dementia Association
http://www.lbda.org/
Lewy Body Society
http://lewybody.org/
National Institute on Aging – Information on DLB
http://www.nia.nih.gov/alzheimers/publication/lewy-body-dementia/introduction
Frontotemporal Dementia/Frontotemporal Degeneration
Association for Frontotemporal Degeneration
http://www.theaftd.org/
National Institute on Aging – Information on FTD
http://www.nia.nih.gov/alzheimers/publication/frontotemporal-disorders/basics-frontotemporal-disorders
Normal Pressure Hydrocephalus
Normal Pressure Hydrocephalus
http://www.hydroassoc.org/cause-view/nph-caregivers/
Creutzfeldt–Jakob Disease
Creutzfeldt–Jakob Disease Foundation
http://www.cjdfoundation.org/

* This is only a partial list; numerous other reputable websites pertinent to dementia-related issues can be found on the internet.

Management

Basic principles

Several strategies in the management of patients with dementia are shown in Table 1.5.

Pharmacologic

Cognition and behavior reflect the integrated coordination of neural networks within the brain. When one or more of these networks are affected by some abnormal process and neurochemical systems are altered, pharmacotherapy (i.e., "symptomatic therapies") directed at these alterations can improve symptoms. These symptomatic therapies are discussed in the pertinent chapters. While no therapies have been proven to positively influence dementia-associated disease mechanisms in humans as yet (i.e., "disease-modifying therapies"), many clinical trials are in progress or being planned.

Information

All families facing dementia-related issues should be informed about national and international organizations devoted to dementia education and support. An abbreviated list of key organizations is shown in Table 1.6.

Several institutions conduct longitudinal studies on aging and dementia and/or conduct experimental drug trials, and the Alzheimer's Association can facilitate identifying a nearby institution involved in such studies. The ClinicalTrials.gov website is also reputable and updated frequently: www.clinicaltrials.gov.

It should be mentioned that some information on the internet is obviously inaccurate, and patients and families should be encouraged to access information from reputable sources and discuss questionable information with their physicians.

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Chapter 2

Neuropsychiatry of dementia

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Introduction

Neuropsychiatry brings psychiatric perspectives to encounters with the neurodegenerative dementias (or primary dementias). It focuses on the breakdowns of mental life and behavior (or psychiatric states) manifested in these disorders and their coherence as syndromes. The approach to the clinical examination focuses on identifying diagnoses, handicaps, and suffering, and formulating treatment plans that include counseling, psychotherapy, and rehabilitation. In this sense, neuropsychiatry (1) studies psychiatric states in brain diseases with known pathology, and (2) links these psychiatric states to specific brain structure and physiology. It is an enterprise at the psychiatry–neurology interface that unites the perspectives, phenomenology, constructs, and practices of psychiatry with the methods, mechanisms, systems, and diseases of neurology. Thus a neuropsychiatry of dementia, such as that described in this chapter, includes an appreciation of the distribution of the psychiatric states associated with the primary dementias, their role in the phenomenology and diagnosis of dementia, as well as their evolution, their correlation with handicap, maladaptation, and suffering, and their management. We have aimed here for a synthesis that is introductory and practical, contemporary and provocative. The focus is primarily clinical, as the chapters in this volume that tackle specific diseases will delve further into genetic, anatomical, and physiological aspects.

Psychiatric states are integral to dementia

Early descriptions of dementia noted the psychiatric states appearing alongside the cognitive dysfunctions and attendant handicaps. Alois Alzheimer's seminal description presented a phenotype featuring profuse anxiety, hallucinations, delusions, and agitation, alongside confusion and dense impairments of memory, orientation, language, and general knowledge [1]. Arnold Pick, his contemporary, had previously described a focal neurodegeneration in which aberrations of temperament, conduct, and language were core features [2, 3]. For several decades following these discoveries, cognitive phenomena and their cortical localizations were emphasized, at the expense of the alterations in behavior and mental life. As a result, the primary dementias came to be conceptualized and described as cognitive syndromes, while the psychiatric states were viewed as understandable reactions or epiphenomena. In 1982, Rabins and colleagues, working in Baltimore, noted the high prevalence of symptoms traditionally considered to be "psychiatric" and their impacts on family life [4]. Several years later, Burns and colleagues, working in London, reported a comprehensive analysis of psychiatric features in dementia [5–8]. These studies demonstrated that disorders of mood, behavior, perception, thought process, and thought content, are common features of dementia, together affecting the majority of patients – 63% of subjects had at least one depressive symptom and 24% a diagnosis of depression. It is now widely recognized that psychiatric states are ubiquitous in dementia, but they are still largely viewed (incorrectly, we argue) as epiphenomena – albeit their contributions to handicap and suffering are freely acknowledged. Today two terms, "neuropsychiatric symptoms (or syndromes)" (NPS) and "behavioral and psychological symptoms of dementia" (BPSD)," identify the same constructs which we here refer to collectively as "psychiatric states." These states can be

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Table 2.1 Psychiatric states manifested in dementia

Domain	Exemplars
Disorders of volition and self-control	Apathy Impulsions Compulsions (including simple and complex rituals, hoarding)
Affective states	Depression Anxiety Euphoria/jocularity Mania Irritability/agitation
Aggression	Impulsive Reactive Premeditated
Abnormal percepts	Illusions and pareidolias Hallucinations
Abnormal ideation	Preoccupations and ruminations Misinterpretations Delusions
Motor disturbances	Restlessness/fidgeting Rummaging Roaming
Feeding disorders	Anorexia Hyperphagia Foraging Pica
Abnormal sexual behaviors	Asexuality/hyposexuality Misdirected intimacy Hypersexuality (which may include impulsive propositions and intrusions)
Disorders of sleep	Hyposomnia/insomnia Hypersomnia Sleep-cycle disruptions REM parasomnias

grouped into clusters or behavioral domains mirroring those of primary psychiatric disorders (see Table 2.1).

Measurement

Interviews of carers and direct observations are adequate for identifying psychiatric states in dementia, but monitoring and research require quantitative approaches. Psychometric instruments advance our precision in describing the phenomena and their correlates, assessing their severity, and monitoring their evolution and responses to treatments. While self-reports can provide information, the loss of evaluative and decisional capacities in people with dementia gives primacy to ratings based on carer interview and clinical observation. Generally, two strategies are used: (1) adapting of standard psychiatric instruments to dementia objectives (e.g., the Positive and Negative Symptoms Scale adapted for apathy studies from schizophrenia research), and (2) developing of measures "fit for purpose." The most widely used measure of this type is the Neuropsychiatric Inventory (NPI) [9], designed for global and domain-specific quantitation of psychiatric dysfunction in dementia research (see Table 2.2). The NPI is a semi-structured interview of a carer or other proxy that uses a screen and probe strategy to reconcile comprehensiveness and efficiency. It has been translated into versions designed for use in clinical and residential care settings, and for carer-generated ratings. A short version, the NPI-Q [10], has proven particularly useful for practice. A variety of other scales exist for measuring specific psychiatric phenomena, or for use in specific dementia syndromes; the interested reader is referred to the excellent guide for making selections [11] and compendium of instruments [12] developed by Burns and colleagues.

Table 2.2 Domains of the Neuropsychiatric Inventory

Delusions
Hallucinations
Agitation or aggression
Depression or dysphoria
Anxiety
Elation or euphoria
Apathy or indifference
Disinhibition
Irritability or lability
Motor disturbance
Night-time behavior
Appetite and eating

Frequency and correlates of psychiatric states in dementia

As psychiatric states appear in all stages of dementia, including preclinical and prodromal phases, they portend, characterize or complicate the illness. Risk