

NEUROCOGNITIVE MARAUDERS OF PSYCHOSIS

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DISCLOSURES

None



AGENDA

Normal Ageing

Schizophrenia

Delirium

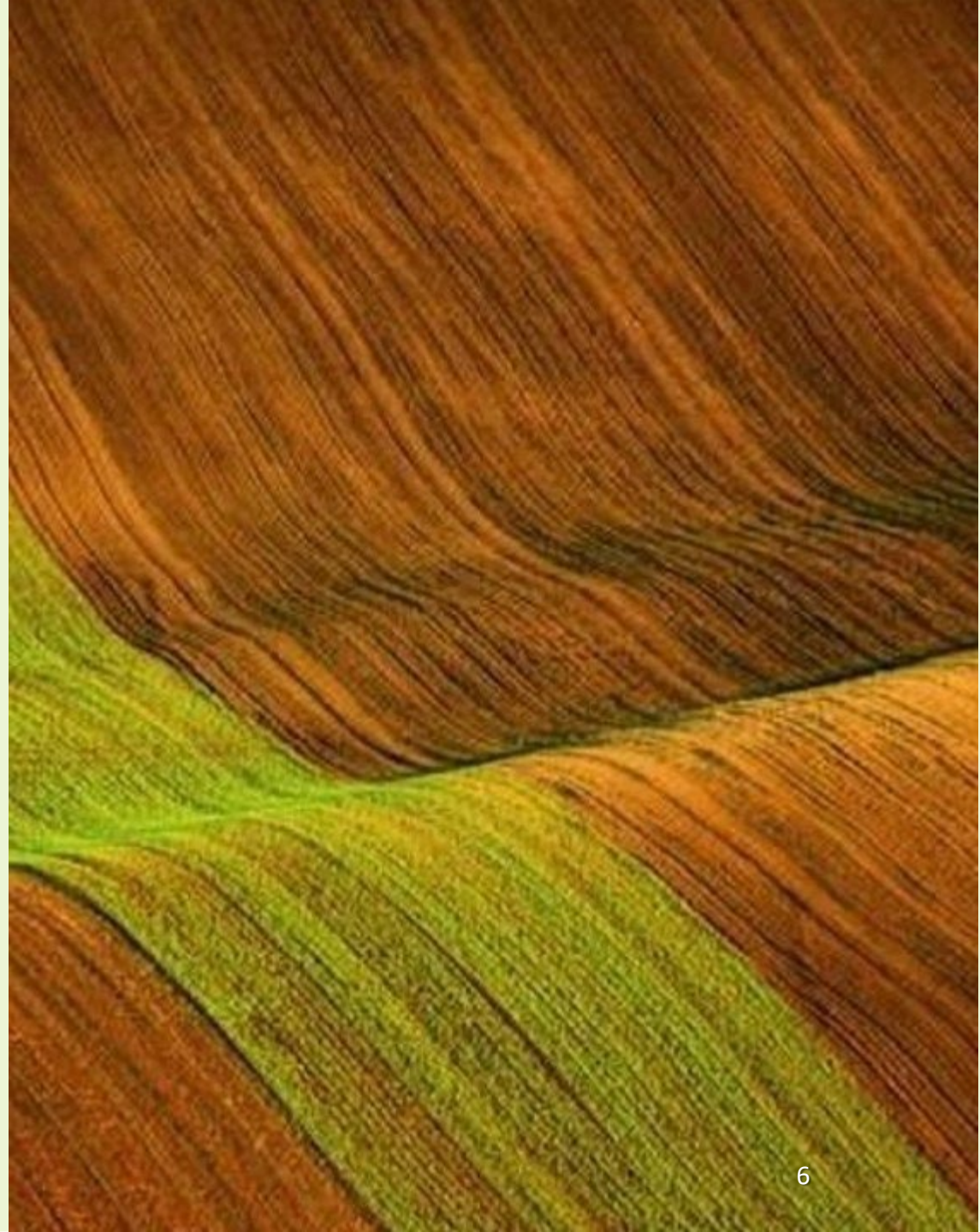


NEUROCOGNITION AND AGE EXPECTED CHANGES

A landscape photograph showing rolling hills. In the foreground, there is a field of tall, green grass. A path or road winds through the middle ground, leading towards a golden field. The sky is overcast with grey clouds. The word "SCHIZOPHRENIA" is written in large, bold, yellow-green capital letters across the center of the image, enclosed in a thin yellow-green rectangular border.

SCHIZOPHRENIA

NEURODEVELOPMENTAL
DISORDER OF SCHIZOPHRENIA



PREVALENCE AND FACTS

- In the United States, The estimated burden of schizophrenia in the US doubled between 2013 and 2019 and was \$343.2 billion.
- 1.1 percent of American adults have been diagnosed with schizophrenia
- High need for care due to well-recognized cognitive and psychiatric issues

STRUCTURAL BRAIN ABNORMALITIES FROM CT/MRI STUDIES

- Reduced whole brain volume
- Increased size of ventricles
- Reduced medial-temporal lobe
- Support for reduced size of frontal lobes

TWIN STUDIES

- Monozygotic twin study by Harren et al.(2004) reported:
 - Lower overall brain volumes
 - Hippocampal volume
 - Size of ventricles
- Childhood-onset schizophrenia literature review by Mehler & Warnke (2002) found:
 - Reduced brain volume
 - Enlarged ventricles
 - Progressive atrophy of the brain
 - Atrophy is thought to be caused by the neurodegenerative process of the illness and further mediated by environmental factors such as antipsychotic medications

LONGITUDINAL MRI STUDIES

- Cahn et al (2002) analyzed MRI scans of individuals at first onset of psychosis and one year later. Compared to healthy controls:
 - initial scans showed higher volume of the third ventricle in Persons with schizophrenia.
 - The follow-up study showed reduced total brain volume and cerebral gray matter volume.
 - The magnitude of the atrophy was significantly correlated with total dosage of antipsychotic medications.
- Ho et al (2003) conducted serial MRIs, every approximately 3 years. The study included persons with first episode of schizophrenia and controls. Results showed:
 - progressive reduction in volume of white matter in the frontal lobes in the clinical groups
 - reduction was correlated with level of functional impairment.

COGNITION

- Variable profiles and presentation
- YET: neurocognitive deficits are at the core, a stable trait of schizophrenia
- Last 3 decades of systematic research show significant cognitive differences between health patients and persons with schizophrenia
- 2005 large metanalysis by Heinrichs showed that the effects sizes that look at cognitive changes are twice as large as effect sized obtained by regional brain volume, blood flow, or metabolism studies.



TIMELINE OF COGNITIVE CHANGES

There is evidence that cognitive deficits pre-date the onset of obvious symptoms and diagnosis.

Children may display cognitive deficits, primary in attention, prior to the first psychotic break.

Children will display additional decline in cognition in prodrome period and/or during the first few years of the illness.

Afterwards, the deficits remain relatively stable.

No further schizophrenia-specific deterioration is expected.

No faster cognitive decline in elderly



COGNITIVE DEFICITS IN SCHIZOPHRENIA

ADULTS

- Sustained attention
- Learning and memory
- Executive functioning
- Goal directed behavior
- Monitoring/awareness of own behavior

CHILDREN/TEENS

- Early: developmental delay
- Attention
- Working Memory
- Language
- Visuo-spatial
- Language
- IQ



DEMENTIA IN SCHIZOPHRENIA

- Older adults with S are not expected to display faster cognitive aging compared to nonpsychiatric patients.
- Those patients will continue to have significant deficits but are not more at low risk of Alzheimer disease as compared to other individuals.
- Age-related cognitive decline may affect those patients more than healthy adults, due to *preexistent* of significant cognitive problems
- The possibility of additional cognitive decline has to be ruled out on patient-by-patient basis.

COGNITION OVER TIME

Longitudinal studies do not show accelerated cognitive decline compared to nonpsychiatric patients

However, negative symptoms may increase the severity of observed cognitive issues

The longer duration of untreated initial psychosis is associated with poorer outcome



BEST PRACTICES IN TREATMENT



Early identification of individuals at risk can help mitigate the illness by reducing the length of untreated initial psychosis

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DELIRIUM



DELIRIUM FEATURES

- Transient and typically reversible state of acute confusion and altered consciousness
- Characterized by disturbances in attention, awareness, cognition, and perception.
- Delirium often develops rapidly over a short period of time, fluctuates in severity throughout the day, and is commonly triggered by underlying medical conditions, medications, or environmental factors.

It often manifests as disorientation, hallucinations, and incoherent speech. Delirium can occur suddenly and tends to fluctuate in severity throughout the day.

Delirium is a serious disturbance in mental abilities that results in confused thinking and reduced awareness of the environment.

Delirium is associated with accelerated cognitive decline in older adults.



DELIRIUM KEY FEATURES

- 1. Disturbance in attention:** Difficulty focusing, sustaining or shifting attention, or easily distracted.
- 2. Altered level of consciousness:** Fluctuations in consciousness ranging from hypoactive (reduced alertness and responsiveness) to hyperactive (agitation, restlessness), or a mixed presentation.
- 3. Cognitive impairment:** Disorganized thinking, confusion, memory, disorientation
- 4. Perceptual disturbances:** Hallucinations (particularly visual or auditory), illusions, or misinterpretations of sensory stimuli.

PREVALENCE AND FACTS

- In the United States, more than 2.5 million adults aged 65 and older developed delirium each year.
- The healthcare costs associated with delirium are estimated at more than \$164 billion per year in the US alone.
- The highest cost of delirium in older adults is a significant risk for cognitive decline, progression of dementia, new onset dementia, falls, and risk of loss of independence/functional decline.

COGNITIVE RISK OF DELIRIUM

- Delirium and dementia are the 2 most frequent causes of cognitive impairment among older adults.
- People with dementia have higher risk for delirium in general population.
- However, the occurrence of delirium is an independent risk factor for subsequent development of dementia.
- In patients with dementia, delirium can cause additional functional and cognitive decline.
- Delirium is well-recognized as one of the modifiable risk factors for dementia, falls, and increased neurocognitive problems.

TIMELINE OF DELIRIUM-CAUSED COGNITIVE DECLINE IN THE ELDERLY

- patients 70+ and dementia with post-operative delirium have significantly lower preoperative cognitive performance, greater immediate (1 month) impairment, equivalent recovery at 2 months, and significantly greater long-term cognitive decline at 3 years relative to the non-delirium group (Inouye et al 2016)
- Cardiac surgery patients who developed delirium have a greater decline in a composite measure of cognition and in visuo-construction and processing speed domains at 1 month. At 1 year processing speed (Brown et al 2018).



MITIGATING RISKS

- Prompt recognition and management of delirium are essential to prevent complications and minimize its impact on patient outcomes.
- Treatment involves addressing the underlying cause(s), optimizing medical management, minimizing precipitating factors (such as reducing unnecessary medications), providing supportive care, and ensuring a safe and calm environment for the patient.

Feature	Delirium	Dementia due to Alzheimer disease	Frontotemporal lobe dementia	Diffuse Lewy body disease	Vascular dementia
Descriptive features	Inattention, impairment of immediate memory	Memory impairments, plus impairments in multiple other cognitive domains	Behavioural disorder, mental rigidity, distractibility	Fluctuating cognition with variations in attention and alertness	Abrupt deterioration or stepwise progression of cognitive deficits; mood and personality changes
Onset	Acute, episodic	Insidious	Insidious	Insidious	Insidious, abrupt or stepwise
Duration	Hours to months	Months to years	Months to years	Months to years	Months to years
Course	Fluctuating, might be worse at night and on waking	Chronic, progressive	Chronic, progressive	Chronic, progressive	Chronic, progressive
Alertness	Altered	Normal	Normal	Fluctuates	Normal
Reversibility	Usually	No	No	No	No
Attention	Impaired by definition	Usually, normal, but might be impaired in later stages	Might be persistently impaired and early feature	Fluctuates	Might be persistently impaired and early feature

Feature	Delirium	Dementia due to Alzheimer disease	Frontotemporal lobe dementia	Diffuse Lewy body disease	Vascular dementia
Orientation	Fluctuates	Not oriented	Typically intact	Variable	Variable
Speech	Incoherent speech	Word-finding difficulties	Altered speech output; stereotypy of speech; echolalia; perseveration; mutism	Hypophonic speech	–
Thought	Disorganized and disconnected thoughts, for example, ‘flight of ideas’	Difficulty with abstract thinking	Poor judgement; impulsivity	–	Abnormal executive function, including mental rigidity and poor insight and judgment
Perception	Distorted: illusions, delusions and/or hallucinations (often visual, tactile or poorly formed)	Delusions of theft or persecution, more common in later stages; hallucinations (auditory, distinct) uncommon	Delusions might be paranoid, religious or bizarre in nature	Visual hallucinations are recurrent and typically well-formed and detailed (that is, animals or children); delusions are common	Delusions more common in later stages
Psychomotor changes	Frequent	Inconsistent	Hyperorality; utilization behaviour	Parkinsonism	Psychomotor retardation
Agitation	Occurs with delirium symptoms, throughout the day	Might occur with sundowning or when resisting activities of daily living	Common	Variable	Variable
Sleep–wake cycle	Often reversed	Might be fragmented but circadian rhythmicity retained	Severely fragmented	REM sleep behaviour disorder	Sleep disturbances are common

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THANK YOU

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