APHASIA

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APHASIA

LEARNING OBJECTIVES

- Define aphasia & list the 4 components of a language exam
- Differentiate the 7 aphasia types based on exam findings
- Localize a lesion based on aphasia type and associated signs
APHASIA: DEFINITION

- Language abnormality due to brain dysfunction
- Involves both spoken & written language
- Although “dysphasia” is technically a more correct term for a partial language deficit, most neurologists only use the term “aphasia” and categorize aphasias as mild, moderate, or severe
APHASIA: FACTS

- Due to focal dysfunction in “dominant” hemisphere (by definition, dominant hemisphere controls language)
  - Handedness suggests dominant hemisphere
  - Most people are LEFT brain dominant
    - R-handed 99% / L-handed 75%
  - Some people have “mixed dominance”

- Clinical features vary based on lesion location

- Dysnomia (difficulty naming) is the only common feature among all 7 types of aphasias

- In recovery, 1° language returns first
THE ANATOMY OF NORMAL LANGUAGE: RECEPTION

- Wernicke area in posterior aspect of the superior temporal gyrus “receives” language and distributes information to temporal and parietal lobes for comprehension.

Wernicke area (W) is near auditory cortex.

Receptive (= posterior = sensory) aphasias are often associated with visual field & sensory deficits.
THE ANATOMY OF NORMAL LANGUAGE: EXPRESSION

Spontaneous language is created in the frontal lobe and is “expressed” via the Broca area in the posterior aspect of the inferior frontal gyrus.

Broca area (B) is near facial motor cortex.

Expressive (= anterior = motor) aphasias are often associated with motor deficits.
THE ANATOMY OF NORMAL LANGUAGE: REPETITION

To “repeat,” language enters Wernicke area, travels along arcuate fasciculus in perisylvian area, and exits via Broca area (“the repetition loop”)

“Repetition loop”:
Wernicke → arcuate fasciculus → Broca
**APHASIA VARIATION BY LESION LOCATION: OVERVIEW**

**ANTERIOR**
- Synonyms: “expressive,” “motor”
- Types: Broca, transcortical motor
- Location: frontal
- **Fluency: poor (↓ words)**
- Comprehension: good
- Assoc. deficits: motor

**POSTERIOR**
- Synonyms: “receptive,” “sensory”
- Types: Wernicke, transcortical sensory
- Location: parietal or temporal
- Fluency: good (↑ words, but nonsensical)
- **Comprehension: poor**
- Assoc. deficits: sensory or visual field

**PERISYLVIAN**
- Types: Broca, Wernicke, conduction
- Location: arcuate fasciculus
- Fluency: variable (usually good)
- Comprehension: variable (usually good)
- Repetition: poor
APHASIA: CLINICAL FEATURES

- Dysnomia / anomia
- Nonfluent speech
- Fluent speech
- Auditory comprehension impairment
- Repetition impairment
- Jargon aphasia
- Reading & writing difficulty
APHASIA CLINICAL FEATURES: DYSNOMIA / ANOMIA

- Difficulty naming or finding words
  - Impaired retrieval of target words
  - Occurs in all aphasias
  - Non-localizing: occurs with lesions anywhere in dominant hemisphere
  - Isolated dysnomia may occur as result of incomplete resolution of any aphasia

- Hesitations

- Circumlocution
  - “Talking around” difficult-to-retrieve words
  - Definition or description instead of target word
APHASIA CLINICAL FEATURES:
NONFLUENT SPEECH

- Rate, quantity, ↓ ease of speech production
  - Verbal output decreased (< 50 words/min)
  - Phrase length short (1-4 words)
  - Production effortful
  - Articulation often poor
  - Prosody (melodic contour) disturbed
  - Telegraphic speech: Preferential use of nouns & verbs without small connecting words

- Frontal language areas damaged
APHASIA CLINICAL FEATURES: FLUENT SPEECH

- Rate, quantity, ease of speech production normal
  - Verbal output normal or increased
  - Phrase length normal (> 5 words)
  - Production easy
  - Articulation usually normal
  - Prosody (melodic contour) normal
  - May be nonsensical

- Frontal language centers intact
APHASIA CLINICAL FEATURES:
AUDITORY COMPREHENSION IMPAIRMENT

- Ranges from complete lack of understanding to subtle failure to extract full meaning of complex sentences
- Informal conversation may be misleading
  - Clues from gestures, tones, setting
  - Automatic (previously stored) words & phrases
- Formal testing without nonverbal clues necessary
- Temporoparietal language areas damaged
APHASIA CLINICAL FEATURES: REPETITION IMPAIRMENT

- Repetition of spoken language is a distinct language function
- Due to damage in the core perisylvian language area, i.e., “the repetition loop” from Wernicke to arcuate fasciculus to Broca
- Main feature of conduction aphasia
- Absent in transcortical aphasias
APHASIA CLINICAL FEATURES:
JARGON APHASIA (NONSENSICAL SPEECH)

- Paraphasic errors
  - Substitution of incorrect words for intended words; 2 types
  - Verbal (semantic) paraphasia
    - Real word similar in meaning to intended word
    - Lesion often frontal, associated with expressive aphasia
  - Literal (phonemic) paraphasia
    - Real or made-up word similar in sound to intended word
    - Lesion often temporoparietal, associated with receptive aphasia

- Neologisms (“new words”)
  - Made-up words unrelated to intended words
  - Lesion temporoparietal, associated with receptive aphasia
APHASIA CLINICAL FEATURES: READING & WRITING DIFFICULTY

- Difficulty reading = alexia
- Difficulty writing = agraphia
- Usually, alexia & agraphia parallel oral deficits
- Both may occur in isolation due to damage to perisylvian area plus other areas
  - Alexia: occipital & inferior parietal
  - Agraphia: frontal & inferior parietal
7 TYPES OF APHASIA: OVERVIEW & LOCALIZATION

Expressive = Motor = Anterior
1. Broca (B)
2. Transcortical Motor (TCM)

Receptive = Sensory = Posterior
3. Wernicke (W)
4. Transcortical Sensory (TCS)

5. Conduction (C)
6. Global (expressive + receptive)
7. Isolated Dysnomia (= Anomic Aphasia)
LANGUAGE EXAM COMPONENTS
TO DETERMINE APHASIA TYPE, LOCALIZE LESION

These 4 items combined take less than 1 minute to perform

- Naming
- Fluency
- Commands
- Repetition

Perform all 4 items if patient has dysnomia on “essential exam.”
Avoid giving nonverbal clues when testing aphasia pts, but use nonverbal clues when communicating with aphasia pts.
LANGUAGE EXAM: NAMING

Ask patient to name hand, finger, fingernail (en español, mano, dedo, uña)

- Dysnomia (difficulty naming) may be mild to severe
- Use items patient should know
  - Avoid unique objects patient might not have known before illness
  - Account for dialect and primary language
- Large items are easier than components
  - Hand is easier than finger
  - Finger is easier than fingernail
LANGUAGE EXAM: FLUENCY

Ask patient a question that requires a response using full sentences, e.g., “How do you get from your house to the hospital?”

- Patient is either fluent or nonfluent
- Normal fluency
  - 5-8 words of grammatically correct speech
  - Identifiable subject and predicate
  - Normal prosody (intonation or rhythm)
  - Individual words may be incorrect
  - Context may be nonsensical
Ask patient a 3-step command across the midline, e.g., “With your left hand, touch your right shoulder, then point to the ceiling, then close your eyes.”

- Deficit may be mild to severe
- Number of steps
  - 1-step easier than 2-step easier than 3-step
- Relationship to midline
  - “Midline” easier than “to midline” easier than “crossing midline”
- Easiest command: 1-step, midline
- Most difficult command: 3-step, crossing midline
LANGUAGE EXAM: REPETITION

Ask patient to repeat “No ifs ands or buts”
(en español, “tres tigres en un trigal”)

- Deficit may be mild to severe
- Individual words are easiest
- Sentences are more difficult
- Prepositions & conjunctions most difficult
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**EXPRESSIVE APHASIAS**

**DIAGNOSIS BASED ON LANGUAGE EXAM**

Both expressive aphasias are nonfluent with normal comprehension. *Broca cannot repeat—transcortical motor can.*

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+ normal
— abnormal
Both receptive aphasias are fluent with abnormal comprehension. Wernicke cannot repeat—transcortical sensory can.

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+ = normal
— = abnormal
CONDUCTION APHASIA PLUS
DIAGNOSIS BASED ON LANGUAGE EXAM

Aphasias on “repetition loop” cannot repeat—conduction, Broca, Wernicke.

ARCUATE FASCICULUS

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+ normal
— abnormal
Global aphasia (expressive + receptive) due to large or multifocal dominant hemisphere injury. Isolated dysnomia due to lesion anywhere in dominant hemisphere.
SUBCORTICAL APHASIAS: DYSNOMIA OR TRANSCORTICAL

*Usually due to large subcortical lesions in dominant hemisphere*

- Striatocapsular aphasia
  - Putamen, caudate, anterior deep white matter
  - Dysnomia or transcortical motor
  - Dysarthria always, hemiparesis often

- Thalamic aphasia
  - Transcortical motor or sensory
  - Other thalamic findings, e.g., sensory loss, amnesia, somnolence, eye findings
ETIOLOGIES OF APHASIAS

- Stroke – ischemia or hemorrhage
  - Perisylvian language zone supplied by MCA
  - Classic syndromes usually due to ischemic stroke
  - Large subcortical hemorrhages can cause aphasia

- Mass lesions (tumor, abscess)

- Primary progressive aphasia
  - Focal degenerative disease with slow progression
  - Form of frontotemporal dementia

- Diffuse lesions
  - Traumatic brain injury or Alzheimer Disease
  - Common causes of aphasia—but not in isolation

- TIA, migraine, or seizure (transient aphasia)
# APHASIA VS. DELIRIUM

Receptive aphasia is commonly mistaken for delirium

## APHASIA
- speech due to expressive aphasia or nonsensical speech due to receptive aphasia

- **Normal:**
  - Attention
  - Consciousness
  - Behavior
  - Orientation

- Focal L brain dysfunction
- Often with R-sided signs
  - Expressive – motor
  - Receptive – sensory, visual fields

- Check brain CT, MRI

## DELIRIUM
- speech due to drowsiness or nonsensical speech due to confusion/disorientation

- **Abnormal:**
  - Attention
  - Consciousness
  - Behavior
  - Orientation

- Diffuse brain dysfunction
- Often due to toxic-metabolic etiology
- Check serum, CSF
APHASIA

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