Session #: 1742
Day/Time: Saturday, November 14, 2015
Title: Clinical features, neuroimaging correlates, and underlying pathology of primary progressive apraxia of speech
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SUMMARY

- **What are progressive apraxia of speech (PAOS) & primary progressive apraxia of speech (PPAOS)?**
  - *Progressive Apraxia of Speech (PAOS) -* AOS of insidious onset & gradual progression due to a neurodegenerative condition. May be associated with aphasia &/or dysarthria.
  - *Primary Progressive AOS (PPAOS) -* PAOS in which AOS is the first, only, or most salient feature of neurodegenerative disease & in which criteria are not met for diagnosis of another neurodegenerative disease (e.g., progressive supranuclear palsy syndrome, corticobasal syndrome)

- **Basic Demographics – PPAOS**
  - Age at onset: late 60s - early 70s (range = late 40s - early 80s)
  - uncommon before age 65, but can occur earlier
  - somewhat older than onset of agPPA (as much as a decade in some studies)
  - Gender: probably more frequent in women (~50-70%)
  - Education: ~ 15 years (10-20 years)
  - Handedness: c/w population as whole (~ 90% R)
  - Initial presentation for evaluation: ~ 2-3 years post onset

- **Speech features associated with PPAOS** (most common, ordered; Josephs et al., 2012)
  - Slow overall speech rate
  - Lengthened intersegment durations (between sounds, syllables, words or phrases; possibly filled, including intrusive schwa)
  - Increased sound distortions or distorted sound substitutions with increased utterance length or increased syllable/word articulatory complexity
  - Syllable segmentation within multisyllabic words
  - Sound distortions
  - Syllable segmentation across words in phrases & sentences
  - Audible or visible articulatory groping; speech initiation difficulty; false starts/restarts

- **Subtypes of PAOS or PPAOS? -** Preliminary evidence (Josephs et al., 2013)

  - Type 1 – Predominated by articulatory abnormalities (e.g., distortions & distorted substitutions, repeated sounds, attempts at self-correction)
    - More evident when aphasia present & > AOS
    - Tends to be associated with widespread involvement in premotor, prefrontal, temporal-parietal lobes, caudate & insula
  - Type 2 – Predominated by prosodic abnormalities (e.g., segmentation of words & syllables)
    - More evident in PPAOS without aphasia or when AOS > aphasia
    - Tends to be associated with involvement in premotor cortex and midbrain atrophy
  - Type 3 – No clear difference in prominence of articulatory versus prosodic abnormalities

- **Accompanying Deficits @ initial evaluation - PPAOS**

    - Nonverbal oral apraxia: ~ 50% of cases at initial evaluation
        - % increases with disease progression
        - Probably more frequent when aphasia is also present (80-90%)
    - Dysarthria: Present in ~ one-third
        - increased frequency with disease progression
        - most often spastic > hypokinetic, or mixed spastic-hypokinetic (Duffy, Strand & Josephs, 2015)
    - Dysphagia: Not usually evident unless dysarthria also present

- **Acoustic Temporal Correlates**
    - Temporal measures of word and sentence duration, and maximum rate speech-like tasks distinguish PPAOS from normal speech and agrammatic PPA

- **Disease Course: Emerging Motor Deficits with Disease Progression**

  Josephs et al. (2014) – Followed evolution in 13 people with PPAOS without other neurologic signs at initial evaluation
        - Initial evaluation at ~ 4 years post onset
        - f/u at ~ 7 years post onset
    - All developed extrapyramidal (parkinsonian) symptoms
    - In 8/13 PPAOS remained predominant problem
    - 5/13 evolved to a severe PSP-like syndrome
        - severe parkinsonism, near mutism, dysphagia, vertical supranuclear gaze palsy, urinary incontinence, balance difficulty with falls, & limb apraxia
    - Conclusion: Some will fairly rapidly evolve by ~ 5 years to a devastating PSP-like syndrome, while others will retain PPAOS diagnosis, although some with mild parkinsonism, at ~7 years. Some evolve to a corticobasal (CBD)-like syndrome (CBS) with asymmetric rigidity, limb apraxia, & other extrapyramidal features

- **Neurologic underpinnings**
    - Primary neuroanatomic correlates
        - *Grey matter* - Superior lateral premotor cortex & supplementary motor area
        - *White matter* – Same as grey matter + inferior premotor cortex & body of corpus callosum, superior longitudinal fasciculus, esp. premotor components
        - Primary composite – Superior lateral premotor cortex & supplementary motor area.
    - Pathology - PPAOS very consistently but not invariably associated with
        - tau biochemistry (tauopathy)
        - progressive supranuclear palsy or corticobasal degeneration
        - In PAOS, when nonfluent/agrammatic aphasia present & AOS = or > nonfluent aphasia
            - Predicts PSP or CBS pathology in ~ 90%
            - PSP or CBD (tauopathy) possible in PPA (with no or less severe AOS), but not common (<20%)

- **Summary – Main take home points**
    - PPAOS exists - may not be as rare as literature implies.
    - When primary, it should not be subsumed under classifications of primary progressive aphasia (PPA)

- It reflects L or L>R hemisphere abnormalities - frontal lobe (superior & mid premotor cortex, SMA)
- Tends eventually to be associated with conditions with prominent motor rather than cognitive deficits (e.g., PSPS, CBS)
- Tends to predict pathology consistent with tauopathy (e.g., PSP, CBD)

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