Information Processing Speed Impairment after Stroke

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No Disclosures

Background: Information Processing Speed (IPS)

- IPS: elemental cognitive function w/ complex dimensions beyond simple reaction time.
 - Essential governor of cognitive performances
 - Close but separate relationships w/ memory, attention, executive function, & academic skills

One year post-stroke:

- 50-70% of stroke survivors have IPS impairment
- IPS impairment more profound then memory impairment

Background: Information Processing Speed (IPS)

Two components: Limited Time and Simultaneity

- Consequence of slow speeds:
 - Limited time is available to complete the later steps of mental operations
 - Information from the earlier mental processing is too <u>impoverished</u> by the time other simultaneous information needs to be processed

Aims/Hypothesis: Information Processing Speed (IPS)

- Aim:
 - Determine frequency & severity of IPS impairment in patients with mild stroke compared to moderate stroke over time (evidenced by abnormal SDMT scores)
- Hypothesis:
 - IPS impairment is not significantly different in patients with mild stoke compared to mod. stroke)

Methods: Information Processing Speed (IPS)

- Longitudinal observational study, 70 adults w/ acute mild (NIHSS <5) v. mod. stroke (NIHSS 5-12)</p>
- Assessments at < 72 hrs, Wk 3, & Wk 12 post-stroke</p>
- Controls: diagnostic standard SDMT norm values tables
 & age matched control group (N=30)
- IPS impairment measurements: Symbol Digit Modalities Test (SDMT)



Results: Information Processing Speed (IPS)

Interim analysis of 30 subjects (mild stroke n=18)

 <u>Linear mixed model regression</u>: No significant difference in frequency & severity of IPS impairment between subjects w/ mild & moderate stroke (p=0.2)

SDMT test results were lower than matched normative table values by the following percent:

			# of patients
Severity of stroke	baseline	Wk 12	defined as
			unimpaired at
			Wk 12
Mild	53% lower	32% lower	6 (33%)
Moderate	60% lower	39% lower	4 (33%)

Results Mean SDMT score change over time



Box and whisker plot for raw SDMT scores for participants with mild and moderate stroke

Figure 1. In each Box, Mean is indicated by x= and Median is indicated by a bar; each Box equals 50% of scores (each whisker = 25%). Most scores fall well below normal value range (Strauss et al., 2006) yet indicate IPS improvement over time. There were three outlier scores: mild stroke scores of zero points (baseline) and 54 points (Week 3) and for moderate stroke a score of 9 (Week 12). When these outliers were removed all whiskers were similar in length per plot.

Conclusion: Information Processing Speed (IPS)

Key findings:

- Regardless of stroke severity:
 - 67% of subjects in both groups have severe, persistent IPS impairment for 3 months
- 94% of all screened patients (n=45) have IPS impairment
- Mod. strokes improved most between baseline & Wk. 3
- Mild strokes between Wk. 3 & Wk12

Limitation:

- Small sample (n=30/70 subjects),
- Tiny effect size (Cohn's d = 0.05)

Information Processing Speed (IPS)

Questions?