Pediatric Head Injuries: Academic and Behavioral Issues Within the School

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Notes available at:
http://www.dartmouthpsychiatry.org/
healthinformation.htm
Cartoons by Delonas, NY Post
Goals & Objectives

- Interwoven
  1. Recognize typical cognitive deficits associated with TBI/CHI
     - Including test score patterns, comorbidity issues
Goals & Objectives, cont.

2. To understand the course of recovery following TBI

- Cognitive processes,
- Support needs
Goals & Objectives, cont.

3. Identify appropriate school-based services for TBI kids based on an understanding of cognitive dysfunction most typically encountered following TBI

- General school programming issues, IDEA (briefly)
Traumatic Brain Injuries (general)

- Cerebral trauma most common form of brain damage in persons under 40.
- Affects brain in several ways
  1. direct damage to cells
  2. disrupted blood supply - ischemia &/or infarction
3. intracranial pressure due to blood causing both additional damage from the blood
4. brain itself swells when injured causing pressure
5. compound fracture opens skull - infection
6. scarring can become epileptiform focus.
Predicting Behavioral Effects

- in general, several factors:
  - age,
  - severity,
  - site of lesion,
  - premorbid personality.
Closed Head Injury

Pathophysiology:
- predilection for anterior regions

Behavioral consequences/symptoms - 
Glasgow Coma Scale
- 5 principle levels of consciousness
- Identifies severity
Post concussive syndrome

headache, dizziness, fatigue, concentration, memory, anxiety, irritability, noise hypersensitivity, photophobia.

More prolonged in premorbid neurotic or anxious personalities.
Post-traumatic psychosis

Post traumatic psychosis - psychotic reactions due to seizure foci or neurochemical abnormalities.
Post-traumatic amnesia

- FORGETTING OF INFORMATION AND DIFFICULTY LEARNING NEW INFORMATION FOLLOWING INJURY
Recovery:

Most happens 6-9 months post, but it continues up to 3 years.

- Personality often suffers the most.
  - Quality of life, perceived stress levels, leisure activities.
  - Behavioral impairment often temporary
Incidence

- varies as function of severity
- estimates vary

severity based on GCS
- mild 76%
- moderate 10%
- severe 13%

- National Pediatric Trauma Registry 1993
Cognitive Functions

- broad spectrum of deficits
  - moderate to severe
- general intellectual
  - severe: much lower PIQ/VIQ (see below)
  - moderate: less striking but significant
- specific functions
  - attention, verbal learning, nonverbal visual memory, problem solving
Severity Issues

- Group findings demonstrate significant deficits in moderate to severe groups

- BUT – group data
  - Mild TBI can produce significant specific deficits in any one individual
Comorbidity Issues

- Individuals with certain disorders at higher risk for TBI
  - E.g., ADHD
  - Psychosocial adversity predicts secondary ADHD (Gerring, 1998)
- Pre-existing conditions complicate outcome
Specific Deficits by Function
Intellectual Functioning

- IQ scores tend to be depressed relative to premorbid levels
  - esp. in severe HI
- significant recovery
- largest increases in severe HI
  - most rapid increase immediately after
  - tend to plateau 1-2 years
  - can improve up to 5 years
Caveat: IQ Test Demands

- likely make up some of the differences seen post-injury
- Verbal scales tend to rely on previously obtained knowledge
- Performance scales rely on fluid problem solving & speeded motor output
General Intellectual: WISC-R studies (Donders, 1997)

- much data
- typically greater & more persistent lowering of PIQ (relative to VIQ)
WISC-III Factor Scores: level and patterns of performances

- (Donders & Warschausky, 1997)
- level of performance across factors tends to be lower
- pattern of performance differences:
  - Perceptual Organization
  - Processing Speed (consistently low)
Pattern of Differences:

- not attributed to demographics
  - relative levels in CHI were related to SES
Pattern of Differences:

- was related to neurological indices
  - severity of injury
  - length of coma
  - CT/MRI + for diffuse lesions
  - CT/MRI for Rt. hem. lesions
  - no specific effect for focal frontal lesions
LANGUAGE SKILLS

- immediately post-injury:
  - spontaneous mutism
  - expressive deficits

- subtle difficulties often persist post moderate/severe
long-term language deficits

- syntactical comprehension
- sentence repetition
- confrontation naming (similar to expressive vocab.)
- object description
- verbal fluency
Language Abilities in Children & Adolescents

Ewing-Cobbs, 1987

- NCCEA aphasia battery

- Expressive more sensitive to severity of injury than receptive

- No differences between moderate/severe & mild injury groups on receptive measures
Expressive Deficits in Children & Adolescents

- visual naming
- sentence repetition
- word fluency
- writing to dictation
  - writing to dictation lower in children relative to adolescents
  - due to rapidly emerging skills
Narrative Stories

- Compared to mild HI & normals
  - contain less information, fewer words, poorly organized
Discourse & Pragmatics

- use of language skills to express ideas & achieve effective communication
  - involves S-T memory, integration of ideas & elements of info, choosing between important & unimportant
- defective narrative discourse abilities may persist long after recovery (Chapman)
Authors suggest that:

even mild language impairment might disrupt scholastic achievement.
Nonverbal Skills

- declines in Performance IQ tasks
- most involve some motor component
  - constructional skills
  - visual-perceptual
- also face recognition & spatial
Attention

- most frequent complaint
- typically tests of sustained attention
  - relative worse in younger children
  - while sustained attention is still developing
HI before age 7

- more severe impairment in attentional processes than later injury
- possibly due to incomplete development of prefrontal cortices at this age
Attention (Dennis, et al)

- is fundamental:
  - underpins learning & retention
- disrupted attention accounts for some of academic difficulties experienced
Different Models of Attentional Processing

- Dennis:
  - focused attention
    - (sustained attention, concentration, vigilance)
  - selective attention
    - (attending in face of distractors)
  - response inhibition
    - (respond appropriately at given time, withholding impulsive responses)
Selective Attention

- more impaired in HI children than normals
- as compared with focused attention
Response Inhibition

- severe impairment related to bifrontal damage
- consistent with adult literature
Executive Functions

- EF difficult to measure
- deficits in planning
- verbal fluency
- concept formation
- mental flexibility
- deficits correlate with volume of lesion
EF: Learning *HOW* to Learn

- Involves attention, memory retrieval, emotion
- Critical thinking relies on EF
Memory

- magnitude of deficit depends on severity of injury
- most studies of verbal memory but some for nonverbal
  - implicit memory remains intact
  - in severe injuries, poor learning, less retention, better recognition than recall
Learning and Retention

- general agreement: impairment in new learning is deficit most frequently encountered in HI children (& adults)
  - both verbal & nonverbal
  - degree of impairment related to injury severity
Memory in kids

- Mild-moderate no different than controls at 3 month f-u
- Severe showed significant deficits
  - Retrieval and recognition
  - Thus, mild encoding deficit
Consequences for memory...

severely impaired children will have difficulty developing semantic organizational strategies when they reach adolescents.

frontal/executive function
Corticosensory & Motor Skills

- tactile sensitivity
- fine motor skills
  - especially timed tasks
  - speeded task performance most effected in severe groups
  - greater the severity, the greater decline as demand for speed increases
Academic Performance

- declines in performance
  - inconsistent
- increased risk of placement in special ed.
- usually not noted for mild injuries
  - one study found differences on WJR Brd. Written Expression but not Broad Reading
    - moderate and severe
    - 6-12 y.o.
Predictors of Post-Injury Special Ed. Placement

- 2 recent studies
  - Spec. Ed. *NOT* related to performance on achievement tests

  - placement related to:
    - ratings of behavioral disturbance
    - NP functioning
      - i.e., memory, nonverbal fx., fine motor speed and dexterity
Achievement tests are not sensitive to effects of HI

but

achievement results were related to demographic factors such as SES
Social-Emotional Functioning

- Personality Inventory for Children - Revised (PIC)
- consistently high on Social Isolation
- Tendency for intensification of premorbid characteristics
Max Study of Personality Change

- 94 kids ages 5-15 at time of injury
- Followed longitudinally
- Extensive battery of tests, interviews imaging.
- Severe head injury caused greatest personality change (40%)
  - 2 years post
- Moderate HI caused transient problems
Subtypes of PC

- Max study found several subtypes:
  - Labile &/or aggressive
  - Disinhibited (accompanied one of above)
  - Apathetic (transient)
  - Paranoid (rare)
Head Injury Is A Family & Community Affair

- Affects everyone related to injured
- All relationships change
- Basic grief model of stages
Some findings

- Supportive family fosters recovery as much as possible
  - heavy burden can disrupt the best families
- Familial coping methods demonstrated
  - children with aggressive role models become more aggressive
Sports Related Concussion

- second impact syndrome
  - serious consequences
  - 1 week ‘rest’ recommended
- poor reporting by athletes
- dingers
Advances in On-field Assessment

- recent studies have provided an accepted framework for assessment
- criteria for returning to play
- critical need for trained on-field personnel
  - games, matches
  - practices
- note recent studies of head injuries in soccer players from ‘heading’
Intervention and Reintegration

The role of the school
1. Externally focused interventions

Do not presume change or improvement

- Alter the external environment
- Change individual expectations
- Use specialized teaching strategies (errorless learning)
2. Restorative Interventions (Internal)

Improve underlying skills

- Behavioral analysis and reinforcement schedules
- Need to focus on generalizability
- Realistic evaluation
3. Compensation strategies

No presumption of change in cognitive function

- Following scripts or procedure
- Organizational techniques
Reintegration into educational system

Consider Consequences of TBI

- Motor
- Language
- Cognitive
- Behavioral and emotional
- Health
- Achievement
Team approach

- Schedule of reintegration
- Immediately following injury
  - Contact family
  - Offer support, establish lines of communication
After stabilization

- Make regular contact in hospital, reassurance
- Contact with family
- Attend team meetings if possible
- Provide any work/materials that can be handled
- Begin education process – about TBI
Prior to hospital d/c

- Make contact with hospital case manager for clear understanding of status and prognosis
- Make necessary arrangements for return to classes
  - Convene school team
    - Make sure a counselor/psychologist is on team
    - Accommodations
    - Adaptive equipment
    - Remedial instruction/therapies
Immediately after d/c

- Have plan ready
- Get accommodations in place
- Meet with parents
Arrival at school

- Slow reintegration as needed
- Tendency is to want to return to normal as soon as possible
  - Watch stamina – don’t allow too much activity/work.
  - Reduced load
After first weeks at school

- Meet with team
- Review plan, adjust as necessary
Modification of Teaching Strategies: SOS

- Structure
- Organization
- Strategies
  - Differ in degree of external control required
Structure

- Physical organization for maximal learning
  - Minimal distractions
  - Clear expectations
  - Basic routine
  - Provide home-school liaison (support for parents)
  - For adolescents, work-release and work transition programs
Structure: Consistency

- Teacher – use same teacher as much as possible
  - Student-teacher match
- Behavioral consistency
  - Difficult time following instructions, making use of independent time
  - Don’t get subtle cues, cause-effect, etc.
- Consider endurance and stamina
  - Shorter day, rest time
- Support and validate feelings
Organization

- Methods used to establish order and relevance in learning
- Provide necessary environmental cues and aids to foster acquisition of new learning and retrieval of previous knowledge
- A close ally of Structure
Organization: Tactics

- need to learn how to learn
  - finding info, organization of info, planning steps, monitoring for errors, quality
  - Help with organizing assignments
  - life-skills curriculum
    - Functional behaviors
  - Career education
    - Structured employment training
Strategy

- Attempt to instruct in planning and self-monitoring schemes
- Direct instruction in learning how to learn again
  - Memory deficits might complicate further
  - Compensatory strategies might also be necessary
- Role modeling, peer tutoring and social skill training
Qualification for Services: IDEA vs. 504

- 504 is broader than IDEA
  - IDEA policies defined more precisely
  - If covered by IDEA, then covered by 504
  - Reverse is NOT true
Application

- Under IDEA, disability determination is based on a discrepancy model
  - And must qualify under 1 of 13 categories
- 504 only requires a disability
  - Substantially limit one major life activity
  - Can include deficits in reasoning, memory, social competency
  - The school needs to include person knowledgeable about TBI in plan development
Both require free, appropriate public education

- Includes individually designed instruction
- 504 does not require excessive financial or administrative burden
Conclusion

Head Injury in children is frequent and can be debilitating.

Schools are an important element in the ecology of treatment, recovery and adaptation processes.

A systems approach is critical.