The child with hemiplegic cerebral palsy – thinking beyond the motor impairment

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Content

• Coming to a diagnosis
• The importance of understanding the injury – MRI scans
• Role of epilepsy and learning difficulties
• New information on executive function
• Quality of life and participation
• Adult life
Hemiplegic cerebral palsy

• Syndrome, not a disease entity
• To understand the child, you need to understand aetiology
• This includes timing of insult – what was the stage of brain development?
• Imaging mandatory to understanding the whole child
Focal cortical infarct

- Vessel occlusion
- Around 34 - 42 gestational weeks
- Asymmetrical cortical damage
- Hemiplegia – hand dominated
- Around 25% of hemiplegia
MRI in CP subtypes periventricular lesions

JAMA. 2006;296(13):1602-1608
Asymmetric periventricular damage
Cerebral Palsy

- Complications
- Comorbidities
- Co-causal

Epilepsy as an example

- **Complication** - secondary to anoxia injury after aspiration pneumonia
- **Co-causal** - secondary to antenatal middle cerebral artery infarct
- **Comorbid** - familial childhood absence epilepsy
Non-motor symptoms and signs in hemiplegic cerebral palsy

- Vision
- Epilepsy
- Learning
- Executive function
- Participation
- Quality of life

- Mean IQ 100
  - Mean IQ 85 if epilepsy present
- Normal bladder and bowel control
- Attention deficit and hyperactivity disorder 5%
  - 33% if epilepsy present
Non motor signs and symptoms in diplegic cerebral palsy

• Epilepsy 20%
  – Low if pure diplegia of prematurity
  – High if low Apgar + perinatal asphyxia

• IQ mean 78
  – More global IQ loss if hands more involved

• Specific learning difficulties
  – Dyslexia
  – Dysgraphia
  – Arithmetic difficulties
  – Upper limb dyspraxia
Epilepsy with hemiplegic cerebral palsy

- 28-46% in congenital hemiplegia
- 27% presented less than 1 year
- 68% presented before 4 years
- Partial seizures in 70%
- GTCS in 27-46%
- Infantile spasms rare
- More have abnormal EEG – not necessarily epileptiform abnormalities
Case study

- Right hemiplegia, hand dominant
- GMFCS 1, MACS 2
- Occasional complex partial seizure
- Significant global learning difficulties
- Mainstream primary school only with maximum support
- No behaviour problems
Case 5 – term infarct
Status in sleep – L centro-temporal spike and slow wave
Terminology

- **CSWS**
  - continuous spike and slow wave in sleep
- **ESES**
  - encephalopathy with electrical status in sleep
- >85% of slow wave sleep affected (not REM sleep)
- **4 features (Tassinari)**
  - Neuropsychological impairment
  - Motor impairment
  - Epilepsy with different seizure types
  - Typical EEG findings lasting > 1 month
Multicentre European Study of Cerebral Palsy

- 29 of 113 children with hemiplegic cp had a history of seizure or epilepsy
- 16 right : 13 left
- Hx of seizures in all categories of MRI abnormality

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Currently has epilepsy

Strong association between epilepsy and language problems in hemiplegic cp

O.R. 5 (2.0-12.5)
Outcomes of ESES

• Abnormal EEG pattern lasts for 3 years
• Seizures also tend to improve – although less likely with underlying structural pathology
• Significant percentage remain with learning problems and unable to live independently
Message

- Think about ESES in hemiplegic cp because with an EEG like this, the child cannot think
Executive function

- Skills needed for
  - Novel, goal directed and complex activities
  - Self regulation, problem solving, organisation

- Deficits result in
  - Inability to focus, perseveration
  - Increased errors without self correction
  - Take longer to complete complex tasks

- Frontal lobe?
Results

• Significant deficits found in most domains compared to able bodied peer group
• No significant differences between right and left hemiplegia
• Better performance in verbal memory – possible retention of verbal skills at expense of non-verbal skills “crowding”
Behavioural and emotional disorders in children with cerebral palsy

- Little information
- Difficult to assess in more severe impairments
- Unlike other comorbidities, may be commoner in more intellectually able
- Associated with communication difficulties (my experience)
Risk factors for behavioural and emotional disorders in CP

- Genetics
- Site of lesion
- Extent of lesion
- Epilepsy
- Drug therapy
- Sleep disturbance
- Visual impairment
- Hearing impairment
- Speech impairment

- Pain
  - Reflux
  - Constipation
  - Dislocated hips
  - Muscle spasticity

- Poor nutrition
- Cognitive abilities
Risk factors for behavioural and emotional disorders in CP

- Lack of independence
- Problems with participation
- Isolation from peer group
- Bullying
- Body image
- Lack of opportunity
- Reliance on parents
- Recurrent operations
- Pain
Participation and quality of life

- QoL is a measure of self perception
- GMFCS associated with activity and participation
- GMFCS associated with physical well being but not psychosocial well being
- Pain, lethargy and communication problems associated with low psychosocial well being.
- Parents often underestimate the QoL of a child with CP
Participation and quality of life

• There is great variability in participation between different communities for children with CP
• Environmental factors may be as important as factors related to child’s abilities
• In teenage years, body image and self esteem become important
Outcomes in adult life

- 80% mainstream education (96% peers)
- Fewer complete advanced education
  - Upper secondary 11% v 19%
  - tertiary 14% v 20%
- Competitively employed 46%
- Middle and above income brackets
  - 38% v 60%
Outcomes in adult life

• Functional stability as a young adult?

• Pain

• Fatigue

• Deterioration in walking
Summary

- Motor disorder is not the only determinant of function
- Understanding aetiology gives clues to non motor impairments
- Non motor impairments can be more difficult to identify and address
- Epilepsy is a significant co-causal disorder
- Challenges continue throughout life
Questions?