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

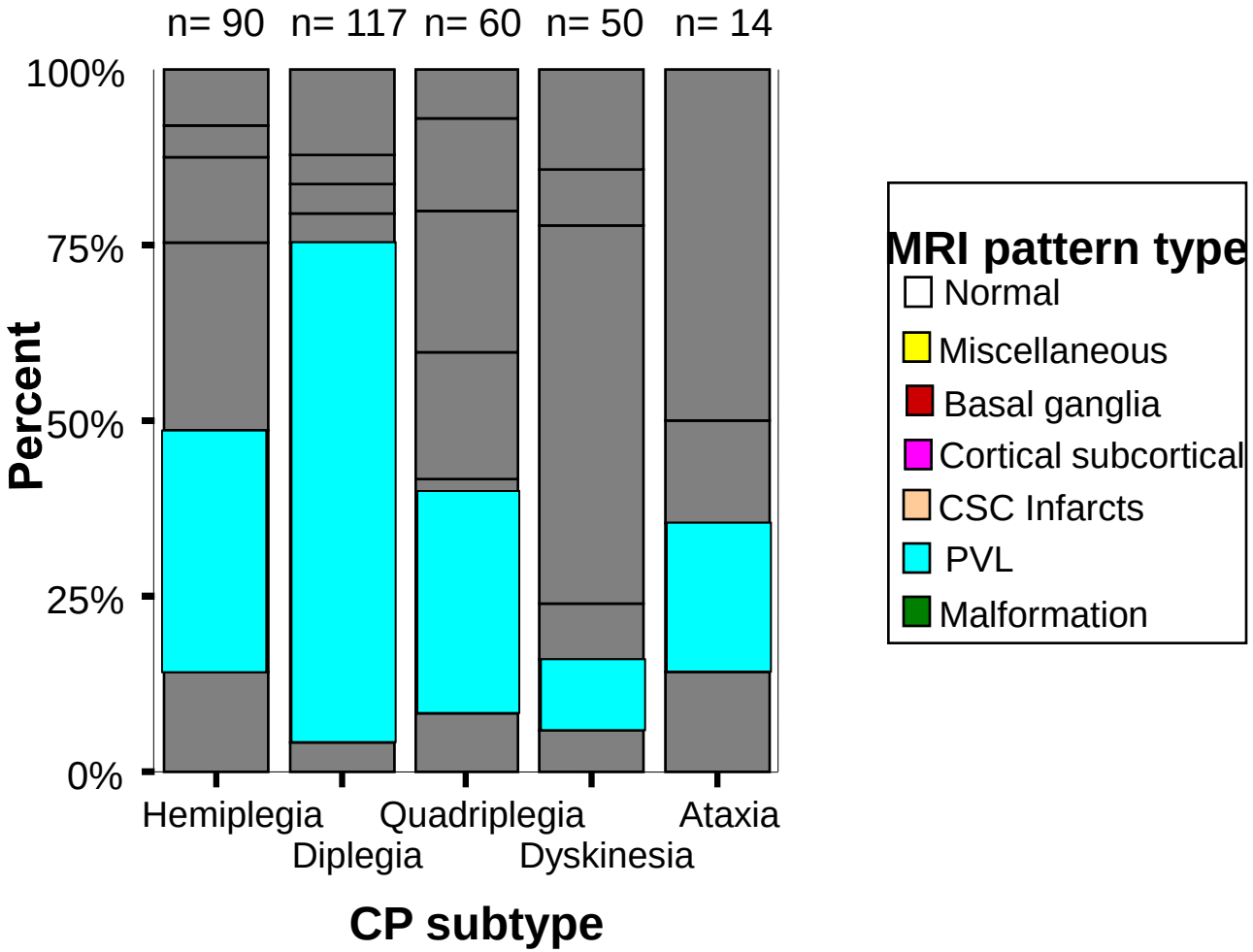
Hemiplegic cerebral palsy

- 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

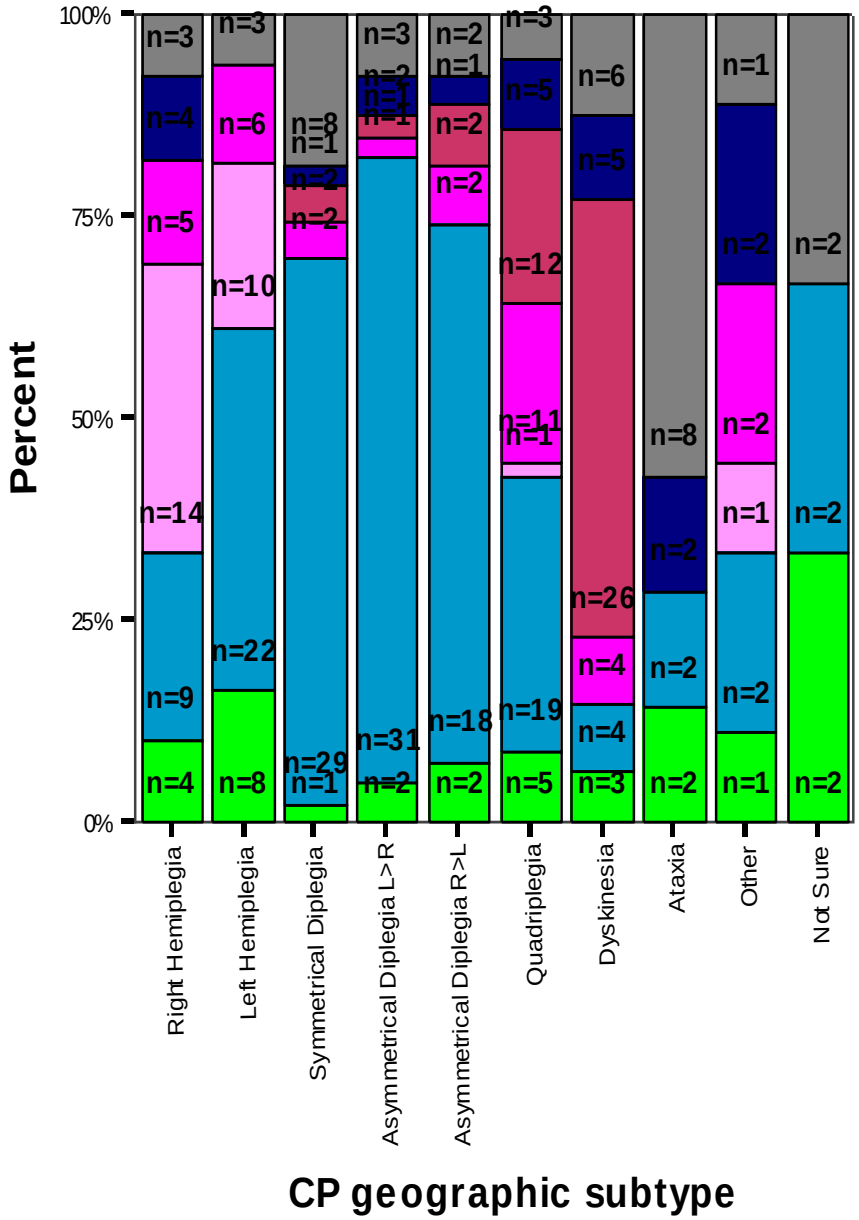
- **Vessel occlusion**
- **Around 34 - 42 gestational weeks**
- **Asymmetrical cortical damage**
- **Hemiplegia – hand dominated**
- **Around 25% of hemiplegia**

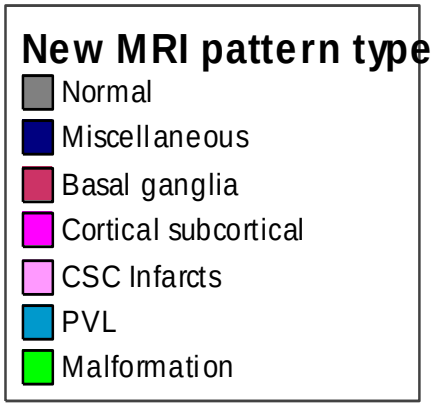
MRI in CP subtypes periventricular lesions



JAMA. 2006;296(13):1602-1608

Asymmetric periventricular damage





Bars show percents

PV white matter damage

Cerebral Palsy

- Complications
- Comorbidites
- Co-causal

Epilepsy as an example

- **Comorbid –** familial childhood absence epilepsy
- **Co-causal –** secondary to antenatal middle cerebral artery infarct
- **Complication-** secondary to anoxia injury after aspiration pneumonia

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

Currently has epilepsy

Language problems	Yes	No
Yes	18	11
No	18	55

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

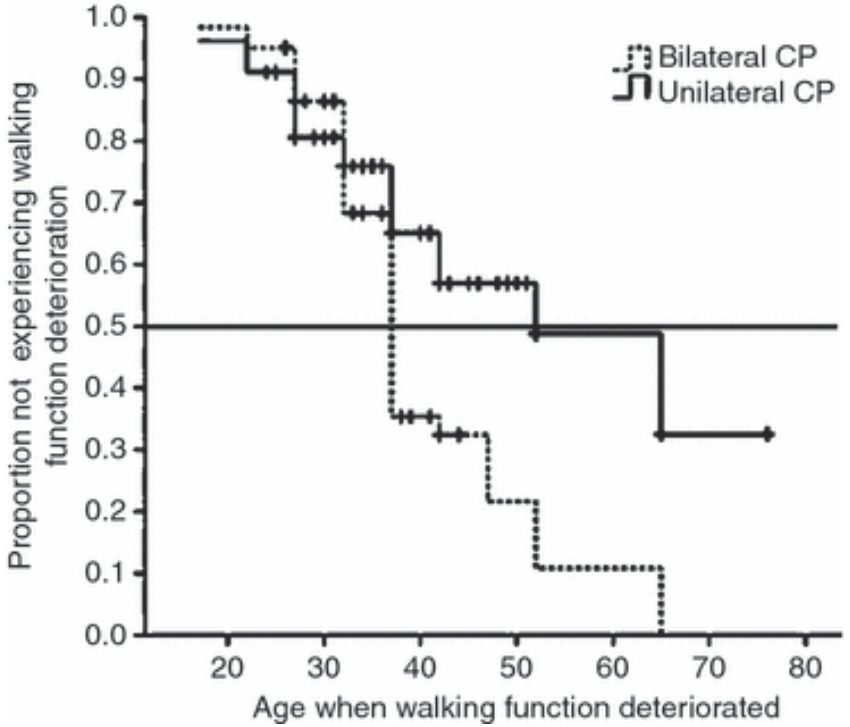
- 80% mainstream education (96% peers)
- Fewer complete advanced education
  - Upper secondary 11% v 19%
  - tertiary 14% v 20%
- Competitively employed 46%
- Middle and above income brackets
  - 38% v 60%

Developmental Medicine & Child Neurology 2005, 47: 511–517

Outcomes in adult life

- Functional stability as a young adult?

- Pain
- Fatigue
- Deterioration in walking



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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?