Developmental Therapy in a Child with Seizures

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Epilepsy is the most common childhood neurologic disorder, affecting 0.5-1.0% of children younger than 16 years.

Population-based studies show that 70-76% of children with epilepsy have some types of disability or handicap affecting their daily life and choices for the future.

Increased awareness and early diagnosis of these conditions may affect therapeutic intervention and long-term outcome.
• Co-morbidities associated with seizures, NDD with seizures
• Initiation and goals of developmental therapy
• What to expect while giving therapy?
• Acute seizure management
• Anti-epileptic drugs effects
• Precautions
Who needs developmental therapy

1. Child with developmental disability, undergoing developmental therapy, now with epilepsy
2. Children followed up by both teams (eg. cerebral palsy)
3. Children with epilepsy- may have cognitive, language, attention issues, learning disabilities, motor difficulties, side effects of anti-epileptic drugs
4. Post surgical (brain tumours, epilepsy surgery)
- Children with developmental disabilities can present with epilepsy as a comorbidity

- Prevalence of epilepsy in this group of children is 30–50% and is higher compared to the general population [Sunder, 1997]

- Coexistence of developmental disorders in the same child further increases the risk for epilepsy

- A study by Tuchman and Rapin [2002] found that children with autism alone have a 2% risk of developing epilepsy by 5 years and an 8% risk by 10 years

- In combination with mental retardation (MR) and CP, the risk increases to 29% at 1 year, 35% at 5 years, and 67% at 10 years
Neurodevelopmental disorders with epilepsy

- Autism Spectrum Disorder
- ADHD
- Intellectual Disability
- Cerebral Palsy
• Structural malformations
• Perinatal complications
• Downs syndrome
• Fragile X
• Ring chromosome 20
• Angelman syndrome
• Tuberous Sclerosis
• Rett syndrome
• patients with epilepsy were found to have lower scores in both cognitive and adaptive behavior as compared to those without epilepsy

• This study corroborates a previous study that concluded that epilepsy is a negative prognostic factor for outcome in autism

  Nordin and Gillberg, 1998. Danielsson et al

• ADHD and epilepsy- both are prevalent
  - Common etiology
  - Seizures can exacerbate
  - Medications
During therapy

- If brief seizure and child is active- continue therapy
- If prolonged episode- end current session
- Position
- Medication – Midazolam/Diazepam if prolonged/cluster

- While giving therapy in ICU – cautious therapy monitoring tolerance to movements
- PT may induce a seizure- stop and reassess on daily basis stability
- ICU- to prevent complications of immobility
• if seizures are occurring for the first time - refer
• Additional Differentials for epileptic seizures in children with epilepsy:
  • Motor Stereotypies
  • Involuntary movements
  • Tics
  • Staring spells
  • Spontaneous behaviours like grimacing, chewing, smacking, grinding
  • Sudden aggressive or unusual behaviours
## Co-morbidities of Epilepsy

A table showing neurological, psychological, and physical comorbidities of epilepsy:

<table>
<thead>
<tr>
<th>Neurological comorbidities</th>
<th>Psychological comorbidities</th>
<th>Physical comorbidities</th>
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</thead>
<tbody>
<tr>
<td>Cognitive impairment</td>
<td>Autism spectrum disorders</td>
<td>Bone loss</td>
</tr>
<tr>
<td>Language impairment</td>
<td>Attention deficit/hyperactivity disorder</td>
<td>Immunological disturbances</td>
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<tr>
<td>Migraine &amp; headache</td>
<td>Mood disorders (anxiety and depression)</td>
<td>Retardation of body height growth</td>
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<tr>
<td>Sleep problems</td>
<td>Psychosocial &amp; familial problems</td>
<td>Hypothyroidism</td>
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<tr>
<td></td>
<td>Rare: psychosis, oppositional defiant or conduct disorders, &amp; tic disorders</td>
<td>Polycystic ovary syndrome</td>
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<td>Body weight changes</td>
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<td>Dyslipidemia</td>
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<td>Carnitine deficiency</td>
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</tbody>
</table>
Reduced social integration

Exclusion from activities

Reduced ability to use public transport

Increased carer stress

School absentism
Factors contributing to cognitive outcomes: Young age at onset, symptomatic cause, epileptic encephalopathy, and continued treatment of AEDs were also reported to be independently associated. 

A population-based prevalence study of children with epilepsy reported that intellectual disability was the most common comorbidity (30-40%) Reilly C et al.

Long-term risk of learning problems exists even in those with normal IQs and well-controlled seizures. Baillet LL et al.

McNelis et al. (2007) found that academic performance declined in all children with new-onset epilepsy for up to 12 months after diagnosis, but further decline depended on whether the seizures remained recurrent or were brought under control. More in younger children.

Particularly strong link between intractable epilepsy and learning disabilities.
• prevalence of ADHD in 40% of children with epilepsy
• attention difficulties rather than hyperactivity predominate in children with epilepsy and ADHD Dunn et al (2003)

• ASD are reported to be between 20% and 50% depending on the complexity of the epilepsy.
• Epilepsy syndromes with poor cognitive outcomes-Infantile spasms, Dravet Syndrome, Lennox Gastaut Syndrome


• West Syndrome- Riikonen reported long-term study of cognitive outcome—214 children were followed for 20 to 30 years or until death (31%). Of 147 survivors, 17% were normal, 7% had mild delay (intelligent quotient 68-75), 24% were in a special training school, and 51% were uneducatable.

Autism

• Dravet Syndrome- Autistic traits, hyperactivity, poor visuomotor skills, ID
Symptomatic generalized epilepsy had a lower full-scale intelligence quotient. Nolan MA et al


JME - psychiatric

BECTS- auditory–verbal memory, learning and executive function resolve as seizures and epileptiform discharges abate

Absence epilepsy has been reported to have an increased risk for neurocognitive impairment. Chan SC, Lee WT. Benign epilepsy in children. J Formos Med Assoc 2011;110:134e44

Auditory and visual inattention. Mirsky et al
Goals

- Management strategies focus not only on controlling seizures, but also on early diagnosis and therapy of comorbid conditions - cognitive, learning, physical
- Maximize function
- School integration
- Education of family
- Psychosocial support
- Provide good QOL

- Multidisciplinary

- Pharmacological and non-pharmacological
Therapy Interventions

1. Motor Function-
   - gross motor
   - handwriting, coordination
   - Swallowing issues

2. Cognitive and Behavioural
   - Attention, hyperactivity
   - Concentration
   - Learning disabilities

3. Training for ADL

4. Psychosocial adaptation - social adjustment, confidence
• Teachers and health professionals need to treat each child as an individual and be alert to the possibility that epilepsy might impact on learning

• Early assessment and monitoring of school performance with consistent follow-up is the best preventive measure

• Fastenau et al. (2009) concluded that a diagnosis of epilepsy (even with controlled seizures and with seizure types that are considered to be less severe) should provide sufficient cause to screen for learning difficulties in schools
• There is a need for epilepsy awareness in schools and training for teachers to become universal and an integral part of initial teacher training.
Precautions

- Children with developmental disabilities may not have adequate communication to describe side effects and caregivers need to be on the look out for change in behavior, activity, and mental status.
- Sudden increased aggressiveness, refusal to take medications
- Necessity of support to ensure drug and therapy compliance
- Any deterioration in motor function may be related to side effects of AEDs
- Playing in the waiting room should be safe and the atmosphere should be adequate for clients and parents/carers not to feel embarrassed
• Prevention of Injury In patients with therapy-resistant epilepsies who continue having seizure-related falls (or sometimes heavy involuntary movements): head protection, helmets, knee or elbow pads

• There is possibility of reduction in bone density Calcium and Vitamin D supplementation
Anti-epileptic drugs

- AEDS predominantly affect attention and psychomotor speed

- Behavioral disorders may also appear when seizure is controlled with AEDs and as the patient becomes more alert. This ‘release phenomenon’ may be incorrectly attributed to the drug as an adverse effect (Mula and Monaco 2009)

- Avoiding polytherapy, slow titration and using the lowest effective AED dose could decrease cognitive and behavioral side effects of AEDs

- Close monitoring for cognitive effects
• Phenobarbitone- greater cognitive impairment

• Topiramate-
  has been associated with more cognitive adverse effects
  decreased language function, frontal lobe executive function
  dose related, rapid titration and polytherapy are additional risk factors

• Levetiracetam- behavioral problems including aggression, and irritability

• Lamotrigine- improves attention and behavior

• Zonisamide affects cognition negatively
• Oxcarbamazepine- less effect on cognition
Sodium channel blockers particularly carbamazepine, lamotrigine, oxcarbazepine, and phenytoin may negatively affect coordination.
In children with LD

- Valproate or lamotrigine are recommended as first-line drugs, although myoclonic seizures may not respond to or deteriorate with lamotrigine.

- Phenytoin, phenobarbital, and the benzodiazepines are less useful long-term AEDs

- Focal – carbamazepine, ozcarbamazepine

- Levetiracetam

- Topiramate-controversial
Summary

• Identification of these comorbid difficulties should be an integral part of management in childhood epilepsy
• It is recommended that clinicians screen and assess the possible neurological and psychological comorbidities both in children with newly diagnosed epilepsy and those with regular follow-up after treatment
• Multidisciplinary approach
• Increased awareness in schools and integration of school, teachers, parent and clinicians in management
Thank you

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