RASMUSSEN’S ENCEPHALITIS

- A CASE REPORT

Dr. Suchithra.J
DNB PG
RAILWAY HOSPITAL
• Master Naveen Kumar, 7/Mch, first born of nonconsanguinous marriage presented to us with
  – Left hemiparesis
  – Seizures on L side of body not controlled with AED
• FT/ LSCS/ Birth Weight - 2.7 Kg
• Uneventful neonatal period
• H/O status epilepticus and fever at the age of 7 months, treated as febrile seizures and recovered without any neurological deficit
• 9 months - stiffening of left UL & LL, lasted for 5 mins, recovered spontaneously without any complications
• 2 weeks later - paucity of movements on left side as compared to right
• Frequent episodes of seizures involving left side of the body with face turned to left side
• CT was done, Child put on AED, advised physiotherapy with good compliance
• Frequency of seizures increased to 5 to 6 episodes per month and put on 3 AED with poor control of seizures

• His motor weakness on left side - gradually progressive and at present he has difficulty in using left UL & LL

• Now child has 1-2 episodes of seizures per month
• H/O abnormal gait (+)
• No involuntary movements
• H/O poor scholastic performance (+)
• All milestones attained at upper limit for normal age
• **General examination** - microcephaly, fixed contractures (+) on L side

• **Anthropometry**
  - **Ht** - 20 kg, -1 z score, b/w 15 & 50\(^{th}\) centile
  - **Wt** - 116 cm, on -1 z score, b/w 15 & 50\(^{th}\) centile
  - **BMI** - 14.8 kg/m\(^2\), z score 0 to -1, underweight
  - **OFC** - 48 cm, Microcephaly
Nervous system

• Higher functions – mild cognitive impairment (+)
  - speech – Articulation difficulty (+)

• Cranial nerves – N

• Motor examination – left hemiparesis (+), exaggerated reflexes on left side, B/L plantar extensor

• Sensory system – normal

• Other systems – normal
Investigations

• Blood inv – Normal

• EEG - epileptiform discharges over the right hemisphere with sharp and slow wave complex

• MRI
  – diffuse cortical atrophy with exvacuo dilatation of cortical sulci and lateral ventricle involving the right cerebral hemisphere.
  – T2W image shows diffuse increased signal intensity in the cortical and sub cortical white matter.
COMPARISON OF NEUROIMAGING
### Differential diagnosis

<table>
<thead>
<tr>
<th>Unihemispheric epileptic syndromes</th>
<th>Cortical dysplasia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tuberous sclerosis</td>
</tr>
<tr>
<td></td>
<td>Sturge-Weber-syndrome</td>
</tr>
<tr>
<td></td>
<td>Stroke</td>
</tr>
<tr>
<td></td>
<td>Hemiconvulsion-hemiplegia-epilepsy-syndrome</td>
</tr>
<tr>
<td></td>
<td>Tumor</td>
</tr>
</tbody>
</table>
• Progressive hemiparesis and hemiseizures
• Progressive hemiatrophy of cerebrum in MRI
• Poor control of seizures

DIAGNOSIS ????

RASMUSSEN’S ENCEPHALITIS
1. Diagnosis of RE

2. Risk of major impairment of relevant motor or language functions by HE?
   - no
   - yes

3. Intractable seizures?
   - yes
   - no

   4. HE

   5. No specific therapy

   6. Intractable seizures

7. Ongoing progression?
   - yes
   - no

   8. ?

9. Immuno-therapy

10. Ongoing progression

11. ?
DISCUSSION
• Rasmussen’s encephalitis - rare, chronic, immune mediated/ inflammatory neurological disorder of childhood characterised by
  – U/L hemispheric atrophy
  – Focal intractable seizures
  – Progressive neurological deficit

• **INCIDENCE** - 2.4 cases/10^7 people = age 18/years

• Mean age of presentation - 6 years
• **Aetiology:**
  
  – ???

  – Sporadic onset

  – Postulations:
    
    • Infectious - viral
    
    • Immune mediated - T cell mediated, autoantibodies (GluR3)
    
    • Epileptic encephalopathy
### Clinical stages

<table>
<thead>
<tr>
<th>Stages</th>
<th>Clinical features</th>
<th>Median duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prodromal</td>
<td>Low seizure frequency, Mild hemiparesis</td>
<td>7.1 months</td>
</tr>
<tr>
<td>Acute</td>
<td>Frequent seizures - simple partial motor, EPC, Neurological detoriation</td>
<td>8 months</td>
</tr>
<tr>
<td>Residual</td>
<td>Permanent and stable neurological deficit</td>
<td></td>
</tr>
</tbody>
</table>

Hemiparesis is the most useful marker for clinical monitoring of the progression.
• MRI

  – Unilateral enlargement of inner and outer CSF compartment more accentuated in insular and peri insular region with increase in cortical or subcortical T2 & FLAIR signal

  – Atrophy of ipsilateral head of caudate nucleus

  – Hemispheric ratio on MRI - to assess temporal evolution of atrophy
• PET
• SPECT
• MR SPECTROSCOPY
• BRAIN BIOPSY
• Diagnostic criteria - Bien et al (2005)

• RE can be diagnosed if either
  – all three criteria of Part A
    (or)
  – two out of three criteria of Part B are present
<table>
<thead>
<tr>
<th>Part A</th>
<th>Part B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical</strong></td>
<td><strong>Clinical Epilepsia partialis continua</strong></td>
</tr>
<tr>
<td>Focal seizures (with or without EPC) and Unilateral cortical deficits</td>
<td>Or Progressive* unilateral cortical deficit(s)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EEG</strong></td>
<td></td>
</tr>
<tr>
<td>Unihemispheric slowing with or without epileptiform activity and</td>
<td></td>
</tr>
<tr>
<td>Unilateral seizure onset</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MRI</strong></td>
<td><em><em>Progressive</em> unihemispheric focal cortical atrophy</em>*</td>
</tr>
<tr>
<td>Unihemispheric focal cortical atrophy and at least one of the</td>
<td></td>
</tr>
<tr>
<td>following:</td>
<td></td>
</tr>
<tr>
<td>• Grey or white matter T2/FLAIR hyperintense signal</td>
<td></td>
</tr>
<tr>
<td>• Hyperintense signal or atrophy of the ipsilateral caudate head</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HPE</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Histopathology T cell dominated encephalitis with activated microglial cells and reactive astrogliosis.</td>
</tr>
</tbody>
</table>
• Progressive - at least two sequential clinical examinations or MRI studies are required

• Clinical progression - each of the examinations must document a neurological deficit, and this must increase over time

• Progressive hemiatrophy - each of these MRIs must show hemiatrophy that increases over time.
TREATMENT

Goals:

- alleviation of the seizure disorder
- To decrease inflammation
- cessation of the progressive neurological deficit & associated loss of brain tissue

Treatment modalities:

- Pharmacotherapy, Immunotherapy, Surgical and Rehabilitative
Pharmacotherapy:

- AED though not effective in controlling EPC but to have some effect against the other seizure types

Immunotherapy:

- Immunomodulatory treatments if introduced early in the disease process helps in slowing down the disease progression

- Steroids, Immunoglobulin, Plasmapharesis, Rituximab, Tacrolimus
• **Surgical**
  - Only cure for disease progression and seizures at the expense of permanent neurological damage
  - Indicated at later stages of the disease when a patient has developed a fixed hemiparesis with loss of fine finger movements
  - Hemispherectomy - anatomical/functional

• **Rehabilitation**
  - Physiotherapy, vocational therapy, speech and language therapy, cognitive rehabilitation
  - Botox injections - uncontrollable EPC
Rasmussen’s encephalitis (RE) is a chronic inflammatory disease of unknown origin, usually affecting one brain hemisphere. In the present study, a comprehensive assessment of the natural history of the disorder is presented. Seizure frequency, degree of hemiparesis and degree of cerebral hemiatrophy in 13 patients with histopathologically proven RE are analysed over the time course prior to resective epilepsy surgery or introduction of long-term immunosuppressive pharmacotherapy. For the assessment of the degree of cerebral hemiatrophy, on defined slices comprising the Sylvian fissure of hard copies of serial MRI investigations, the hemispheric ratio (HR) was determined. The data show an initial prodromal phase with an intermediate frequency of focal onset seizures and mostly no hemiparesis. The occurrence of this stage was mainly observed in the adolescent and adult patients. All patients went through an acute phase with a median duration of 8 months. During this stage, there were frequent simple partial motor seizures, development of hemiparesis and volume loss of the affected hemisphere. After this, the patients passed into a residual stage with a marked decrease in seizure frequency. Twelve months after the onset of the acute stage, the average HR was 0.72. These data allow an estimation of the prognosis of newly affected patients, and demonstrate that most of the brain damage in RE occurs during the first 8–12 months. These findings should be taken into consideration when future therapeutic approaches to RE are evaluated.
Why this presentation?!!?

• This case is presented not only for its rarity but also to create awareness about the importance of early recognition and treatment.

• Immunotherapy if advocated at early stages can halt the progression of the disease with better neurological performance.
REFERENCES


• Eileen PG Vining, Struggling with Rasmussen’s Syndrome. Epilepsy Curr. 2006 January; 6(1): 20-21

Thank you!!