MICROCEPHALY
Defined as head circumference that measures 3 standard deviations below the mean for age and sex.
MICROCEPHALY
ETIOLOGY

• 2 Main Groups:
  - Primary (Genetic)
  - Secondary (Non Genetic)
PRIMARY MICROCEPHALY

A group of conditions that usually have no associated malformations and follow a mendelian pattern of inheritance or are associated with specific genetic syndrome.
CAUSES OF MICROCEPHALY

• FAMILIAL
  1. Autosomal dominant
  2. Autosomal recessive

• SYNDROMES
  1. Downs syndrome
  2. Edward syndrome
  3. Cri-du-chat
  4. Cornelia de lange
  5. Rubinstein - taybi
SECONDARY MICROCEPHALY

Results from insult that affect in-utero or an infant during periods of rapid brain growth especially during 1st year of life.
CAUSES OF MICROCEPHALY - CONT'D..

CONGENITAL INFECTIONS

- Cytomegalovirus
- Rubella
- Toxoplasmosis

DRUGS

- Fetal Alcohol
- Fetal Hydantoin
CAUSES OF MICROCEPHALY - CONTD..

MISCELLANEOUS

• Metabolic (maternal diabetes, maternal, hyperphenylalaninemia)

• Meningitis

• Hyperthermia

• Hypoxic –ischemic encephalopathy

• Radiation
EVALUATION - HISTORY

Antenatal

• Fever with rash
• Maternal hyperthermia
• Radiation exposure
• Drug intake - phenytoin
EVALUATION - HISTORY

Postnatal
• Birth asphyxia
• CNS infections
• Head circumference at birth

Family history
• Small head
• Mental retardation
• Seizures
EXAMINATION

- Head circumference (occipitofrontal circumference - OFC)
- To record the greatest volume of cranium.
MEASUREMENT OF OFC

• A fibroelastic tape is placed over the nasion anteriorly and most prominent portion of occiputo-posteriorly

• Measurement made by overlapping tape over temporal bone.
MEASUREMENT OF OFC
**INCREMENT OF HEAD CIRCUMFERENCE**

- Normal value at birth 34-35 cm

<table>
<thead>
<tr>
<th>AGE</th>
<th>GROWTH IN HEAD CIRCUMFERENCE(cm/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 month</td>
<td>2</td>
</tr>
<tr>
<td>3-6 month</td>
<td>1</td>
</tr>
<tr>
<td>6-9 month</td>
<td>0.5</td>
</tr>
<tr>
<td>9-12 month</td>
<td>0.5</td>
</tr>
<tr>
<td>1-3 yrs</td>
<td>0.25</td>
</tr>
<tr>
<td>4-6 yrs</td>
<td>1cm/yr</td>
</tr>
</tbody>
</table>
HEAD CIRCUMFERENCE

- Head circumference can be plotted on growth charts
- Serial measurements are more meaningful
- Head circumference of parents and siblings should be recorded
Head circumference-for-age  GIRLS
Birth to 5 years (percentiles)

WHO Child Growth Standards
DYNE’S FORMULA

- Head circumference length ratio (Dyne et al) applied to infants below 1 yr of age
- Normal HC in cms = length in cm/2 + (9.5 ± 2.5)
EXAMINATION-CONTD

• Abnormal head shape
• Fontanels
• Sutures
• Stigmata of intrauterine infections
• Dysmorphism
• Detailed CNS examination
INVESTIGATION

• Determined by history and physical examination
• TORCH titers-intrauterine infections
• Karyotyping-chromosomal syndrome
• Maternal serum phenylalanine - (PKU)
INVESTIGATION-CONTD

• Fetal USG-if family history of small head
• CT scan-intracerebral calcifications
• MRI scan-structural abnormality of brain
TREATMENT

• Head size cannot be changed with treatment

• Genetic & family counseling provided

• Associated problems –
  i. Hearing/Visual Problems
  ii. Mental Retardation
  iii. Seizures
THANK YOU