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Summary of Observations and Discussions at SRCC Children's Hospital, Mumbai

Please note that non-disclosure agreement regarding patient history was maintained.

SRCC Children's Hospital began, in 1947, as small clinic dedicated to treating children with polio. Over time, it expanded its services to offering comprehensive healthcare, treating, diagnosis and rehabilitation for children from various socio-economic backgrounds.

The radiology department at the hospital is equipped with advanced imaging technology like CT and MRI to provide accurate diagnosis and treatment for paediatric patients. Observations were done under Dr. Sonal Garg, an experienced radiologist specializing in paediatric imaging, who analyses various scans to diagnose conditions.

Aim:

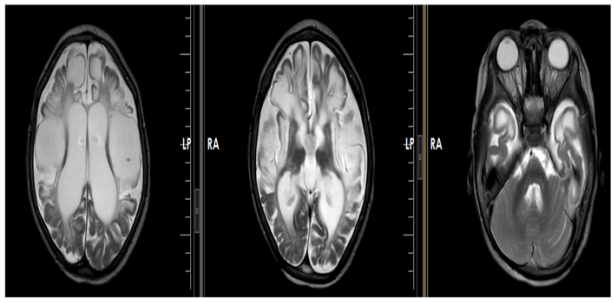
To assess the impact of hypoxia on the developing brains of infants aged 1-3 years by analysing MRI reports, categorising each case based on birth timing (preterm, normal, post-term), and identifying their associated neurological symptoms during developing years.

Methodology:

1. Collected reports of 30 hypoxic infants between 1-3 years of age.
2. Categorised patients based on birth timings.
3. Reviewed MRI reports of the patients to identify key areas of the brain affected by oxygen deprivation.
4. Identified neurological symptoms such as developmental delays, motor impairments, cognitive effects, and more.
5. Established correlations of symptoms with MRI findings in each category.

Findings :

Consolidation of Preterm Births - Severe Hypoxic Impact



Remarks: The MRI study reveals-

Extensive bilateral cystic encephalomalacia with bilaterally symmetric abnormal signal intensity and volume loss involving the bilateral periventricular deep white matter and basal ganglia structures as described above in detail. Resultant ex-vacuo dilatation of both lateral ventricles and third ventricle and severe thinning of the corpus callosum.

Features consistent with known severe hypoxic ischemic injury.

Sample of case

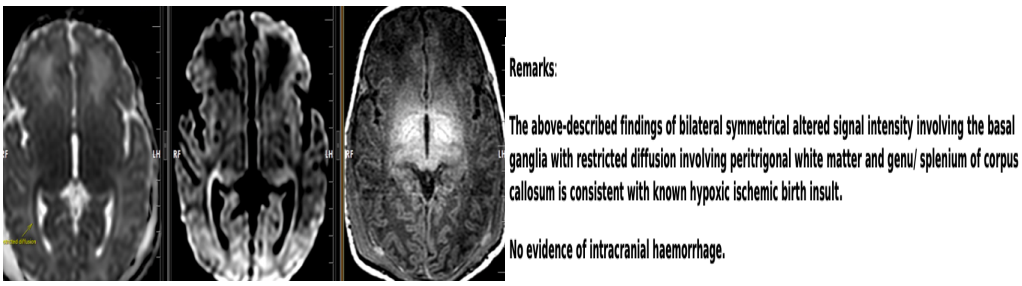
MRI Findings:-

1. White Matter Damage (Periventricular Leukomalacia) -
   The most significant finding was the presence of white matter damage, specifically in the periventricular regions, that is responsible for motor coordination.
2. Cerebral Cortex Thinning -
   Cortical thickness was reduced, correlating with cognitive impairments and executive function deficits.
3. Basal Ganglia and Thalamus Lesions -
   Damage to these specific regions, that are key areas for motor control and sensory integration, was common.

Symptoms:-

1. Motor Delays -
   Due to the white matter damage, preterm infants showed delays in gross and fine motor skills, as well as hand-eye and walking coordination.
2. Cognitive Impairments -
   The cerebral cortex thinning correlated with slowed cognitive development, mainly in attention span, problem solving and learning.
3. Speech and Language Delays -
   Lesions in the basal ganglia and thalamus lead to difficulty in speech articulation and language development

Consolidation of Normal Births - Moderate Hypoxic Impact



Sample of case.

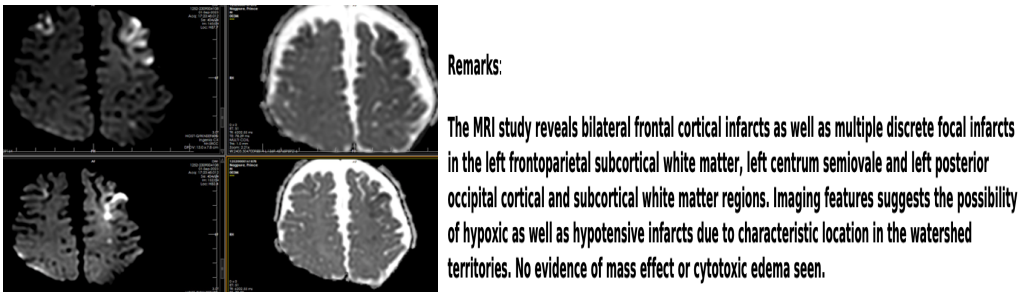
MRI Findings:-

1. Moderate White Matter Abnormalities -
   There was less significant damage in the periventricular regions compared to preterm births.
2. Hippocampal Atrophy -
   Mild atrophy in the hippocampus was observed. The region is involved with memory and learning.
3. Mild Ventricular Enlargement -
   This indicated some degree of cerebral atrophy, though less than the preterm births.

Symptoms:-

1. Mild Motor Delays -
   The term infants showed delays in gross and fine motor skills like walking, though less pronounced than preterm births.
2. Learning and Memory Challenges -
   Hippocampal atrophy was linked to difficulty in early learning and memory retention.
3. Mild Speech Delays -
   Delayed speech developments, not as severe as preterm births.

Consolidation of Post-term Births - Mild Hypoxic Impact



Sample of case.

MRI Findings:-

1. Minimal White Matter Damage -
   Least white matter damage with minor abnormalities in the periventricular regions.
2. Normal Cortical and Basal Ganglia Development -
   Cerebral cortex and basal ganglia are also relatively normal compared to the other birth timings.

Symptoms:-

1. Mild Motor Delays -
   Mild delays in reaching motor milestones, such as crawling and walking. However, these lasted only for a minimal period.
2. No significant cognitive deficits -
   Cognitive development, such as memory, attention, and problem-solving, appeared normal in most post-term births.
3. Normal Speech Development -
   On track development of speech and language skills for most patients.

Conclusion and Final Remarks:

The impact of hypoxia on the brain development has a strong correlation with birth timing. Preterm infants experience the most neurological damage, resulting in the most motor, cognitive, and speech delays. Term infants show moderate symptoms, and post-term infants typically exhibit mild or close to no symptoms. This discussion highlights the importance of early intervention, especially for preterm infants, to mitigate effects of hypoxia on brain development and neurological function in the long term.