AAY therapy have given a ray of hope for mentally challenged children by improving their over all development. It works by improving the cellular metabolism of brain hence giving an improvement in functioning of brain and clinical improvement in these children.

MENTAL RETARDATION

What is Mental Retardation

Mental retardation is a condition characterized by limitations in performance that result from significant impairments in measured intelligence and adaptive behavior that occurs before age 18.

This is a condition of both clinical and social importance.

Introduction

Mental retardation also confers a social status that can be more handicapping than the specific disability itself. The determinants of competence in any individual are complex and multifactorial. Regardless of his or her level of performance, each child's abilities are influenced by both the integrity and the maturational status of the nervous system and by the nature and quality of his or her life experience. Some children sustain significant neurologic insults and develop normal skills. Others manifest severe cognitive impairment despite the absence of recognizable focal neurologic findings or historical evidence of significant risk factors for CNS dysfunction.

Incidences

Approximately 3% of the general population has an IQ less than two standard deviations below the mean. It has been estimated that 80-90% of persons with mental retardation function within the mild range, whereas only 5% of the population with mental retardation is severely to profoundly impaired.

Causes

Table 1 lists potential contributing factors in the pathogenesis of mental retardation from preconception through the early childhood years.

Clinical Manifestations

- failure to meet intellectual developmental markers
- persistence of infantile behavior

- lack of curiosity
- decreased learning ability
- inability to meet educational demands of school

Table 2 lists a number of atypical physical features that have been associated with a higher incidence of mental retardation.

Mental retardation may suggest syndromes that are associated with mental retardation should be identified at birth or during early infancy e.g. Down syndrome, fetal alcohol syndrome, and primary microcephaly are examples of such conditions.

Deviations in normal adaptive behaviors depend on the severity of the condition. Mild retardation may be associated with a lack of curiosity and quiet behavior. Severe mental retardation is associated with infantile behavior throughout life.

Although youngsters with severe impairment show marked delays in psychomotor skills in the first year of life, children with moderate retardation typically exhibit normal motor development and present with delayed speech and language abilities in the toddler years. Mild retardation, on the other hand, may not be suspected until after entry into school, although participation in an organized preschool or child-care program can highlight discrepancies in the performance of a young child with significantly sub average abilities.

Classification

Recently categories of mild, moderate, severe and profound retardation have been replaced by a classification system that specifies four levels of support systems needed for daily functioning (i.e., intermittent, limited, extensive and pervasive).

Mental efficiency

Ultimately, the diagnosis of mental retardation requires confirmation of significantly sub average general intellectual functioning (i.e., an IQ standard score of 70-75 or below) in association with deficits in two more of the following ten adaptive skill areas: communication, self-care, home living, social skills, community use, self-direction, health and safety, functional academics, leisure, and work.

Diagnosis

- Parental report, and, care giver or teacher report gives the initial clue that this child needs further evaluation.
- A comprehensive history, physical examination, and laboratory evaluation often lead to identification of specific factors.
- This finding follows developmental assessment and systemic evaluation. A range of laboratory studies must be considered in the medical evaluation including karyotypes.
- It should be kept in mind that a diagnosis of mental retardation relies on an assessment of adaptive behavior and not solely on IQ, the epidemiology varies with the life cycle.

Neuropathology

Mental retardation is multifactor and neuropathology varies with the cause.

Biological studies

It have been observed that irrespective of the cause of mental retardation, brain perfusion defects have been observed in various areas of brain. This finding is of significance since t**he central theme of treatment common to all efforts to treat and prevent mental retardation is the promotion of healthy brain development and the provision of a nurturing and growth-promoting environment.**

Treatment:

Management of a child with mental retardation is multidimensional and highly individualized.

1. Treatment of decreased efficiency of brain

Medication therapy directed at abnormal behavior is frequently unsuccessful. Treatment with a number of neuro active drugs has been reported with varying success.

Biological studies in cases of mental retardation have revealed decrease in the efficiency of cellular metabolism, especially of brain. It have also been documented by reduced cerebral perfusion of brain. So far no way was there to improve cellular metabolism of brain, hence brain functioning

A effort have been made by AAY centre with a trial of AAY therapy (annexure 1), which works by improving the cellular metabolism of brain hence giving an improvement in functioning of brain and clinical improvement in these children.

2. Treatment of complications

Specific medical complications that occur with greater frequency among children with developmental disabilities (e.g., seizure disorders, impairments of vision or hearing, and nutritional problems) require accurate diagnosis and prompt management.
Ongoing health surveillance should be guided by knowledge of the relative risks of specific associated disorders (e.g., slowly progressive sensorineural hearing impairment in children with congenital CMV infection or the development of hypothyroidism, atlantoaxial instability, conductive hearing loss, or celiac disease in youngsters with Down syndrome).

3. Speech therapy for improve their speech.

4. Training – This includes school training and vocational trainings

Important protective factors include good physical health, a normal rate of growth, healthy parent-child attachment, and a cohesive family unit within a supportive social network.

Specialized educational and therapeutic services are central elements in the multidisciplinary care of children with mental retardation. During the adolescent years, issues related to sexuality, vocational training, and community living become more prominent.

5. Councelling

Finally, the physician has an important responsibility to ensure the provision of genetic counseling of the underlying diagnosis.

Collaboration between the primary care physician and an early intervention service system (and later with the school) is particularly important in the management of children with developmental impairments.

PREVENTION

Number of disorders can be detected thorough prenatal diagnostic studies such as ultrasound, amniocentesis, or chorionic villus biopsy.

When specific early treatments are available for infants with metabolic disorders (such as phenylketonuria) or structural abnormalities (such as hydrocephalus), successful prevention requires prompt diagnosis and sophisticated management.

PROGNOSIS

The outcome is related to the aggressiveness of treatment, personal motivation, opportunity, and associated conditions. Many people lead productive lives while functioning independently; others require a structured environment to be most successful.

TABLE 1

POTENTIAL CONTRIBUTING FACTORS IN THE PATHOGENESIS OF MENTAL RETARDATION

Preconceptual Disorders

- Singal gene abnormalities (e.g., inborn errors of metabolism, neurocutaneous disorders)
- Chromosomal abnormalities (i.e. X-linked disorders, translocations, fragile X syndrome)
- Mitochondrial abnormalities
- Polygenic familial syndrome

Early Embryonic Disruptions

- Chromosomal disorders (e.g., trisomies, mosaics)
- Infections (e.g. CMV, rebella, toxoplasmosis, HIV)
- Teratogens (e.g., alcohol, radiation)
- Placental dysfunction
- Congenital CNS malformations (idiopathic)

Fetal Brain Insults

- Infections (e.g. HIV, toxoplasmosis, CMV, herpes simplex)
- Toxins (e.g., alcohol, cocaine, lead, maternal phenylketonuria, maternal tobacco smoking[?]).
- Placental insufficiency/infrauterine malnutrition
- Perinatal Difficulties

Extreme prematurity

- Hypoxic-ischemic injury
- Intracranial hemorrhage
- Metabolic disorders (.e.g, hypoglycemia, hyperbilirubinemia)
- Infections (e.g., herpes simplex, bacterial meningitis)

Postnatal Brain Insults

- Infections (e.g. encephalitis, meningitis)
- Trauma (e.g. severe head injury)
- Asphyxia (e.g. near-drowning, prolonged apnea, suffocation)
- Metabolic disorders (e.g., hypoglycemia, hypernatremia)
- Toxins (e.g., lead)
- Intracranial hemorrhage

Malnutrition

- Postnatal Experiential Disruption
- Poverty and family disorganization
- Dysfunctional infant-caregiver interaction
- Parental psychopathology
- Parental Substance abuse

- Unknown Influences

TABLE 2: Atypical Physical Features That May Be Associated with increased incidence of Mental Retardation

Hair	Double whorl Fine, friable, prematurely gray or white locks Sparse or absent hair
Eyes	Microphthalmia Hypertelorism, Hypotelorism Upward-and outward or downward-and-outward slant Inner or outer epicanthal folds Coloboma of iris or retina, Brushfield spots Eccentrically placed pupil, Nystagmus
Ears	Low-set pinna Simple or abnormal helix formation
Nose	Flattened bridge Small size, Upturned nares
Face	Increased length of philtrum Hypoplasia of maxilla or mandible
Mouth	Inverted V-shape of upper lip Wide or high-arched palate
Head	Microcrania Macrocrania
Hands	Short 4^{th} or 5^{th} metacarpals Short, stubby fingers Long, thin, tapered fingers Broad thumbs Clinodactyly Abnormal dermatoglyphics (e.g., distal triradius) Transverse palmar crease Abnormal nails
Feet	Short 4^{th} or 5^{th} metatarsals Overlap of toes, Short, stubby toes Broad, large big toes Deep crease leading from angle of 1^{st} and 2^{nd} toes Abnormal dermatoglyphics
Genitals	Ambiguous genitalia Micropenis Large testicies
Skin	Care-au-lait spots Depigmented nevi
Teeth	Evidence of abnormal enamelogenesis Abnormal odontogenesis

MODE OF ACTION OF AAY THERAPY

It has been seen that in many neurological disorders/insults, after injury three types of neural cells/tissue are left behind:

Group A cells :completely dead cells (anatomically and physiologically dead cells)- Nothing can be done with this tissue

Group B cells :partially functioning (anatomically normal but physiologically poorly functioning cells)

Group C cells :Normally functioning.

So far as the improvement in the functioning of these cells is concerned, nothing can be done for cells of Group A. Group C cells are already functioning well, so the cells left behind are Group B cells. If the functioning of Group B cells can be improved, there are many chances that the brain functioning can be improved in Toto.

How the functioning of neural cells can be determined **:**

In normal functioning tissue, cerebral blood flow and metabolism are coupled, which have been termed as local cerebral metabolic rates for glucose (LCMRglc). Because the major portion of glucose extracted by the normal human brain goes toward the maintenance of resting membrane potentials, it is reasonable to assume that, in the resting state, a direct relation exists between the cerebral energy demand (i.e. LCMRglc) and total membrane surface area. Since a demand for more oxygen or glucose is supplied by a corresponding increase in blood flow, which corresponds with brain function.

It have been observed that the period between 8 and 10 years, when LCMRglc for many cortical regions begins to decline, is also the period when brain plasticity in children decreases notably. Clinically, the age of 8-10 years roughly corresponds to the age following which children begin to exhibit a notable decrease in physiologic plasticity, as well as diminished recovery of function due to cerebral injury. Thus, Lenneberg appears to have been correct when he hypothesized a "critical period for language acquisition" ending at about 10 years of age, after which the ability t acquire language may be more limited, but is not absent.

LCMRglc can be measured by functional brain imaging viz. Positron emission tomography (PET) and single photon emission computed tomography (SPECT) are capable of detecting functional

disturbances in the brain and are referred to as functional imaging. Because of the lack of facility of PET we conducted all work on SPECT.

How AAY therapy works:

Conventional therapies mainly based on physiotherapy and early intervention therapy is of help with rather slow improvement and that too not in all cases. So far as treatment of these children is not focused on improving the functioning of brain tissue, mainly of the cells of Group B.

AAY therapy improves the cerebral perfusion, and hence the functioning of brain in toto. Improvement in cerebral perfusion also prevent these cells from further damage, especially of the cells of Group B, which is of at most important as far as the improvement of brain function is concerned.

***** : *Measurement of cerebral perfusion represents the local cerebral metabolic rates for glucose (LCMRglc)*** and can be measured by PET or SPECT studies. The change in LCMRglc relates with the neural insults.*

*** *Chugani HT. Functional brain imaging in pediatrics. The pediatric Clinic of North America. 1992; 4: 777-799.*

What this AAY therapy contains:

AAY (ALLPOATHY-AYURVEDA-YOGA) CENTRE offers a AAY therapy which is a combination of allopathic, ayurveda and yoga system to catalyse effects of each other and enhances successful management of mental retardation.

What needs to be understood:

- 100% improvement is not possible
- Best results can be achieved when the therapy starts between the age group of 2-4 years
- It is a long course of management. Therapy helps in overall growth as child grows with age
- 100% children do not improves
- This therapy improves the brain functioning. It can not teach or train any thing to any child, hence training and teaching is a part and partial of this management.