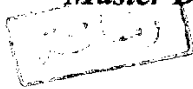


**STUDY OF THE REGIONAL CEREBRAL
BLOOD FLOW IN DOWN SYNDROME
USING BRAIN SPECT**

Thesis

*Submitted for the Partial Fulfillment of the Requirements of
Master Degree in Pediatrics*

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By

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**FACULTY OF MEDICINE
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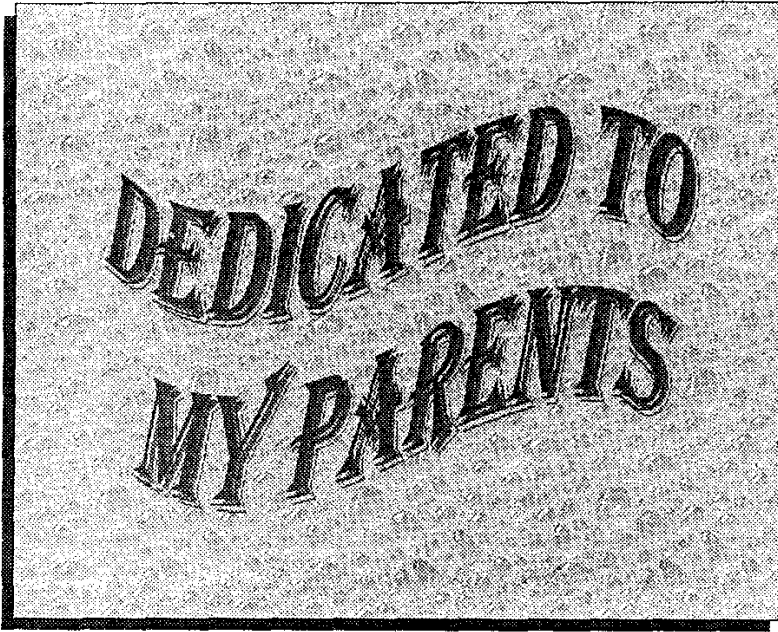
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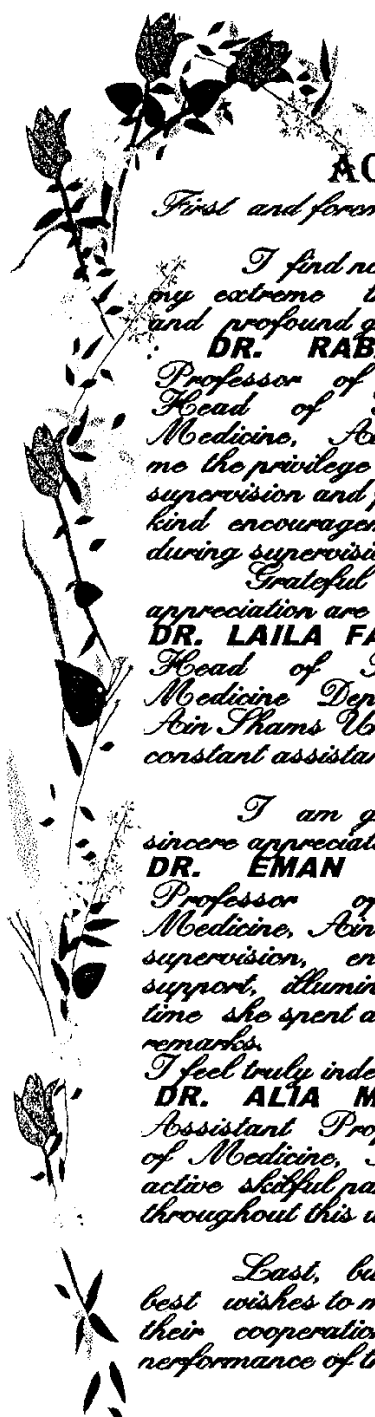
بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿ قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴾

صدق الله العظيم

سورة البقرة - آية ٣٢





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ABSTRACT

Seventeen patients with Down syndrome (DS), 13 males and 4 females (mean age 6.48 ± 6.6 years, range: 7months-22years) were studied. ^{99m}Tc hexamethyl propylene amine oxime (HMPAO) brain single photon emission computed tomography (SPECT) was performed to evaluate the regional cerebral blood flow (rCBF).

In addition, all studied cases were subjected to full history taking, thorough clinical examination, intelligence quotient (IQ) assessment, language age estimation and psychometric evaluation for behavior disorders. Two of the studied cases were subjected, in addition, to cranial computed tomography (CT).

In this study, ^{99m}Tc HMPAO brain SPECT scans showed abnormalities in 14 out of 17 studied case (82.35%) with DS. Cerebellar and frontal hypoperfusion were the commonest abnormalities noted in our patients (47.05% and 35.3% respectively).

Moreover, cerebellar hypoperfusion was more frequent among patients with hypotonia (58%) while patients with behavior disorders showed significant frontal hypoperfusion (66.7%)

These results demonstrate that abnormalities of r CBF do exist in young patients with DS prior to the occurrence of dementia.

Key words:

- Cerebral blood flow.
- Down syndrome.
- ^{99m}Tc -HMPAO SPECT.
- Brain.

LIST OF ABBREVIATIONS

AD	Alzheimer disease.
ADHD	Attention deficit hyperactivity disorder.
AIDS	Acquired immune deficiency syndrome.
ALL	Acute lympholastic leukemia.
AML	Acute myeloid leukemia.
APP	Amyloid precursor protein.
ASD	Atrial septal defect.
AVC	Atrioventricular canal.
AVM	Arterio-venous malformations.
BPD	Biparietal diameter.
CBCL	Child behavior checklist.
CHD	Congenital heart disease.
CP	Cerebral palsy.
CT	Computed tomography.
CVS	Chorionic villous sampling.
DS	Down syndrome.
ECG	Electrocardiography.
EEG	Electroencephalography.
ECMO	Extracorporeal membrane oxygenation.
EDE	Effective dose equivalent.
FISH	Fluorescent in situ hybridization.
FTD	Fronto- temporal dementia.
GH	Growth hormone.
GSHP	Glutathion peroxidase
HCG	Human chorionic gonadotrophin.
HIV	Human immune deficiency virus.
IDDM	Insulin dependent diabetes Mellitus.
IGF	Insulin like growth factor-I.
IQ	Intelligence quotient.
LA	Language age.
LAC	L-acetyl carnitine.
LAD	Language age delay.
MA	Mental age.
MAD	Mental age delay.
MELAS	Mitochondrial encephalomyopathy with lactic acidosis and stroke like episodes.
MR	Mental retardation.
MRI	Magnetic resonance imaging.
MSAFP	Maternal serum alpha fetoprotein.
NES	Non-epileptic seizures.
NFT	Neurofibrillary tangles.
OCD	Obsessive compulsive disorder.
OFC	Occipito-frontal circumference.
PDA	Patent ductus arteriosus.
PEM	Protein energy malnutrition.

PET	Positron emission tomography
PKU	Phenylketonuria.
PUBS	Percutaneous umbilical blood sampling.
RCBF	Regional cerebral blood flow.
rCMRglc	Regional cerebral metabolic rate for glucose.
SPECT	Single photon emission computed tomography.
SP	Senile plaque.
SOD	Superoxide dismutase.
TIA _s	Transient ischemic attacks.
Tc-99m-HMPAO	Technetium 99m hexamethyl propylene amine oxime.
TGA	Transient global amnesia.
UE ₃	Unconjugated estriol.
VSD	Ventricular septal defect.
WHO	World Health Organization.