Thyroid Dysfunction in Indian Children with Down Syndrome

This record review of 82 children with Down Syndrome (DS) between April 2004 and March 2014 who had thyroid dysfunction, showed that majority (76, 92.6%) had subclinical hypothyroidism. Of the 60 patients who underwent radionuclide scan, 63.3% had a normal gland; the rest exhibited only impaired tracer uptake. Ultrasonograms done in 20 patients showed reduction of thyroid gland size in 3 (15%) patients only.

Keywords: *Hypothyroidism, Trisomy 21, Thyroid dysgenesis.*

Thyroid dysfunction in Down syndrome ranges from subclinical to overt hypothyroidism, and rarely hyperthyroidism [1]. The decision to treat is often difficult as thyroid dysfunction is usually mild and there are no clear recommendations for thyroxine supplementation [1], although periodic screening for thyroid dysfunction has been emphasized [2,3].

The review of data reports on initial thyroid profile, age at diagnosis, parental age, age at start of thyroxine, initial thyroxine doses, time to normalization of thyroid functions, thyroid ultrasound imaging and *Technetium*-99m pertechnetate thyroid scintiscan, of 300 children with Down syndrome who presented between April, 2004 to March, 2014. Thyroid dysfunction was defined on the basis of alterations in total serum T4 and TSH levels measured in venous blood by electrochemiluminescence immunoassay (E-2010; Roche Diagnostics, Germany). Elevated TSH level was defined as above 20, 10 and 5 mU/L in patients aged from birth to 1 week, 8 days to 1 month, and those older than 1 month, respectively [4]. Subclinical hypothyroidism was considered with TSH level between 5-10 mU/L and normal (4.5-12.5 µg/dL) total T4 level. Overt hypothyroidism was defined as low total T4 levels and TSH levels greater than 10.1 mU/L [4]. The Institute's Ethics Committee approved the study.

Eighty two (27.3%) patients (55 boys) had abnormal thyroid profiles. Median TSH and total T4 levels at diagnosis were 8.95 (range 5.5-62) mU/L and 7.49 (range 0.6 to 12.8) µg/dL, respectively. Based on the predefined cut-off values 76 (92.6%) patients were diagnosed as subclinical and rest were labeled as overt hypothyroidism. Only 19 patients had symptoms attributable to thyroid dysfunction. Median age at diagnosis of thyroid dysfunction was 18 months (range 0.5-156) months. Out of 31 patients less than 1 yr of age, only 3 were diagnosed during first month of life. Median age at the beginning of L-thyroxine treatment was 18 (range 0.5-132 months) months. Thyroid function normalized in all patients at 3 months follow up. Anti-thyroid peroxidase (TPO) antibodies were positive in 6 (2 boys) out of 8 patients (mean age 7.8 yrs) tested.

Only 3 out of 20 patients who underwent thyroid ultrasound examination showed hypoechoic areas in one lobe of thyroid and reduction in thyroid size. Of the 60 patients who underwent *Technetium*-99m pertechnetate thyroid scans, 22 (36.6%) showed abnormal results; 21 showed impaired trapping function, while 1 patient showed absent trapping. The scans were normal in the remaining 38.

Our study population showed a spectrum of thyroid dysfunction similar to previous reports; subclinical hypothyroidism being the most common problem [1,3,5]. Thyroid dysfunction may also appear during follow-up necessitating the need for periodic surveillance [6]. Anti-TPO antibody positivity in our patients suggests that thyroid autoimmunity may be common in older patients [7]. A recent study that demonstrated a high prevalence of thyroid dysgenesis and permanent thyroid dysfunction in children with Down syndrome suggested that the newer ultrasound imaging techniques may pick up dysgenesis usually missed on nuclear scans [5]. It is possible that we may have missed some cases of thyroid hypoplasia but the percentage of abnormal thyroid volumes in 20 patients who underwent ultrasound examinations was also quite low in our study. No child was found to be hyperthyroid, similar to observations in previous studies [5-7].

The mean age at initiation of therapy in our patients was much higher in contrast to developed countries where treatment is usually begun during neonatal period due to established newborn screening programs [3]. Recent data indicates beneficial effects of early thyroxine supplementation on psychomotor and physical development in Down syndrome [8,9]. In our country, hypothyroidism in Down syndrome often remains undiagnosed during the critical treatment-sensitive newborn period due to absence of a standardized national protocol [10]. In conclusion, our data indicates that majority of children with Down syndrome – associated hypothyroidism have subclinical hypothyroidism with normal morphology and location of thyroid gland.

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Antimicrobial Susceptibility Profile of Isolates from Pediatric Blood Stream Infections

We describe the pathogens and their antimicrobial profile causing blood stream infections in children over a 4-year period. The commonest pathogens were: non-fermenting Gram negative bacilli other than *Pseudomonas, Salmonella* species, *Escherichia coli*, *Staphylococcus aureus* and *Klebsiella* species. High rates of drug-resistance were observed.

Keywords: *Antibiotic, Bacteremia, Resistance.*

Blood stream infections are important causes of morbidity and mortality in children [1]. Successful outcome of these infections relies on prompt and timely empiric therapy with broad spectrum antibiotics [2]. Inadequate empiric therapy results in poor outcome with increased mortality rate and emergence of antibiotic resistance [3]. Drug resistant organisms such as extended spectrum beta-lactamase (ESBL) producing organisms and Methicillin - resistant *Staphylococcus aureus* (MRSA) concern health care providers, especially in the developing countries [4]. Surveillance of prevalence and antimicrobial susceptibility of pathogens is essential for empiric treatment choice in pediatric blood stream infections. We present the distribution of pathogens and their antibiotic susceptibility profile from blood cultures in children who presented with clinical features of sepsis over a 4-year period.

All children aged between 30 days and 15 years of age, who presented to Christian Medical College, Vellore from January 2010 to December 2013 with clinical features of sepsis had their blood samples drawn under aseptic condition. The specimens were inoculated and processed by BacT/ALERT system followed by Gram staining and sub-cultures on MacConckey agar and 5% sheep blood agar. Biochemical identification of the pathogen was done using standard procedures, and followed by antibiotic susceptibility testing as per standard Clinical and Laboratory Standards Institute (CLSI) guidelines. Organisms such as Coagulase negative *Staphylococcus aureus* (CONS), Diphtheroids and Aerobic spore formers (ASF) were considered contaminants and excluded from analysis.

A total of 41457 blood cultures were done during the study period with positive cultures in 4.8% *(n=2015)*; 3.6% (*n*=1507) Gram negative bacilli (GNB) and 1.2%