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Study of thyroid diseases in Pediatrics patients

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Abstract
Most of the studies to date on thyroid hormone profile in critically ill patients and its correlation with outcome of patient are mainly conducted in surgical ICUs especially in adults. Very few studies are conducted in pediatrics ICUs, especially in India. The purpose of the current study was to measure the hormonal levels in the pediatric and children and studying of various thyroid disorders. Also aimed to differentiate diseases by their hormonal conditions.
The 50 patients of Newborns &Children years of age who visited the Pediatric Out-Patient Department (OPD) and in-patient department (IPD) of Nalanda medical college and hospital, were considered in the study. They were clinically suspected of Thyroid diseases were included in the study.
Thyroid hormones are unique in view of their important role in fetaland early neonatal brain development and also having actions on growth and development during the first two decades of life. The adverse effects of deprivation of thyroid hormone on the rapidly growing infantile brain have prompted the institution of neonatal screening for congenital hypothyroidism thus promoting an early intervention.
The findings of this study highlight the need to adopt strategies avoid the for disorders of thyroid gland before it is coming severe.

Keywords: hormonal levels, thyroid diseases, pediatric, newborn, children

Introduction
Thyroid disease is a medical condition that affects the function of the thyroid gland (the endocrine organ found at the front of the neck that produces thyroid hormones) [1]. The symptoms of thyroid disease vary depending on the type. There are four general types: 1) hypothyroidism (low function) caused by not having enough thyroid hormones; 2) hyperthyroidism (high function) caused by having too much thyroid hormones; 3) structural abnormalities, most commonly an enlargement of the thyroid gland; and 4) tumors which can be benign or cancerous. It is also possible to have abnormal thyroid function tests without any clinical symptoms [2]. Common hypothyroid symptoms include fatigue, low energy, weight gain, inability to tolerate the cold, slow heart rate, dry skin and constipation [3]. Common hyperthyroid symptoms include irritability, weight loss, fast heartbeat, heat intolerance, diarrhea, and enlargement of the thyroid [4]. In both hypothyroidism and hyperthyroidism, there may be swelling of a part of the neck, which is also known as goiter.
Diagnosis can often be made through laboratory tests. The first is thyroid-stimulating hormone (TSH), which is generally below normal in hyperthyroidism and above normal in hypothyroidism. The other useful laboratory test is non-protein-bound thyroxine or free T4. Total and free triiodothyronine (T3) levels are less commonly used. Anti-thyroid autoantibodies can also be used, where elevated anti-thyroglobulin and anti-thyroid peroxidase antibodies are commonly found in hypothyroidism from Hashimoto's thyroiditis and TSH-receptor antibodies are found in hyperthyroidism caused by Graves' disease. Procedures such as ultrasound, biopsy and a radioiodine scanning and uptake study may also be used to help with the diagnosis [2].
Treatment of thyroid disease varies based on the disorder. Levothyroxine is the mainstay of treatment for people with hypothyroidism [5]. While people with hyperthyroidism caused by Graves' disease can be managed with iodine therapy, antithyroid medication, or surgical removal of the thyroid gland [6]. Thyroid surgery may also be performed to remove a thyroid nodule or lobe for biopsy, or if there is a goiter that is unsightly or obstructs nearby structures [6].
Hypothyroidism affects 3-10% percent of adults, with a higher incidence in women and the elderly [7, 8, 9]. An estimated one-third of the world's population currently lives in areas of low dietary iodine levels, making iodine-deficiency the most common cause of hypothyroidism and endemic goiter. In regions of severe iodine deficiency, the prevalence of goiter is as high as 80% [10]. In areas where iodine-deficiency is not found, the most common type of hypothyroidism is an autoimmune subtype called Hashimoto's thyroiditis, with a prevalence of 1-2% [10]. As for hyperthyroidism, Graves' disease, another autoimmune condition, is the most common type with a prevalence of 0.5% in males and 3% in females\ [11]. Although thyroid nodules are common, thyroid cancer is rare. Thyroid cancer accounts for less than 1% of all cancer in the UK, though it is the most common endocrine tumor and makes up greater than 90% of all cancers of the endocrine glands [10].
Most of the studies to date on thyroid hormone profile in critically ill patients and its correlation with outcome of patient are mainly conducted in surgical ICUs especially in

adults. Very few studies are conducted in pediatrics ICUs, especially in India. The purpose of the current study was to measure the hormonal levels in the pediatric and children and studying of various thyroid disorders. Also aimed to differentiate diseases by their hormonal conditions.

Material & Methods

The 50 patients of Newborns &Children years of age who visited the Pediatric Out-Patient Department (OPD) and in-patient department (IPD) of Nalanda medical college and hospital were considered in the study. They were clinically suspected of Thyroid diseases were included in the study.

Inclusion criteria: clinical features suggestive of thyroid disorders like prolonged jaundice in newborn, features of cretinism, goiter, physical and mental growth retardation, obesity, constipation etc.

Exclusion criteria: Patients who were on any medications known to alter the thyroid hormone status including patients already diagnosed with thyroid disorder on therapy

Normal reference ranges for thyroid hormones levels were as follows.

Serum TSH – 0.4 – 7 micro IU/ml
Serum T3 - 0.5 – 1.9 ng/ml
Serum T4 – 5.5 -12.6 microgm/dl.

Result & Discussion

The serum estimation of all 50 patients was done. The hormonal observations were reported in the following tables. Out of the 30 patients 18 patients detected the hormonal abnormalities.

Table 1: Age group & the no. of patients

Age Group	No. of Cases
New Born (0-3 Months)	6
3-12 Months	4
1-2 years	8
2-4 yrs	12
4-6 yrs	10
6-8 yrs	6
8-10 yrs	4
Total	50

Table 2: Hormonal Condition and the no. of cases observed

Hormonal Condition	No. of Observation
Euthyroid	16 (32%)
Hypothyroid	6 (12%)
Hyperthyroid	6 (12%)

Out of the 28 cases 16 patients showed the Euthyrioidism. Whereas 6 patients showed the hypothyroidism and 6 showed the Hyperthyroidism.

Table 3: Various thyroid disorders and their hormonal status

	Goiter including graves disease	Acquired Hypothyroidism	Congenital hypothyroidism	Autoimmune Thyroiditis	Total
Euthyroid	3	7	2	4	16
Hypothyroid	2	2	1	1	6
Hyperthyroid	2	1	2	1	6
Total	7	10	5	6	28

Meena P. Desai *et al*. [11] had studied autoimmune thyroid diseases in childhood. Total 174 infant and children diagnosed by hormonal estimation and clinical presentation having thyroid diseases. Study carried out by MeenaDesai shows prevalence of congenital hypothyroidism 46%. In the present study it was 16.67%.

Irfan M. Khurram *et al*. [12] had studied 394 cases on clinical presentation of congenital hypothyroidism with hormonal estimation. Present study can be compare with the results of their study. Study carried out by IrfanKhurram [13] shows hypothyroidism in 27.65% and euthyroidism in 72.55 % cases. While present study shows their prevalence in 22.22% and 61.11% cases respectively this is comparable.

Thus congenital hypothyroidism is frequently encountered and most preventable thyroid disease in newborn and children. Its early diagnosis can prevent physical and mental retardation. Follow up study of subclinical hypothyroidism can prevent its progress to overt disease. Mildly elevated TSH may either revert to normal or remain high due to resistance to TSH. Autoimmune thyroid disorders are now emerged as leading cause of thyroid disorder in pediatric age and these immunologically mediated diseases have genetic and familial predisposition. Hyperthyroidism is very rare condition observed in children.

Conclusion

Thyroid hormones are unique in view of their important role in feta land early neonatal brain development and also having actions on growth and development during the first two decades of life. The adverse effects of deprivation of thyroid hormone on the rapidly growing infantile brain have prompted the institution of neonatal screening for congenital hypothyroidism thus promoting an early intervention.

The findings of this study highlight the need to adopt strategies avoid the for disorders of thyroid gland before it is coming severe.

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