THE STUDY OF AUDITORY AND VISUAL REACTION TIME IN PATIENTS OF HYPOTHYROIDISM

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ABSTRACT

BACKGROUND

Hypothyroidism is one of the well-known endocrinial disorders in clinical practice which leads to various complications and abnormalities like peripheral neuropathy which can lead to prolongation of conduction time in nerve1,2 Reaction time is a time between application of stimulus and response obtained it also includes time for control delay. It is an important parameter to evaluate nervous system.

METHODS

Fifty male hypothyroid patients having history of hypothyroidism for more than five years were taken for reaction time test, fifty normal healthy male subjects of same age group were taken as control. Subject of same age group were taken as control. The auditory and visual reaction time was taken from response time analyser. Comparison was made between controls and hypothyroid patients. The auditory and visual, reaction time was taken from response time analyser. Comparison was made between controls and hypothyroid patients. It was observed that in hypothyroid patients there is early involvement of peripheral and central nervous system; also, there is decreased conduction in sensory as well as motor pathways; hence, there is prolongation of auditory and visual reaction time in hypothyroidism.

RESULTS

Obtained results show that reaction time is prolonged in patients of hypothyroidism.

CONCLUSIONS

Reaction time is prolonged in hypothyroidism it can be used as a screening test to determine nerve involvement. In the present study we studied reaction time with response analyser in our study we found significant increase in audio-visual reaction time in hypothyroidism, patients as compared to control group. In hypothyroidism, patients as compared to control group. In hypothyroidism patients, reaction time was significantly prolonged (p< 0.05) in hypothyroid group audio, visual reaction time was significance higher than control group. This is probably because of generalized decrease in metabolic rates affecting sensory receptors natural pathways and selected males. It seems that there is dependency of auditory receptors for their metabolic rates on serum T3, T4. Also, in hypothyroidism there is development of neuropathy also. There is involvement of central conducting pathways impairment of central processing also there is altered attention which affects reaction time. Because of all these factors, reaction time is prolonged in patients of hypothyroidism. Reaction time has physiological significance and it can be used as a screening test as it is cheap test as compared to expensive techniques like EMG, NC studies.

KEYWORDS

Hypothyroidism, Auditory & Visual Reaction Time

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BACKGROUND

Hypothyroidism is one of the well-known endocrinial disorders in clinical practice which leads to various complications and abnormalities like peripheral neuropathy which can lead to prolongation of conduction time in nerve1,2 Reaction time is a time between application of stimulus and response obtained it also includes time for control delay. It is an important parameter to evaluate nervous system. It depends on several factors starting from nerve condition to coordinating system of our body including long term and recent memory learning ability perception and visuo perceptive skills,1,3 so it proves to be an important parameter for assessing the reaction time. It is very cheap and non-invasive test as compared to other expensive test like nerve conduction studies and electrotherapist.4 As per reports of different studies there was prolongation in reaction time in hypothyroid patients in present study here we have made an attempt to study the effect of hypothyroidism on visual and auditory reaction time.4,1 The thyroid gland is situated in neck anterior to trachea. It consists of two lobes gained by an isthmus: A section of thyroid gland shows follicles lined by epithelium under microscope. International Journal of Health sciences and research. The follicles are filled with colloid the secretion of epithelial cells. An active thyroid has cuboidal or a columnar epithelial cells but very little colloid in the follicles because
the secretions are released promptly into blood stream. On the other hand an inactive thyroid has follicles lined with squamous epithelial cells and full of colloid because whatever sections are there are stored rather than released. Thus, paradoxical though it may seem a thyroid having follicles fall of colloid is actually inactive. The epithelium of thyroid follicles produces two hormones triiodothyronine (T₃) and tetrapod threonine (T₄). Synthesis of thyroid hormone involve iodination of amino acids tyrosine. There is iodide pump to capture iodine. Role of event related potentials in evaluation of cognitive function in subclinical hypothyroidism the steps involved in synthesis are-
1. Oxidation of iodide to iodine.
2. Iodination of tyrosine to form moniodotyrosine and diiodotyrosine.
3. Coupling of some of iodinated residues to form T₃, T₄ jet bound to a plasma protein called thyroxin binding globulin (TBG). In small amount that is free is one which is responsible for activity of hormones most of free T₄ is converted to T₃.

T₃ has ten times as much activity as T₄.

Functions of Thyroid Hormones-
1. It increases the chemical reaction in our bodies.
2. It has calorigenic action.
3. It has effect on growth and development.
4. Thyroid hormones are necessary for normal formation of synapses and mediation in brain.
5. The thyroid hormones increase the heart rate and cardiac output, and systolic B.P.
6. On RS these hormones increase the rate and depth of respiration.
7. On GIT these hormones increase peristalsis. Thyroid hormones act via reception. Hypothyroidism means decrease in thyroid hormone activity. Its predominant cause is iodine deficiency. Hypothyroidism in newborn is called as cretin. Lally N, Nettlbeck T. Intelligence Hypothyroidism in adults leads to myxoedema it leads to decrease in BMR.

Hypothyroidism is one of the well-known endocrinial disorders in clinical practice which leads to various complications and abnormalities like peripheral neuropathy which can lead to prolongation of conduction time in nerve. Reaction time is a time between application of stimulus and response obtained it also includes time for central delay. It is an important parameter to evaluate nervous system. It depends on several factors starting from nerve conduction to coordinating system of our body including long term and recent memory learning ability perception and visuoceptive skills. So, it proves to be an important parameter for assessing the reaction time. Mathur LA, It is very cheap and non-invasive test as compared to other expensive tests like nerve conduction studies and electromyography. As per reports of different studies there was prolongation in reaction time in hypothyroid patients. In present study here we have made an attempt to study the effect of hypothyroidism on visual and auditory reaction time.

METHODS
Kaplan M. The present study was carried out in Dr. Patwardan’s endocrine research center and Dept. of Physiology, Govt. Medical College Miraj. Fifty male patients who are diagnosed as hypothyroid with duration of hypothyroidism more than five years and free from any other disorder were selected as study group and reaction time was carried out with the help if an instrument cable response analyses. Jensen AR Fifty healthy male subjects were selected as control of the same age group. They were from same socioeconomic, ethnic and professional class. In these controls reaction time was carried out same as that of patients. All the patients and controls were divided in two age groups as 30- 40 and 40-50 years and were named as group I and IT respectively. For each parameter mean and standard deviation were calculated for each group. Comparisons was made between controls and patients for reaction time to find out the difference. The Significance of difference was tested by students '+' test and significance was noted at P <0.05

RESULTS
Auditory and visual reaction time En the following observation (Table 1 & Table 2) mean and standard deviation of visual and auditory reaction time in milli - seconds of controls and patients of hypothyroidism is given. Boumeister, Kellas G. It is observed that visual and auditory reaction time in hypothyroidism was prolonged as compared to control in both age groups

<table>
<thead>
<tr>
<th>Age Group (Years)</th>
<th>(30-40)</th>
<th>(40-50)</th>
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<tbody>
<tr>
<td>No. of Subjects</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Controls</td>
<td>184: 12</td>
<td>1219 (S.D.)</td>
</tr>
<tr>
<td></td>
<td>12 (S.D.)</td>
<td>1217 (S.D.)</td>
</tr>
<tr>
<td>Hypothyroid</td>
<td>22412</td>
<td>12.5 (S.D.)</td>
</tr>
<tr>
<td></td>
<td>Sig. inc.</td>
<td>Sig. inc.</td>
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</table>

Table 1. Visual Reaction Time in Milliseconds
Sig-significant, inc – increase, S.D. Standard Deviation

<table>
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<th>Age Group (Years)</th>
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<th>(41-50)</th>
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</thead>
<tbody>
<tr>
<td>No. of Subjects</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Controls</td>
<td>197: 62</td>
<td>6.09 (S.D.)</td>
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<tr>
<td></td>
<td>9.4 (S.D.)</td>
<td>Sig.inc</td>
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<tr>
<td>Hypothyroid</td>
<td>248.04</td>
<td>12.36 (S.D.)</td>
</tr>
<tr>
<td></td>
<td>Sig.inc</td>
<td>Sig.inc</td>
</tr>
</tbody>
</table>

Table 2. Auditory Reaction Time in Milliseconds

DISCUSSION
As in hypothyroidism these is involvement of sensory nerves in the form neuropathy also there is involvement of central conducting pathways and impairment of central processing. Some worked documents abnormal attentions in patients of hypothyroidism. Thus there is prolongation of auditory and visual reaction time in patients of hypothyroidism because of involvement of peripheral and central nervous system in the form of neuropathies secondly there is altered actuation and altered processing of information in central nervous system
as indicated by different studies. Boutneister AA, Kellas CI
It is because of all these factors reaction time is prolonged.
Reaction time has physiological signification and can be used
to assess involvement of nervous in patients of hypothyroidism. Reactions which only travel to, though, and
from the spinal cord are often called spinal reflexes or cord-
mediated reflexes; withdrawing one's hand from a hot stove
is an example of such a reflex.

CONCLUSIONS
Reaction time is prolonged in hypothyroidism it can be used
as a screening test to determine nerve involvement. In the
present study we studied reaction time with response analyser in our study we found significant increase in audio-
visual reaction time in hypothyroidism, patients as compared
to control group. In hypothyroidism, patients as compared
to control group. In hypothyroidism patients, reaction time
was significantly prolonged (p< 0.05) in hypothyroid group
audio, visual reaction time was significance higher than
control group. This is probably because of generalized
decrease in metabolic rates affecting sensory receptors
natural pathways and selected males. It seems that there is
dependency of auditory receptors for their metabolic rates
on serum T3, T4. Also, in hypothyroidism there is
development of neuropathy also. There is involvement of
central conducting pathways impairment of central
processing also there is altered attention which affects
reaction time. Because of all these factors, reaction time is
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