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Influence of Mahua and Dudhia liquor on thyroid and adrenal gland

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Abstract

It is well known that alcohol abuse depresses the thyroid gland and cause physical imbalance and strain. Although alcohol has pretty strong effects on the thyroid gland, it has a much stronger influence on the liver and adrenal gland. Alcohol stimulates cortisol release from adrenal glands which leads to stress. The present work demonstrates the histological effects of Mahua and Dudhia on thyroid gland and adrenal gland.

Keywords: Mahua and Dudhia liquor

Introduction

Alcohol related deaths, diseases and disabilities are increasing worldwide. They are much higher in men than women and are highest in developed countries, where they range from 8% - 18% for males and 2% - 4% for females. According to the National Institute of Alcohol Abuse and Alcoholism, each year, approximately 80,000 people die from alcohol- related causes. Excessive alcohol drinking has been recognized as causing several adverse health consequences and serious effects on different components of the endocrine system.

Thyroid Gland

Recent research has shown that alcohol affects almost all aspects of the thyroid gland including the thyroid hormone levels and the size of thyroid gland. It also destroys the thyroid cells and reduces their volume due to continued toxicity for a long time. Alcohol causes a moderate suppression of Thyroxine (T4) levels with more significant suppression of Triiodothyronine (T3) levels in chronic alcoholics. Overall, the T3 and T4 hormones are crucial for normal bodily functions and general well-being. However, T4 must be converted to T3 before the body can make use of it and this conversion takes primarily in the liver which also becomes affected after heavy alcohol consumption. The longer it takes to convert the hormones in the liver, the more sluggish the body will feel.

Adrenal Gland

One theory states that heavy alcohol consumption produces an increase in cortisol (stress hormone). Cortisol is produced by the adrenal gland and it is the body's primary glucocorticoid. Cortisol plays an important role in regulating the body's immune, reward, cognition, and emotion systems, as well as cause sleep disruption. Research has found that alcohol consumption also increases the body's production of cortisol, not only while the person is intoxicated, but also when the drinker is withdrawing from the effects of intoxication. Researchers believe that a high level of intoxication can cause a state of general stress, which can stimulate cortisol release and suddenly stopping alcohol consumption can cause an even higher level of stress for the drinker. It is also thought that alcohol could affect brain chemicals that signal the adrenal glands to produce more cortisol.

This article would reflect the effect of other alcoholic beverages like mahua and dudhia liquor on thyroid gland and adrenal gland. For this study, Swiss albino mice were selected and purchased from Calcutta and from Patna district of Bihar. The mice were administered with mahua and dudhia daily for 5 to 15 days and then examined their histological effects.

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Material method

Tissue slide preparation required surgical resection of the thyroid lesions. The preparation of thyroid samples included fixation using 10% zinc formalin, after which the tissue required embedding in paraffin. Paraffin embedding provided an option for long-term preservation of tissues. The tissues were not left to fix for more than 24 hours because over fixation could cause mask the antigen. Tissues were transferred to alcohol following fixation before the embedding process. Contrarily, the tissues can be frozen instead of fixing.

Next, the embedded sections cut using a microtome. Usually, 4mm thick sections provided accurate staining with haematoxylin and eosin for routine histological

examination. For double staining, the thyroid cells from lesion or fine- needle aspiration specimens are transferred and attached to a solid support, usually a coverslip. Paraffin removed by dipping in xylol. After removal of paraffin, slide dipped in different strength of alcohol 30%, 50%, 70% for two minutes in each. It was further dehydrated by upgrading in 90% and 100% alcohol solution for 10 minutes in each. Section was cleared by dipping in xylol. The same procedure was performed for adrenal gland of mice. Then the specimens examined under a compound microscope.

Result

Effects on Thyroid gland

Table 1: The double stained section of thyroid gland of Mahua treated albino mice demonstrated the following histological features

5 Days Mahua treated Albino mice	15 Days Mahua treated Albino mice
Deshaping of follicles.	Appearance of a vacant area around the follicles.
Great reduction in the size of cuboidal cells	The haphazard scattering of cuboidal cells.
Partial loss of basement membrane.	
Nucleus not apparent.	

Table 2: The T.S. section of thyroid gland of dudhia treated albino mice illustrated the below mentioned variation at histological levels

5 Days Dudhia treated Albino mice	15 Days Dudhia treated Albino mice
Scattering of cuboidal cells.	A few enlarged cells at some places.
Loss of follicular epithelium.	Breakage of follicles.
Complete loss of cuboidal content.	Appearance of colloidal content.
Shrinkage in the size of cuboidal cells.	The section did not appear as that of thyroid.

Effects on Adrenal gland

Table 3: The 5 micron thick and double stained T.S. of adrenal gland of Mahua treated albino mice showed the following histological variations

5 Days Mahua treated Albino mice	15 Days Mahua treated Albino mice
No change in adrenal cortex.	No apparent change in adrenal cortex.
No major changes in the medulla.	Gradual damage of medullary cells.
Nuclei not well stained.	Vacuolation of cells.

Table 4: The T.S. of adrenal gland of Dudhia treated albino mice illustrated the below mentioned variation at histological levels

5 Days Dudhia treated Albino mice	15 Days Dudhia treated Albino Mice
A significant enlargement of cortical cells.	Shrinkage in the cells of adrenal cortex.
Great enlargement of medullary zone.	Shrinkage in the medullary cells.
No damage of connective tissue and other parts of the adrenal gland including cortex and medulla.	Vacuolation in the medullary zone. Also, necrosis in medullary cells.

Discussion

Thyroid gland

The effect due to dudhia liquor was more profound than mahua liquor. It caused loss of follicular epithelium at several places. Absence of colloid also in dudhia treatment was because of alcoholic effect of liquor. The presence of few enlarged cells at some places might be because of partial loss of cuboidal cells. In the dudhia treatment showed a recovery stroke when colloidal contents began to appear. The size of cells also was of normal size, thus these changes might be because of acclimatization of mice towards increasing days of treatment.

Adrenal gland

The Mahua treatment caused a major histological change in the medulla of adrenal gland whereas no change in the cortex. Chronic treatment of Dudhia liquor caused damage of medullary zone by appearance of vacuoles in this region. The hyperactivity of cortical cells as well as medullary cells might be the reason behind these histological changes.

Summary and Conclusion

Mahua and dudhia liquor caused reduction in the size of thyroid follicles as well as exhaust of colloid in five days treated albino mice due to alcoholic effect. The effect of dudhia liquor was more profound. It caused loss of follicular epithelium at several places. Absence of colloid also in dudhia treatment was because of alcoholic effect of liquor. The necrosis in adrenal gland, its vacuolization might be because of mahua and dudhia liquor treatment. Thus, it appears that alcoholism either in acute or chronic use is in no way beneficial to animal health.

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