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Original Research Paper

Pharmacology

EFFECT OF WHEAT GRASS (*TRITIUM AESTIVUM LINN*) ON LIPID PROFILE IN ALBINO RATS INDUCED WITH MYOCARDIAL INFARACTION.

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ABSTRACT

Context: Obesity had emerged important risk factors associated with various disease. Prevalent of obesity is on the rise

Aims: to study the effect of wheat grass (*Tritium aestivum Linn*) on lipid profile by observing its effect on Isoproterenol induced myocardial infarction in rats.

Settings and Design: This was a longitudinal study done on thirty healthy albino rats

Methods and Material: Thirty albino rats were grouped into five groups of six rats in each, and housed in separate cages group-wise. All groups except control received Isoproterenol. In addition to Isoproterenol, two groups were given wheat grass at different dosage and one group received Carvediliol. Serum lipid profile was assessed.

Statistical analysis used: ANOVA test and post hoc Dunnett test using SPSS version 16, unpaired t testResults: Significant reduction in HDL and increse in LDL, cholesterol and triglyceride was seen..

Conclusions: *Triticum aestivum* has a favourable effect on lipid profile. Wheatgrass extract can be a good alternative or primary therapy in treating dyslipidemia.

KEYWORDS : Tritium Aestivum Linn, Dyslipidemia

TEXTINTRODUCTION:

Obesity had emerged important risk factors associated with various disease. Prevalent of obesity is on the rise. In 2016, more than 1.9 billion adults aged 18 years and older were overweight. Of these over 650 million adults were obese. In 2016, 39% of adults aged 18 years and over (39% of men and 40% of women) were overweight. Overall, about 13% of the world's adult population (11% of men and 15% of women) were obese in 2016. The worldwide prevalence of obesity nearly tripled between 1975 and 2016. (1)

Elevated LDL (>190 mg/dL) and triglycerides are risk factors for coronary heart disease. In all individuals, emphasize must be given on heart-healthy lifestyle across the life course. A healthy lifestyle reduces atherosclerotic cardiovascular disease risk at all ages. In younger individuals, healthy lifestyle can reduce development of risk factors and is the foundation of atherosclerotic cardiovascular disease risk reduction. In young adults 20 to 39 years of age, an assessment of lifetime risk facilitates the clinician–patient risk discussion and emphasizes intensive lifestyle efforts. In all age groups, lifestyle therapy is the primary intervention for metabolic syndrome. (2,3)

Whole grain like wheat (*Tritium aestivum Linn.)* finds a place in the recommended DASH diet and is an important component of human diet, particularly in developing countries. Epidemiological studies reveal that consumption of whole grain and its products are protective against chronic diseases such as cardiovascular diseases, dyslipidemia, diabetes and cancer. Wheat when harvested as young green shoots germinated over a period of 6-10 days is generally called 'wheat grass' and it is known as 'functional food' during which vitamins, minerals and phenolic compounds such as flavonoids are synthesized in wheat sprouts reaching maximum antioxidant potential.(4) Herbal products are highly acceptable and used 70 to 80% of the world population for their primary health care, especially in developing countries, due to their easy access, lesser side effects and low cost. It is also known to possess antioxidant as proven in several studies. (5,6) This property might protect the heart and preventing the most important cardiovascular complication. It may help in favourable lipid profile. This study will definitely help and add knowledge in scientific exploration of Effect of wheat grass (*Tritium aestivum Linn*) on lipid profile by observing its effect on Isoproterenol induced myocardial infarction in rats.

SUBJECTS AND METHODS:

This was a longitudinal study done on thirty healthy albino rats weighing between 100-200gms. Prior to the dietary manipulation, all rats were fed standard rat chow, containing 60% vegetable starch, 11% fat and 29% protein, water ad libitum and maintained on 12 hours light/dark cycle. Simultaneously rats were acclimatized to the procedure of blood pressure measurement daily for one week.

DRUGS & CHEMICALS:

The drugs selected for the study were obtained in pure powder form from the following sources.

1- *Triticum aestivum* powder –Girmes wheat grass, Pune
2- Carvediliol – Alkem Company, Mumbai, Maharastra, 400013
3- Isoproterenol (ISO) – Get well Pharmaceuticals, New Delhi

Myocardial Infarction was induced in rats by intraperitoneal injection of Isoproterenol hydrochloride at a dose of 20mg/100g body weight, dissolved in normal saline for 2 consecutive days.

Thirty albino rats were grouped into five groups of six rats in each, and housed in separate cages group-wise, as follows.
Group 1 (Control) : Rats were administered Normal saline 0.5ml orally for 15 day followed by Normal saline 5ml s.c. on 14th& 15th day, at an interval of 24 hr.

GROUP 2 (ISO) :

Rats were administered Normal saline 0.5 ml orally once daily for 15 days followed by ISO 20mg/100g body weight subcutaneously on the 14th& 15th day, at an interval of 24 hr.

GROUP 3 (TR LOW DOSE + ISO) :

Rats were pretreated with *Triticum aestivum* low dose 200mg/kg orally for a period of 15 days followed by subcutaneous injection of Isoproterenol 20mg/100g body

weight on 14th& 15th day at an interval of 24 hr.

GROUP 4 (TR HIGH DOSE + ISO):

Rats were pretreated with *Triticum aestivum* high dose 250mg/kg orally for a period of 15 days followed by subcutaneous injection of Isoproterenol 20mg/100g body weight on 14th& 15th day at an interval of 24 hr.

GROUP 5 (CARVEDILOL + ISO):

Rats were pretreated with carvedilol 5mg/kg orally for a period of 15 days followed by subcutaneous injection of Isoproterenol 20mg/100g body weight on 14th and 15th day at an interval of 24hr.

Group	Drug	Dose	Duration	Induction of MI
1	Distilled Water	0.5 ml	For 15 days	No treatment
2	Distilled Water	0.5 ml		Isoproterenol 20mg/100gbwt. SC Inj on 14th& 15th day.
3	Triticum aestivum Extract	200mg/kg		
4	Triticum aestivum Extract	250mg/kg		
5	Carvedilol	5mg/kg		

BIOCHEMICAL STUDIES :

Serum lipid profile (cholesterol, triglyceride, HDL, LDL) will also be estimated in all the groups. This was done by standard acceptable method. (7)

Statistical Analysis--The comparison were done using ANOVA test and post hoc Dunnett test using SPSS version 16, unpaired t test and $p<0.05$ was considered as statistically significant.

RESULTS:

Effect of *Triticum aestivum linn*. on various lipid profile is shown in in Isoproterenol induced myocardial infarction in albino rats. As evident in the table, it is having comparable effect to that of Carvedilol. Wheat grass (WG) had significantly increased the level of HDL and it has significantly decreased the level of cholesterol, LDL and triglycerides. We also dose dependant result. (Table 1)

Table 1: Effect of *Triticum aestivum Linn*. on lipid profile.

Parameters (mmHg)	Group1 CONTROL (Distilled Water)	Group2 CONTROL ISO 20mg/100gbwt	Group3 WG200mg/kg +ISO 20mg/100gbwt	Group4 WG250mg/kg +ISO 20mg/100gbwt	Group5 Carvedilol 5mg/kg+ ISO 20mg/100gbwt
Cholesterol ± SE	54.43 ±4.145	109.16*** ±4.88	90.49* ±5.52	67.73*** ±5.91	56.96 ±3.53
Triglyceride ± SE	132.32 ± 5.529	317.07*** ±13.5	247.405* ±7.45	178.638*** ±8.112	127.77 ±4.867
HDL ± SE	27.135 ±1.87	33.14*** ±1.51	34.847* ±1.93	38.98*** ±2.14	41.03*** ±1.35
LDL ± SE	66.97 ±0.59	39.9*** ±0.66	59.06* ±0.66	51.97*** ±0.6	44.99*** ±0.59

* – P<0.05, ** – P<0.01, *** – P<0.001

DISCUSSION:

This study was carried out to find out Effect of wheat grass (*Tritium aestivum Linn*) on lipid profile by observing its effect on Isoproterenol induced myocardial infarction in rats. Wheat grass (WG) had significantly increased the level of HDL and it has significantly decreased the level of cholesterol, LDL and triglycerides. We also dose dependant result.

Wheat grass refers to the young grass of wheat (*Triticum aestivum*) germinated for a period of 6 to 10 days. It contains vitamin C and E, ß carotene, ferulic acid, vanilic acid and phenols, especially flavonoids. Wheat grass juice is found to have healing properties in various degenerative diseases and is known to benefit blood cells, bones, glands, kidney and other parts of the body. (8,9) Since little or no work has been done on cardio-protective effects of wheat grass, the present study was designed to analyse its role on Isoproteronol induced myocardial insufficiency.

In the study , first myocardial-infarction was induced with a - adrenergic agonist Isoproterenol, which caused severe stress in the myocardium causing coagulative necrosis (i.e. infarct like) of heart muscle. Pre-treatment of *Triticum aestivum linn*.in both doses (TA Linn + ISO) showed a reduction in blood lipid profile levels with concomitantly increase in HDL cholesterol. Lipid lowering effect of *Triticum aestivum linn*.is due to the inhibition of cholesterol biosynthesis, increased fecal bile acid secretion and stimulation of receptor mediated catabolism of LDL cholesterol and increase in the uptake of LDL from blood by the liver. Heart tissue injury induced by ISO in rats was indicated by elevated level of the marker enzymes such as serum. (10,11,12)

Wheat grass by virtue of its flavonoids and phenolics, effectively protected the heart and vessels from induced damage. Hence Wheat grass extract can become an effective therapeutic agent for treatment of dyslipidemia.

To conclude, the present result suggests that *Triticum aestivum* has a favourable effect on lipid profile. Wheatgrass extract can be a good alternative or primary therapy in treating dyslipidemia. .

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