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EVALUVATION OF SARJIKA KASHARA AS A NIDANA IN CARDIOVASULAR DISEASES – AN EXPERIMENTAL STUDY

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ABSTRACT

In India the burden of non-communicable diseases has been emerging rapidly due to globalization, urbanization, early ageing of society and an increased event of chronic diseases· Among all the non-communicable diseases cardiovascular diseases (CVDs) has gained our attention, as they have now become the leading cause of mortality in India. Acharya Charaka explains about *Dinacharya, Rtucharya, Sadvrutta* in maintenance of healthy lifestyle. In *vimanasthana* he prohibits excessive and chronic intake of *Pippali, Ksharaand Lavana*. If they were used in excessively and for the long term it may lead to many health conditions. SarjikaKsharai.e., Sodium Bicarbonate is routinely used in hotels, bakeries, and fast-foodcentres as a leavening agent and for giving soft and crisp texture to food. Among all the *ksharas, SarjikaKshara* [Sodium bicarbonate]is commonly used for preparation of food in restaurants, in preparation of bakery items, fast food, cold drinks and also in some Ayurvedic classical and proprietary medicines. This study aims to evaluate the effect of consumption of *SarjikaKshara* for long duration on *Hrudroga* by an animal study.

In this study 6 Wister albino rats used as standard and 3 groupings viz-sub acute, sub chronic and chronic group with 6 rats in each were taken as experiment group after dose fixation and assessment of lab parameters. In this animal experiment it is noted that significant changes in CKMB and LDH signifies that there will be Acute and

Chronic damage to the Cardiac Muscles. With this study it can be concluded that use of SarjikaKshara for long term will increase the chances for cardiovascular diseases.

Keywords: Hrudroga, SarjikaKshara, pippali, lavana

INTRODUCTION

Ayurveda is Indian ancient medical science explains about different diseases, its cause, pathogenesis, types, complications and prognosis and treatment. In India the burden of non-communicable diseases has been emerging rapidly due to globalization, urbanization, early ageing of society and an increased event of chronic diseases[1]. Among all the non-communicable diseases cardiovascular diseases (CVDs) has gained our attention, as they have now become the leading cause of mortality in India.[2] First attack survey done in Sri Jayadeva Institute of Cardiovascular sciences, Bengaluru found that 47% of the 3450 patients registered with first cardiac event in their lifetime were aged less than 35[3]. Modern Medicine based on clinical and experimental evidence puts the blame on food containing large amounts of saturated fat, and cholesterol, alcohol and cigarette smoking, stress and strains of modern sophisticated life for cardiac disease[4].

Cardiovascular disorderswerea major health burden to society. Acharya Charaka explains about *Dinacharya, Rtucharya, Sadvrutta* in maintenance of healthy lifestyle. In *vimanasthana* he prohibits excessive and chronic intake of *Pippali*, *Ksharaand Lavana*. If they are used in excessively and for the long term it may lead to many health conditions. SarjikaKsharai.e., Sodium Bicarbonate is routinely used in hotels, bakeries, and fast-foodcentres as a leavening agent and for giving soft and crisp texture to food. Among all the *ksharas*, *SarjikaKshara* [Sodium bicarbonate]is commonly used for preparation of food in restaurants, in preparation of bakery items, fast food, cold drinks and also in some Ayurvedic classical and proprietary medicines. This study aims to evaluate the effect of consumption of *SarjikaKshara* for long duration on *Hrudroga* by an animal study.

MATERIALS AND METHODS

Wister strain albino rats of either sex weighing between 150 to 250 gm were obtained from animal's house attached to department of Pharmacology, SDM Research centre Udupi, Karnataka, India. The animals were fed with standard brand pellet and water. They were acclimatized in the laboratory condition for two weeks prior to the experimentation. The animals were exposed to natural day and night cycles under ideal laboratory conditions. The experiment was carried out in accordance with the direction of "Institutional animal ethics committee" [IAEC Approval No-SDMCRA/IAEC/SH-R-9].

GROUPING OF ANIMALS

In this study control group sub-acute group sub chronic group and chronic group with 6 Wister Albino Rats in each group were subjected for experiment. Control group rats were named with A1 to A6 and they were fed with standard brand pellets and water. Sub-Acutegroupswere named with B1 to B6 and administered with calculated *Sarjika Kshara* for 30 days, Sub Chronic group named C1-C6 and administered the *Sarjika Kshara* for 60 days and Chronic group D1-D6 administered the *Sarjika Kshara* for 90 days.

DOSE FIXATION

The dose calculation was done on the basis of body surface area ration using the table of "Paget and Barnes rule". Rat dose was calculated on the basis of Human Dose by using of Standard Conversion method on the basis of body surface area ratio. Then it was convertedinto ml.

Therapeutically human dose of SarjikaKshara [Sodium Bicarbonate] is 1.250gm/day.

Rat Dose = Human Dose X body surface area ratio convertibility factor

= 1250 X 0.018

= 22.5mg/200gm body weight of rat.

=11.25/100gm

=0.1125/gm body weight of rat

MODE OF ADMINISTRATION

The drugwas administered through oral route. The drug was mixed with distilled water and that solution was administered with the use of feeding syringe to avoid oral injury. The dose was calculated accordingly.

= 11.25mg/100gm X20ml distilled water
= 225mg/20ml
=11.25mg/1ml

Table 1: Grouping of an. ls and their dosage.

A CON-TROL GROUP [90 DAYS]	WEIGHT IN GMS	B SUB ACUTE GROUP [3O DAYS]	WEIGHT IN GMS	DOS-AGE IN ML	C SUB CHRON-IC GROUP [60 DAYS]	WEIGHT IN GMS	DOS-AGE IN ML	D CHRON-IC GROUP [90 DAYS]	WEIGHT IN GMS	DOS-AGE IN ML
A1	165	B1	210	2.1	C1	185	1.8	D1	186	1.8
A2	222	B2	174	1.7	C2	199	1.9	D2	173	1.7
A3	174	B3	118	1.2	C3	133	1.3	D3	178	1.7
A4	191	B4	169	1.6	C4	189	1.8	D4	175	1.7
A5	206	B5	198	1.9	C5	228	2.2	D5	190	1.9
A6	218	B6	161	1.6	C6	214	2.1	D6	142	1.4

Collection of blood sample

On completion of study blood samples were collected through supra orbital puncture by capillary and sent to laboratory for estimation of serum biochemical parameters.

OBSERVATION AND RESULTS

Comparison between biochemical values of all the groups and control reveal following observation:

Table 2: Effect of *Sarjika Kshara* on Biochemical parameters recorded in rats.

PARAMETERS	GROUP- A CONTROL GROUP [90 DAYS]	GROUP – B SUB ACUTE GROUP [3O DAYS]	GROUP – C SUB CHRONIC GROUP [60 DAYS]	GROUP-D CHRONIC GROUP [90 DAYS]
LDH	428 ± 82.58	398 ± 37.08	465.83±103.65	652±128.44
CKMB	21.16±4.63	95±4.10	12.58±1.65	17.66±9.02
SGOT	89.6 ±12.61	95.5±17.023	85.16±9.05	81±5.4
SGPT	64.83±7.0	56.83±5.68	56.66±10.8	68.5±8.74
ALP	662.833±196.93	489.5±125.68	437.83±76.789	724.66±460
TOTAL PROTIEN	8.61±0.98	10.65±1.14	8.95±0.65	8.43±0.51
ALBUMIN	4.06± 0.27	4.98±0.65	5.06±0.32	3.1±0.09
TOTAL BILIRUBIN	0.5866±0.0321	0.3083±0.03683	0.5666±0.04944	0.605±0.01893
DIRECT BILIRINE	0.0866±0.033	0.0983±0.01621	0.255±0.02473	0.1116±0.03135
CHOLESTROL	23.5±1.91	86.83±11.89	102.1±15.86	62.83±13.77

TRIGLYCERIDES	12.6±8.142	223.5±19.91	245.5±9.5	141.5±8.18
HDL	52.6±0.714	53±1.46	57.8±1.49	57±1.291
LDL	54.4±2.60	21.6±4.89	31.03±6.90	36.7±8.44
VLDL	25.23±1.62	44.7±3.98	49.1±1.91	28.3±1.63

- Statistically significant increase in LDH in Group D, CKMB in Group B, Albumin and HDL in Group C was observed in comparison with control groups.
- The changes in the biochemical parameters like SGOT, SGPT, ALP, Total Protein, were observed statistically insignificant.
- Total Bilirubin and Direct Bilirubin found to be significantly decreased in Group B while LDL found to be decreased both in Group Band Group C
- Triglycerides and VLDL found to be Significantly increased in both Group B and Group C

DISCUSSION

The effect of Sarjika Kshara on cardiovascular system is assessed with Lipid Profile, Cardiac Enzymes, Proteins and Bilirubin. Dyslipidemia is one of the major causes for Atherosclerosis and leading tocoronary artery disease. In this study Cholesterol, Triglycerides and VLDL were significantly increased in sub-acute and sub chronic groups. A significant change in lipid profile in the test group signifies that there is an effect of SarjikaKshara in lipid metabolism. LDH is widely distributed in most of the tissues particularly heart, skeletal muscle, liver kidney and RBC's[5]. It is one of the glycolytic enzymes active under hypoxic condition.LDH is composed of four subunits of two types i.e., H and M [H for heart and M for muscles]. There are five isoenzymes with different subunit composition named LDH1 to LDH5. In the Chronic group there is significant increase in LDH which signifies that Sarjika Kshara have the effect on myocardial tissues. LDH levels will elevate late and remain elevated for long time in myocardial tissue damage. CKMB is a very important cardiac marker which will be elevated in cardiac tissues damages. It is an intracellular enzyme present in cardiac tissue in acute damage to cardiac muscle. CKMB will be elevated in this study. There is a significant increase in CKMB in sub-acute group and there is no significant increase in sub chronic and chronic group.

In this study Bilirubin, Proteins, Amino transferese and ALP were also measured to see that the secondary effect of SarjikaKshara in relation with cardiovascular disease and hepatobiliary system. Nothing significant is observed with these tests.

CONCLUSION

In this animal experiment it is noted that significant changes in CKMB and LDH signifies that there will be Acute and Chronic damage to the Cardiac Muscles. With this study it can be concluded that use of Sarjika Kshara for long term will increase the chances for cardiovascular diseases. Nidana parivarjana is the first line of treatment in any illness. The use of Sarjika Kshara needs to be reduced to maintain a healthy cardiovascular system. Further there is a need for clinical study to assess etiopathogenesis of cardiovascular diseases with special reference to use of excessive and long-term use of Sarjika Kshara.

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