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An observational pilot study on *Sidma kushta* in relation to *Yakrit & Pliha* as *moola sthana* of *Raktavaha srotas*

Research Article

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Abstract

Acharya Charaka has mentioned fifteen *koshtanga* in the *shareera*. *Koshtanga* refers to the viscera. Two *koshtanga*, *Yakrit* and *Pliha*, have been designated as the *moola sthana* (primary centres of physiological activity) of the *Raktavaha srotas* (haemopoiesis). The description of *Yakrit* & *Pliha* corresponds to the functions of the liver and spleen in contemporary anatomy. *Kushta* (skin disease) is a *Rakta prodashaja vikara* (disease caused due to the vitiation of blood). *Sidma Kushta*, or psoriasis, is one of the eighteen *kushta* listed in the *Samhita.* Its prevalence in the Indian population ranges from 0.44 to 2.8%. Recent observational studies have shown that the prevalence of NAFLD [Non-Alcoholic Fatty Liver Disease] (as diagnosed either by imaging or by histology) is remarkably higher in psoriatic patients (occurring in up to 50% of these patients) and suggested the presence of a novel hepato dermal axis. In this pilot study, six individuals diagnosed with *sidma kushta* were subjected to ultrasonography of the abdomen & selected biochemical assays on the function of the liver, to observe the relationship between *sidma kushta* and *moola sthana* of *raktavaha srotas*. The data was statistically analysed using Spearman's correlation coefficient and a correlation was observed between the fatty liver grade and the levels of ALT, AST, and blood ammonia.

Keywords: *Yakrit, Pliha, Sidma Kushta, Raktavaha Srotas*, Ultrasonography, Biochemical assay.

Introduction

Ayurveda is aimed at the well-being of human beings. The *shareera* (human body) itself is viewed as a *Sthoola* (macro) & *Sookshma* (micro) entity. But it is the *sthoola shareera* that has been subjected to *chikitsa*. The *sthoola shareera* has been divided into six by the concept of *shadangam* (six *Angas*). They are *Shiras* (head), four *Shakha* (extremities) and *Madhya kaya* (trunk) (1). Later the *Acharyas* again divided the Anga into *Koshtanga* and *Pratyanga*. *Acharya Charaka* has mentioned fifteen *koshtanga* and fifty six *pratyanga* in the *shareera* (2). Primarily *koshtanga* refers to the viscera and *pratyanga* to the externally visible structures of the human body. *Acharya Vagbhata* in *Ashtanga Hrudaya* has mentioned 11 *koshtanga* in the *shareera* (3). *Yakrit* & *Pliha* are two *koshtanga* that have been designated as *shonita sthana* (4). It is also mentioned as the *moolasthana* of *Raktavaha srotas* (5).

The description of *Yakrit* in the *Ayurveda samhita* exactly matches with liver mentioned in modern anatomy. *Rakta* which is the second formed *dhatu* (body constituent) is dependent on *yakrit*. Similarly the description of *Pliha* matches with that of the spleen mentioned in modern anatomy.

Charaka has mentioned *Kushta* as a *Raktapradoshaja vikara* (6). Moreover, *Kushta* needs to be approached with utmost importance since it is one among the *Ashta Maha agada* (eight dreadful diseases) mentioned in our *samhita* (7).

The prevalence of Psoriasis is 0.44-2.8 % in India, it commonly affects individuals in their third or fourth decade with males being affected two times more commonly than females (8).

The signs of *Sidma kushta* mentioned in the *samhita* match with that of psoriasis (9).

Recent observational studies have shown that the prevalence of NAFLD (as diagnosed either by imaging or by histology) is remarkably higher in psoriatic patients (occurring in up to 50% of these patients) than in matched control subjects (10). Notably, psoriasis is associated with NAFLD even after adjusting for metabolic syndrome traits and other potential confounding factors. Some studies have also suggested that psoriatic patients are more likely to have more advanced forms of NAFLD than non-psoriatic controls and that psoriatic patients with NAFLD have more severe psoriasis than those without. This study has also suggested the presence of a novel hepato-dermal axis (10). The work is being carried out to study the correlation between *sidma kushta* &*moola sthana* of *raktavaha srotas* so that it will present a novel idea to the scientific world and help in establishing a new biological axis.

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Aims and Objectives

- To study the relation between *Sidma kushta* and the structural aberration & dysfunction of the *yakrit* (liver) & *pliha* (spleen) as *moola sthana* of *raktavaha srotas*.
- To explore the relation between *Sidma kushta* and structural aberration of the liver and spleen.
- To explore the relation between *Sidma kushta* and biochemical markers related to the liver.

Materials and methods

Study Design

Observational study

Study setting

Patients from OPD & IPD of Govt. Ayurveda College, Tripunithura.

Inclusion criteria

People belonging to both sexes between the age group of eighteen & sixty who have been diagnosed with Psoriasis fulfilling the criteria of *Sidma kushta*.

Exclusion criteria

People who have been diagnosed with chronic liver disease, pregnant & lactating women were excluded. People who were not willing to give the informed consent were also excluded.

Procedure

Six patients belonging to both sexes between the age group of 18 to 60 years diagnosed with Psoriasis fulfilling the criteria of *sidma kushta* were subjected to ultrasonography of the abdomen to evaluate the structure of *yakrit* (liver) & *pliha* (spleen). The Serum Bilirubin Total, Serum Bilirubin conjugated (Direct bilirubin), Serum Bilirubin unconjugated (Indirect bilirubin), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Alkaline Phosphatase (ALP), Gamma-glutamyltransferase (GGT), Prothrombin time & Blood Ammonia were assessed biochemically.

Observations

Consecutive sampling was done and the pilot study was executed using six patients. Half of the patients were male & the remaining half female. It was discovered that the patient's mean age was 36.66. Every patient had a mixed diet. The participants did not have a family history of the disease *sidma*. Four out of the six patients were graduates. All the patients had undergone treatment under modern medicine before coming to our hospital. Four out of the six patients were married while two were unmarried. Auspitz sign was present in all six patients.

Results

Table 1: Findings in the Ultrasonography of Liver

Sl.No	Age	Sex	Measurement in mid-clavicular line (cm)	Parenchymal Echogenicity	Focal Lesion	Portal Vein	Impression
PT1	31	Male	12.74	Increased	Nil	Normal	Fatty liver grade I
PT2	22	Female	11.39	Normal	Nil	Normal	Normal
PT3	44	Female	12.38	Normal	Nil	Normal	Normal
PT4	29	Female	11.87	Increased	Nil	Normal	Fatty liver grade I
PT5	47	Male	13.83	Increased	Nil	Normal	Fatty liver grade II
PT6	44	Male	13.80	Increased	Nil	Normal	Fatty liver grade II

Two patients had normal liver ultrasonography images, while the other two had been diagnosed with fatty liver grade I and two with fatty liver grade II. It was discovered that the average liver measurement at the mid-clavicular line was 12.67 cm. Increased liver parenchymal echogenicity was observed in four out of the six patients. In all six cases, the portal vein was confirmed to be normal, and there was no localised lesion. (Table 1)

Table 2: Findings in the ultrasonography of spleen

Sl.No	Age	Sex	Measurement in cm	Parenchymal Echogenicity	Focal Lesion	Impression of Spleen
PT1	31	Male	9.07	Normal	Nil	Normal
PT2	22	Female	9.18	Normal	Nil	Normal
PT3	44	Female	9.37	Normal	Nil	Normal
PT4	29	Female	9.67	Normal	Nil	Normal
PT5	47	Male	12.0	Normal	Nil	Normal
PT6	44	Male	12.66	Normal	Nil	Normal

The ultrasonography impression of the spleen was normal for all six patients. The mean of the spleen measurement was 10.32 cm. All six patients had normal parenchymal echogenicity of the spleen & focal lesion was also absent. (Table 2).

Table 3: Results of biochemical assays

Sl.No	Impression of Liver	Total Bilirubin mg/dl	Direct Bilirubin mg/dl	Indirect Bilirubin mg/dl	ALT U/L	AST U/L	ALP U/L	GGT U/L	PT sec	Blood Ammonia µmol/L
PT1	Fatty liver grade I	0.5	0.2	0.3	50	25	81	25	15.2	29
PT2	Normal	0.7	0.3	0.4	10	14	66	15	13.3	25
PT3	Normal	0.3	0.1	0.2	9	10	73	12	13.3	20
PT4	Fatty liver grade I	0.5	0.2	0.3	16	16	44	9	13	23.4
PT5	Fatty liver grade II	0.6	0.2	0.4	76	38	87	67	13.7	45
PT6	Fatty liver grade II	0.5	0.2	0.3	80	52	112	48	13	36.8

The biochemical assay showed that three patients had increased levels of ALT, whereas one had an elevated level of GGT. (Table 3)

The grade of liver and ALT were shown to have a Spearman's correlation coefficient (rho) of 0.956, which was statistically significant (p value=.003). The grade of fatty liver and AST were shown to have a Spearman's correlation coefficient (rho) of 0.956, which was statistically significant (p value=.003). The grade of fatty liver and ammonia were shown to have a Spearman's correlation coefficient (rho) of 0.837, which was statistically significant (p value=.038). The degree of fatty liver and the measurement at the mid-clavicular line were shown to have a Spearman's correlation coefficient (rho) of 0.837, which was statistically significant (p value=.003). The grade of fatty liver and ALP were shown to have a Spearman's correlation coefficient (rho) of 0.717, which was statistically insignificant (p value=0.109). The coefficient of correlation (rho) between the grade of fatty liver and measurement of spleen was found to be 0.717 and was statistically insignificant (p value=0.109). (Table 3)

Discussion

The symptoms of psoriasis and Sidma Kushta are comparable, according to Ayurveda. *Kushta* is a *rakta pradoshaja vikara* and *yakrit* (liver)/ *pliha* (spleen) are mentioned as the *moola sthana* of *raktavaha srotas*. The purpose of this study was to find out the correlation, if any, between structural abnormalities in the liver and spleen and *sidma kushta*. Additionally, the relationship between liver biomarkers and *sidma kushta* was investigated.

Ultrasonography of the liver& spleen is a sensitive and noninvasive method, widely available, that can be easily performed and has no contradictions (11).

The last byproduct of heme catabolism is bilirubin. It is a waste substance that goes into the intestines and is eventually removed via stools. Conjugated/direct bilirubin, with a normal value of 0.1-0.4 mg/dl, is conjugated with glucuronic acid to make it soluble in water. The protoporphyrin component of heme is converted into unconjugated or indirect bilirubin. It is insoluble in water, is carried to the liver by albumin, and typically has a normal level of 0.2–0.7 mg/dl. A two-milligram per deciliter increase in serum bilirubin is indicative of a clinical diagnosis of jaundice. Hepatic cellular damage, obstructive jaundice, and liver cancer are associated with increased direct bilirubin levels.

The normal range for AST levels in serum is 8–20 U/L.It is a marker for liver damage and indicates a moderate to sharp rise in parenchymal liver illnesses, such as hepatitis and liver cancers.

For men, the normal serum ALT level is 13–35 U/L, while for women, it is 10–30 U/L. Acute hepatitis of either toxic or viral aetiology is characterized by very high levels (300–1000 U/L). Liver illness raises both ALT and AST values, however ALT is higher than AST. A rise in ALT levels might be observed for a few days before the onset of clinical symptoms like jaundice. Chronic liver illnesses such as cirrhosis, hepatitis C, and non-alcoholic steatohepatitis (NASH) can cause a moderate increase in ALT (50-100 U/L).

An indiscriminate enzyme called Alkaline Phosphatase (ALP) hydrolyzes heterocyclic, aromatic, and aliphatic substances. The normal range for ALP in serum is 40–125 U/L.

Hepatic disorders such as alcoholic hepatitis, hepatocellular cancer, and infectious hepatitis are associated with elevated ALP levels.

The normal range for GGT (Gamma-Glutamyl Transferase) in serum is 10–30 U/L. Prostate cancer and infectious hepatitis both have elevated levels of GGT. GGT can identify alcohol misuse with such sensitivity, that it is therapeutically significant. Even when other liver function tests are within normal ranges, alcoholism is associated with elevated GGT. Within a few days of quitting alcohol, the GGT level drops dramatically. An increase in GGT levels is typically correlated with alcohol consumption.

The liver produces thrombin, which is a helpful measure of liver health. Prothrombin has a six-hour half-life, hence PT reflects the liver's current state of function. Only when the liver loses more than 80% of its reserve capacity is PT prolonged. Another reason for a prolonged prothrombin time is vitamin K insufficiency. Even if vitamin K is given to the parents, the PT in cases of liver disease continues to be extended.

Blood Ammonia is an index of urea synthesis by the liver. It is a useful test in hepatic encephalopathy. It is produced by the action of intestinal bacteria. The ammonia is later converted to urea by the liver, but this activity is considerably decreased in hepatic cell damage (12).

It was discovered that four of the six individuals with *sidma kushta* had fatty livers. Of them, two had

grade I fatty liver while the other two had grade II fatty liver. A statistically significant correlation was observed between the fatty liver grade & mid-clavicular measurement of the liver. This can be an indication towards the change in the morphology of the liver in patients diagnosed of *sidma kushta*.

A statistically significant correlation was seen between the fatty liver grade and the levels of ALT, AST, and Blood Ammonia.This is an indication towards the pathophysiological changes occurring in liver in cases of *sidma kushta* which subsequently reflect in the biochemical assays. There was no discernible statistical difference between the ALP and GGT levels and the fatty liver grade. There was no statistical significance between the measurement of spleen & *sidma kushta*

Conclusion

Ayurveda treatises have a detailed description of the concept of *srotas*. The primary hubs of physiological activity are called *srotas*. It is necessary to conduct extensive research on the connection between the *dhatu pradoshaja vikaras* and the *dhatuvaha srotas*. The results of this pilot study showed a positive correlation between *sidma kushta* & structural aberration of liver. A significant correlation was also noted between *sidma kushta* and a few biochemical assays namely ALT, AST & Blood Ammonia. There was no statistical significance between *sidma kushta* and measurement of spleen which may be due to the smaller sample size.To fully understand the existence of a novel biological axis (hepato dermal axis), the aforementioned study needs to be conducted in a bigger sample.

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Conflict of Interest: There is no conflict of interest in the present study.

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