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Research Article

PHYTOCHEMICAL STUDY OF DARUHARIDRA (*BERBERIS ARISTATA* DC) AND ITS HEPATOPROTECTIVE EFFICACY IN INFECTIVE HEPATITIS

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ABSTRACT
Infectious hepatitis is a highly contagious disease that attacks hepatocytes of liver. Tens of millions of individuals worldwide are estimated to become infected with hepatitis each year. In modern medical sciences there is no conventional line of treatment regarding hepatitis. In Ayurveda, Daruharidra (*Berberis aristata* DC) is natural source of Berberine which reduces the inflammation of hepatocytes in liver. It has properties like cholegogue, astringent, hepato-stimulant and hepato-protective. Open labeled study was done on 30 patients at Ayurved Mahavidyalaya Sion, Mumbai, India. Daruharidra kwath 30 ml bd was given to the patients for duration of 30 days. Weekly assessment was done on the basis of signs and symptoms like Haridra netrata (yellow sclera), Pita tvak (yellowish discolouration of skin), Pita mutrata (yellow urination), Aruci (anorexia), Hrullasa (nausea), Chhardi (vomiting), Sadan (loss of appetite), Jvar (fever), Udarashula (pain in abdomen), Kandu (Pruritus), Yakrita-vruddi (Hepatomegaly), Daurbalya (Malaise), Daha (burning sensation). Objective improvement was done on the basis of reduction in serum bilirubin, SGOT and SGPT count at initial and then after 30 days, urine test for bile salt, bile pigment was done weekly. Statistical analysis was done by applying unpaired t-test to objective parameters at baseline and at the end of study (after 30 days). Subjective improvement is shown in percentage. The observations were found to be significant. It was observed that all patients were markedly improved i.e. there improvement in signs and symptoms was 71.47 %. Unpaired t test was found to be highly significant at 1 % level of significance i.e. $p < 0.01$.
Keywords: Infective hepatitis, Daruharidra, Berberine, Hepatoprotective activity, *Berberis aristata* DC.

INTRODUCTION

India is developing country. The population of India is increasing day by day tremendously. Health ignorance, increased hot and humid environment, low living standards, unhygienic conditions are causing various gastro-intestinal diseases mainly diarrhoea, viral hepatitis and many other diseases. Hepatitis A (formerly known as infectious hepatitis) is an acute infectious disease of the liver caused by the hepatitis A virus (HAV) an RNA virus[1]. It usually spread by the fecal-oral route, transmitted person-to-person by ingestion of contaminated food or water or through direct contact with an infectious person[2]. In developing countries like India and in regions with poor hygiene standards, the incidence of infection with this virus is high[3]. Symptoms typically appear 2 to 6 weeks (the incubation period) after the initial infection[4]. Symptoms usually last less than 2 months, although some people can be ill for as long as six months[5]. The signs and symptoms described in charaka samhita are Haridra netrata (yellow sclera), Pita tvak (yellowish discolouration of skin), Pita mutrata (yellow urination), Aruci (anorexia), Hrullasa (nausea), Chhardi (vomiting), Sadan (loss of appetite), Jvar (fever), Udarashula (pain in abdomen), Kandu (Pruritus), Yakrita-vruddi (Hepatomegaly), Daurbalya (Malaise), Daha (burning sensation)[6]. Tens of millions of individuals worldwide are estimated to become infected with HAV each year[7]. The overall mortality of acute viral hepatitis is 0.5 % under the age of 40 years and 3 % in patients over 60 years. Also in modern medical sciences there is no conventional line of treatment regarding hepatitis[2]. Daruharidra (*Berberis aristata* DC) has been described by various Acharyas for kamala and various other diseases[8]. Daruharidra (*Berberis aristata* DC) has tikta rasa, vipaka katu, ruksha guna, ushna virya[9] and lekhana karma[4] which plays a major role in bahupittakamala (Hepatitis). Berberine present in Daruharidra is responsible for hepatoprotective activity. Other constituents present are berbamine, aromoline, palmatine oxyacanthine and oxyberberine are also present[10]

MATERIALS AND METHODS

Selection of cases

There was random selection of patient from O.P.D. and I.P.D. of R.V. Ayurvedic Hospital, Sion; Mumbai, India. Known cases of Hepatitis (bahupittakamala) were taken. Study was carried out as per Ethical Clearance Number- AMS/1355/11-12.

Type of study

Open labeled study

Total no of cases: 30
Duration of study-30 Days

Inclusive criteria

- Either sex.
- Age between 18-60 years.
- Hyperbilirubinaemia having raised serum bilirubin (> 3 mg/dl).
- Having signs and symptoms of Infective Hepatitis (bahupittakamala).

Exclusive criteria

- Age less than 18 years and more than 60 years.
- Pregnant women and lactating mother.
- Hemolytic jaundice.
- Congenital hyperbilirubinemia.
- Obstructive jaundice.
- HIV-AIDS
- Patient having malignancy.
- Intoxication hepatic encephalopathy.

- Serum bilirubin more than 15 mg/dl.
- Chronic renal failure, Diabetics mellitus.
- Liver abscess, Liver cirrhosis, Hepatic failure.

Drug source
Stem (Kanda) of Daruharidra (*Berberis aristata* DC)

Formulation
Decoction of Daruharidra (*Berberis aristata* DC)

Mode of administration: Oral.
Dose: 30 ml bd.
Anupan: Koshnodak

Follow up
Clinical follow-up was advised every 10 days in duration of 30 days.

Statistical test
Statistical analysis was done by applying unpaired t-test to objective parameters: at baseline and at the end of study (after 30 days). Subjective improvement has been shown in percentage[11]

Assessment of efficacy
Subjective improvement
Weekly assessment in reduction of following symptoms:

- Haridra netrata (yellow sclera)
- Pita tvak (yellowish discoloration of skin)
- Pita mutrata (yellow urination)
- Aruchi (anorexia)
- Hrullasa (nausea)
- Chhardi (vomiting)
- Sadan (loss of appetite)
- Jvar (fever)
- Udarashula (pain in abdomen)
- Kandu (Pruritus)
- Yakrita-vruddi (Hepatomegaly)
- Daurbalya (Malaise)
- Daha (burning sensation)

Objective improvement
Serum bilirubin
SGOT and SGPT count at initial and then after 30 days.
Urine Test: Bile salt, Bile pigment weekly.

Gradation of symptoms
Haridra netrata (yellow sclera)
1. absent
2. mild
3. can be seen in sunlight
4. can be seen without sunlight

Pita mutrata (yellow urination)
1. Bile Salt, Bile Pigment absent
2. Bile Salt, Bile Pigment +
3. Bile Salt, Bile Pigment ++
4. Bile Salt, Bile Pigment +++ or more

Yakrita-vruddi (Hepatomegaly)
0-Absent
1- One finger palpable
2-Two finger palpable
3-Three finger palpable

Jvar (fever)
0-Absent
1-Température 99-100 F
2-Température 99-102 F
3-Temprature above 102

Chhardi (vomiting)
0- No vomiting
1- Less than three episodes per day
2- Three-Six episodes per day
3- More than Six episodes per day

Sadan (Loss of appetite)
0- Normal appetite
1- Up to 10 % reduced appetite, eating forcefully
2- Up to 50 % reduced appetite, having food only once a day
3- Complete loss of appetite

Daha (burning sensation)
1. Absent
2. Occasionally
3. Occurs at particular time
4. Occur every time

Pita tvak(yellowish discoloration of skin)
0-absent
1-mild
2-can be seen in sunlight
3-can be seen without sunlight

Hrullasa (nausea)
0-absent
1-mild
2-moderate
3-sever

Udarashula (pain in abdomen)
0-absent
1-mild
2-moderate
3-severe

Daurbalya (Malaise)
0-absent
1-mild
2-moderate
3-severe

Aruchi (anorexia)
0- Normal
1- Less desire to eat
2- Less desire to eat with nausea
3- Less desire to eat with severe nausea

Kandu (Pruritus)
0-Absent
1-Occasionally
2-Occurs at particular time
3-Continuous Sleep disturbance[12]

Table 1: Symptom wise relief in %

Symptoms	% of Relief
Haridra Netra	84.49
Pita Tvak	81.96
Pita Mutra	85.93
Hrullasa	64.44
Kandu	54.99
Aruchi	84
Sadana	47.98
Chharadi	81.23
Jvara	40
Udarshula	72.69
Daurbalya	78.35
Daha	79.77
Yakrutavruddhi	73.78

Table 2: Relief in objective criteria

	BT	AT	X	SD	SE	T value
SGOT	21897	1507	679.66	777.56	141.96	4.78
SGPT	28035.3	2053.2	866.07	861.37	157.26	5.5
Total Bilirubin	194.11	56.13	4.599	4.36	0.79	5.77
Direct Bilirubin	143.02	42.3	3.357	3.48	0.636	5.27
Indirect Bilirubin	64.62	33.3	1.044	1.305	o.238	4.38
Alkaline Phosphate	6732.28	4791	64.71	77.1	14.076	4.59

Table 3: Symptom wise Relief in %

Medicine Given	No of Patients	Symptom wise Relief (%)
Daruharidra kwath	30	71.47

Table 4: Phytochemical Analysis

Parameters	Result			
Description	Stem yellow in colour, cylindrical in shape, decotion yellow in colour.			
Content of Ash	9.54 %			
Acid Insoluble Ash	2.39 %			
Water Soluble Extractive	16.73 %			
Alcohol soluble Extractive	11.21 %			
Elements				
Lead (Pb)	0.7492ppm			
Mercury(Hg)	Less than detectable limit.			
Cadmium(Cd)	Less than detectable limit.			
Arsenic(As)	Less than detectable limit.			
TLC				
Sample	*Berberis aristata*		Daruharidra	
Solvent system	Chloroform			
Detection	**After spraying anisaldehyde**			
	R_f value	**Colour**	**R_f value**	**Colour**
	0.04	Grey	0.04	Grey
	0.29	Light green	0.29	Light green
	0.43	Purple	0.43	Purple
	0.55	Light Purple	0.55	Light Purple
	0.62	Purple	0.62	Purple
	0.88	Light Purple	0.88	Light Purple
Foreign matter	Not found			

RESULTS

Subjective evaluation showed that there was significant improvement in symptoms of 30 patients Percentage of relief in symptoms observed like Haridra netrata 84.49 %, Pita Tvak 81.96 %, Pita Mutrata 85.93 %, Hrullasa 64.44 %, Kandu 54.99 %, Sadana 47.98 %, Udarashula 72.69 %, Aruchi 84 %, Chhardi 81.23 %, Jvara 40 %, Daurbalya 78.35 %, Daha 79.77 %, Yakruta vruddhi 73.78 % (Table 1). In objective evaluation the level of SGOT was reduced significantly. t value = 4.78 at 1 % level of significant i.e. $P < 0.01$. Level of SGPT was reduced significantly. t value = 5.5 at 1 % level of significant i.e. $P < 0.01$. Level of Total Bilirubin was reduced level significantly. t value = 5.77, at 1 % level of significant i.e. $P < 0.01$. Level of Direct Bilirubin was reduced significantly. t value = 5.27, at 1 % level of significant i.e. $P < 0.01$. Level of Indirect Bilirubin was reduced significantly. t value = 4.38, at 1 % level of significant i.e. $P < 0.01$. Level of Alkaline Phosphate was reduced significantly. t value = 4.59 at 1 % level of significant i.e. $P < 0.01$(Table 2). Total effect of therapy was evaluated by percentage of relief in each sign and symptoms of every patient. It was observed that all 30 patients were markedly improved i.e. there improvement in signs and symptoms was 71.47 % (Table 3). The Phytochemical Analysis of Stem of Daruharidra (*Berberis aristata* DC) was done with the help of Shree Dhootpapeshwar ltd. Mumbai, India. The obtained values were in accordance with the standard Ayurvedic Pharmacopeia of India values (Table 4).

DISCUSSION

In Ayurveda some drugs are explained as a hepatoprotective like Kutaki (*Picrorhiza kurroa* Royle ex Benth), Kumari (*Aloe vera* Tourn. ex Linn.) etc. Daruharidra is a one of the drug which shows Hepatoprotective activity. Daruharidra - Rasa: Tikta, Katu, Guṇa: Laghu, Rukṣa, Virya: Ushna Vipaka: Katu and is rich in content of Berberine. It alleviates kapha and pitta dosas[13]. The properties like cholegogue, hepato-stimulant and astringent are useful in treating anorexia, dysentery and hepatitis[13]. Due to Tikta rasa and Berberine of Daruharidra it reduces the excretion of excessive formation of bile pigments. Due to this, it reduces the level of serum enzymes in blood and decreases the inflammation of liver. Daruharidra is Rakta shodaka, tvaka , mansa prasadaka and yakruta uttejak due to its Tikta rasa. As no conventional line of treatment is present in modern medicine for infective hepatitis, Daruharidra acts as a drug is effective in Bahupitta Kamala (infective hepatitis). From the above case studies of 30 patients the hepatoprotective activity of Daruharidra can be proved. It definitely reduces the duration of symptoms of hepatitis. Also there is need to work on Daruharidra in specific Hepatitis like Hepatitis B, C, D, E and evaluate its hepatoprotective activity. More efforts should be done to find hepatoprotective activity of other medicinal plants. It is hoped that these efforts will provide a guideline for future researchers to plan their studies.

CONCLUSION

After studying 30 patients for days, Lower economic class, mixed diet consumption was observed as main causative factors for Kamala. Percentage of Kamala (Infective Hepatitis) was observed more in Vatapittaja prakruti. Conclusion of symptoms as per gradation system in patients of Kamala- Daruharidra gave more relief in symptoms like Haridra Netra, Pita Tvaka, Pita Mutra, Udarshula, Aruchi, Daurbalya, Daha, Yakrutavruddhi compared to Jvara, Hrullasa, Sadan. Conclusion of objective parameters- it was observed that Daruharidra reduced the levels of SGOT, SGPT and Sr. Bilirubin very significantly. The drug does not showed any toxic effects. All the subjective and objective variables show that Daruharidra definitely has a positive effect in reducing signs and symptoms of infective hepatitis. Thus Daruharidra will definitely reduce the morbidity of Infective Hepatitis to some extent.

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