



## Research Article

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### ASSESSMENT OF DHATU INVOLVEMENT IN THE PATHOGENESIS OF PITTOULBANA SANNIPATAJA JWARA WITH SPECIAL REFERENCE TO TYPHOID FEVER

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#### ABSTRACT

Jwara is the most powerful ailment and due to Vikriti (abnormality) of Rasavaha Srotas (channels carrying nutrients fluids) and Manavaha Srotas, it affects the whole body, senses and the mind. Pittoulbana Sannipataja Jwara has a similarity with Typhoid fever on the ground of symptoms and etiological factors. Hence, the present study is carried out with the objective to assess the Dhatu (major structural components of the body) involved in the patients of Pittoulbana Sannipataja Jwara. To achieve the objective, total 50 patients of Pittoulbana Sannipataja Jwara having widal titre 1:80 or more than 1:80 were registered and evaluated for the presence of symptoms of Dhatugata Jwara Lakshana described by Acharya Charaka in Chikitsa Sthana. After analyzing the data statistically, the maximum symptoms of involved Dhatus (major structural components of the body) were of Rasa (primary product of digested food), Rakta (blood tissue) followed by subsequent Dhatus. It was found that with the increasing level of titres, the rate of involvement of Rasa, Rakta, Mamsadi (muscle tissue) Dhatu increases with the advancement of the disease. Assessment of Dhatu involvement can be used as a diagnostic and prognostic tool.

**Keywords:** Pittoulbana Sannipataja Jwara, Typhoid fever, Dhatugata Jwara Lakshana.

#### INTRODUCTION

Jwara roga is the most important among diseases and here the term implies the ability of a disease to cause anguish to mind and body. It is caused due to hypo-functioning of Jatharagni (metabolic factors located in digestive tract) in which food is not digested properly resulting in the formation of immature Rasa. Acharyas have described Jwara foremost and as an imperative among all the diseases<sup>1</sup>. Pittoulbana Sannipataja Jwara has dominating Pitta Dosha with Madhyama Bala of Vata Dosha and Hena Bala of Kapha Dosha. Bhavamishra has termed it as Pakal Sannipata Jwara. In India, Typhoid fever is still an endemic disease and remains an important cause of morbidity and mortality worldwide<sup>2</sup>. Poor sanitation, poor standard of personal hygiene and contaminated food are found responsible for the causation of Typhoid fever. Acharya Charaka has described jwara as Rasapradoshaja Vikara which is caused due to vitiation of Rasa Dhatu (primary product of digested food)<sup>3</sup>. Thus, vitiation of furthermore Dhatus is an obvious event due to hypo-functioning of Dhatwagni (metabolic factors located in dhatu). The Widal test detects antibodies against *Salmonella typhi*, *Salmonella Paratyphi A* and *B* and agglutination titre depends on the stage of the disease and usually appears by the end of the first week<sup>4</sup>.

According to Acharya Madhava<sup>5</sup>, Mithya Ahara-Vihara causes aggravation of Doshas (regulatory functional factors of the body) in the Amashaya which contains partially digested and the hypo-functioning of Agni results in the formation of immature Anna Rasa known as Ama (undigested material). These increased

Doshas also displace the Kosthagni from its Swathana then they combine with Ama along with Rasa Dhatu and circulate all over the body and produce Jwara. According to Acharya Charaka, the abnormal functioning of Jatharagni causes Ama formation which vitiates Rasagni. This generates Samavastha and vitiates Rasavaha Srotas and Svedavaha Srotas, blocks the Srotas (structural or functional channels) giving rise up to body temperature<sup>6</sup>.

The study of Pittoulbana Sannipata jwara is needed as the pathogenesis of Sannipata (conglomeration) condition is more complex and incurable. Because of its severity, Pittoulbana Sannipata Jwara has been considered for the present study. If some protocols can be established by this study, it can be useful for the prognosis as well as the diagnosis of the disease. For this purpose, Lakshana (sign and symptoms) of Pittoulbana Sannipataja Jwara are compared with symptoms of Typhoid fever and relation between Dhatugata Jwara and Widal titre has been seen with the advancement of the disease. According to Acharyas, as there is an advancement of a disease, there is a progression in the involvement of Dhatus which causes disease difficult to cure or even untreatable.

Owing to the gravity of the situation, the need is felt to establish early diagnostic parameters to diagnose the Pittoulbana Sannipataja jwara and Typhoid fever. The present study has been undertaken to clinically explore the relation of Dhatugata jwara Lakshana with the widal titre.

### Aims and objectives of the study

- To establish the co-relation of typhoid fever with Pittoulbana Sannipataja Jwara.
- To assess the Dhatu involvement based on widal test (in different titers).

### MATERIAL AND METHODS

#### Selection of Patients

Total 50 patients selected from OPD/IPD of Roga Nidana Department, Rishikul Campus UAU, Haridwar, having chief complaints described in Pittoulbana Sannipata jwara, were subjected to Widal Agglutination test. Patients with widal titre 1:80 or more (for either sex) after taking written consent were registered for the present study.

The study has been approved by the Institutional Ethics Committee (UAU/RC/IEC/2018-19/04) and is registered to CTRI (CTRI/2019/02/023823).

#### Type of Study

Clinical Observational study

#### Inclusion Criteria

- Patients having chief complaints of Pittoulbana Sannipataja Jwara.
- Typhi dot should be positive.
- Widal titre with 1:80 or more than 1:80.
- Patients between the age group of 16 to 70 years.

### Exclusion Criteria

- Negative typhi dot.
- Widal titre less than 1:80.
- Patients having Vishama Jwara such as Malaria, Dengue, Chikungunya etc. and other type of fevers.
- Known case of chronic heart diseases, kidney diseases, HTN, DM, severe infections.

### Investigations

- Serological tests like Widal test detect antibodies against *Salmonella typhi*, *Salmonella Para typhi A* and *B* and measurement of H and O agglutinins for *typhoid* and *paratyphoid bacilli* in the patient's sera.
- Typhi Dot test is based on the presence of specific IgM antibodies to a specific outer membrane protein antigen on *S. typhi* and becomes positive as early as in the first week of the fever.
- Other routine hematological tests such as hemoglobin estimation, total leucocyte count, differential leucocyte count and erythrocyte sedimentation rate to detect leukopenia and neutropenia with relative lymphocytosis important features of typhoid fever.
- Urine examination (R/M) (if required) – For detection of other causes of fever like UTI.

**Duration of Study:** 12 months.

#### Criteria for assessment

The assessment of the study was done based on number of the symptoms present out of the total number of symptoms in a particular Dhatugata Jwara Lakshana as described below:

**Table 1: Symptoms of Dhatugata Jwara**

S. No.	a) Rasagata Jwara	S. No.	d) Medagata Jwara
1.	Gaurava (Heaviness of body)	1.	Teevra sweda (Excessive sweating)
2.	Dainya (Miserable feeling, being humbled by the effect of disease)	2.	Pralap (Delirium)
3.	Udvega (Restlessness)	3.	Vamana (Frequent vomiting)
4.	Sadana (Malaise)	4.	Swagandhaya (Inability to tolerate the smell of own body)
5.	Arochaka (Anorexia)	5.	Glani (Lassitude)
6.	Bahistapa (Warm body and extremities, increase in external body temperature)	6.	Arochaka (Anorexia)
	<b>b) Raktagata Jwara</b>		<b>e) Asthigata Jwara</b>
1.	Raktaushna (Excessive warmth of blood -Pidaka pimples)	1.	Vireka and Vamana (Both diarrhea and vomiting)
2.	Rakta Sthivana (Frequent spitting of blood – hemoptysis)	2.	Asthibheda (Pain in the bones)
3.	Daha (Burning sensation)	3.	Prakujanam (Production of Kujana (cooing) sound)
4.	Raga (Redness)	4.	Gatra Vikshepa (Strong movement of the body and limbs)
5.	Bhrama (Giddiness)	5.	Shwasa (Difficulty in breathing)
6.	Mada (Intoxication)		<b>a) Majjagata jwara</b>
7.	Pralap (Irrelevant talk)	1.	Hikka (Hiccup)
	<b>c) Mamsagata Jwara</b>	2.	Shwasa (Difficulty in breathing)
1.	Antardaha (Burning sensation inside the body)	3.	Kasa (Cough)
2.	Trishna (Thirst)	4.	Tama darshan (Frequently entering into the darkness, blinding)
3.	Sammoha (Unconsciousness)	5.	Marmached (Pain in vital organs)
4.	Glani (Tiredness)	6.	Bahir shaityam (Cold extremities)
5.	Srushta Vitkata (Diarrhoea)	7.	Antardaha (Internal burning sensation)
6.	Daurgandhyam (Foul smell)		
7.	Gatra Vikshepa (Body shivering)		

**OBSERVATIONS****Demographic Profile**

Total of 50 patients were registered for the present study. It was found that the maximum number of patients, i.e. 54% belonged to the age group of 16–30 years, followed by 32% of patients to 31–45 years and 14% of patients belonged to 46–60 years of age group. Sex wise, the maximum patients, i.e. 54% were males while the rest of the patients, i.e. 46% were females. Religion wise maximum, i.e. 82% were Hindus followed by 18% of Muslims. On considering the nature of occupation, it was found that the maximum patients, i.e. 38% were students, 24% were

housewives, 18% and 6% were servicemen and businessmen respectively and 14% were labors and 24% were travelers. On considering Agni wise, a maximum of 62% of patients were having Mandagani (depressed state of Agni), 30% were having Vishamagni (irregular state of Agni) and 8% were having Samagni (normal state of Agni). Koshta wise maximum patients, i.e. 56% were having Mridu Koshta, 30% were having Krura Koshta and 14% of patients were found Madhyama Koshta. Considering the indulgence of dominant Rasa in diet, maximum patients, i.e. 80% were taking Amla Rasa. 80% and 60% were taking Lavana and Katu Rasa respectively, whereas Madhura Rasa dominancy was found in 50% of patients and Tikta Rasa dominancy in 20% of patients.

**Table 2: Dhatugata Jwara Lakshana Wise Distribution**

S. No.	Rasa Dhatugata	No. of patients	Percentage (%)
1.	Gaurava	40	80.0%
2.	Dainya	37	74.0%
3.	Udvega	38	76.0%
4.	Sadana	37	74.0%
5.	Chardi	27	54.0%
6.	Arochaka	40	80.0%
7.	Bahistapa	42	84.0%
8.	Angamarda	44	88.0%
9.	Jrimbha	38	76.0%
	<b>Rakta Dhatugata</b>	<b>No. of patients</b>	<b>Percentage (%)</b>
1.	Raktaushna	31	62.0%
2.	Raktaṣṭhivana	22	44.0%
3.	Daha	34	68.0%
4.	Raga	30	60.0%
5.	Bhrama	33	66.0%
6.	Mada	7	14.0%
7.	Pralap	21	42.0%
	<b>Mamsa Dhatugata</b>	<b>No. of patients</b>	<b>Percentage (%)</b>
1.	Antar Daha	20	40.0%
2.	Trishna	35	70.0%
3.	Sammoha	11	22.0%
4.	Glani	16	32.0%
5.	Srushta Vitkata	34	68.0%
6.	Daurgandhyam	04	8.0%
7.	Gatra Viksepa	6	12.0%
	<b>Medo</b>	<b>No. of patients</b>	<b>Percentage (%)</b>
1.	Teevra Sweda	10	20.0%
2.	Pralap	1	2.0%
3.	Vamana	20	40.0%
4.	Swagandhaya	4	8.0%
5.	Glani	16	32.0%
6.	Arochaka	40	80.0%
	<b>Asthi Dhatugata</b>	<b>No. of patients</b>	<b>Percentage (%)</b>
1.	Vireka and Vamana	16	32.0%
2.	Asthibheda	1	2.00%
3.	Prakujanam	0	00.0%
4.	Gatra Viksepa	5	10.0%
5.	Shwasa	8	16.0%
	<b>Majja Dhatugata</b>	<b>No. of patients</b>	<b>Percentage (%)</b>
1.	Hikka	0	00.0%
2.	Shwasa	8	16.0%
3.	Kasa	10	20.0%
4.	Tamadarshana	5	10.0%
5.	Marmached	5	10.0%
6.	Bahir shaityam	4	8.0%
7.	Antardaha	20	40.0%

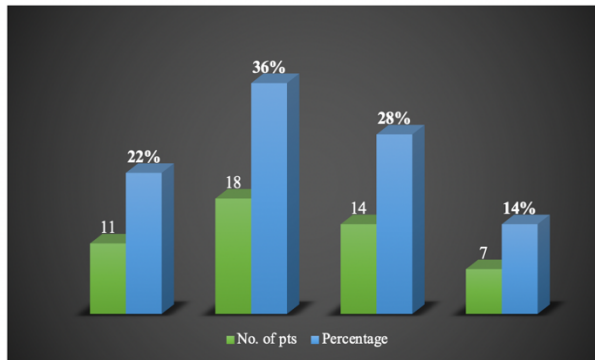


Figure 1: Antigen "O" Titre Wise Distribution

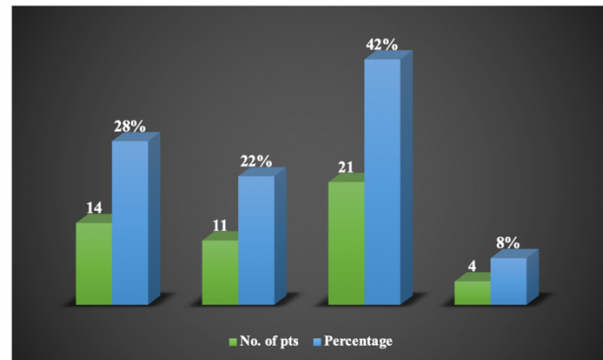


Figure 2: Antigen "H" Titre Wise Distribution

**Statistical analysis**

Karl Pearson correlation method was used to check correlation between two parameters and the obtained results were interpreted as –

- Strongly positive –  $r = > 0.8 - 1$
- Moderately positive –  $r = > 0.3 - 0.8$
- Weakly positive -  $r = 0 - 0.3$
- Strongly negative -  $r = > -0.8$  to -1
- Moderately negative -  $r = > -0.3$  to -0.8

- Weakly negative -  $r = 0$  to -0.3

In present study to make calculations easy and without manual errors, Sigma Stat software for Windows, version 3.1 was used.

**RESULT**

According to the presence of symptoms of Pittoulbana Sannipataja Jwara, it was found that 90% of patients were having Agnidaurbalyata, 80% were having Aruchi. 70% of patients were having Trishna, 68% of patients were having Verchobheda, 68% of patients were having Daha and 66% were having Bhrama.

**Table 3: Assessment of Dhatugata Jwara Lakshana with "O" Titre**

S. No.	Dhatu and titre	Sample size	p*	r*	Correlation
1.	Rasagata jwara Lakshana	50	0.000	0.6	Moderate positive
2.	Raktagata Lakshana	50	0.000	0.6	Moderate positive
3.	Mamsagata Lakshana	50	0.000	0.3	Weakly positive
4.	Medagata Lakshana	50	0.05	0.2	No relation
5.	Asthigata Lakshana	50	-0.016	0.9	No relation
6.	Majjagata Lakshana	50	0.14	0.32	No relation

r\* - Karl Pearson correlation coefficient, p\* - Probability  
 p\* < 0.050 – significant relation, = > 0.050 – no significant relation

**Table 4: Assessment of Dhatugata Jwara Lakshana with "H" Titre**

S. No.	Dhatu and titre	Sample size	p*	r*	Correlation
1	Rasagata jwara Lakshana	50	0.000	0.5	Moderate positive
2	Raktagata Lakshana	50	0.000	0.5	Moderate positive
3	Mamsagata Lakshana	50	0.000	0.4	Moderate positive
4	Medagata Lakshana	50	0.009	0.3	No relation
5	Asthigata Lakshana	50	0.06	0.25	No relation
6	Majjagata Lakshana	50	0.07	0.6	No relation

r\* - Karl Pearson correlation coefficient, p\* - Probability  
 p\* < 0.050 – significant relation, = > 0.050 – no significant relation

**DISCUSSION**

Jwara roga is a Rasa Pradoshaja vyadhi in which there is disturbance in the Jatharagni<sup>7</sup>, the digestive and absorptive fire in the body due to which Dhatus formation not occur properly and get vitiated. All the metabolic transformations in the body are controlled by the Pitta Dosha (responsible for regulating body temperature and metabolic activities). The deranged Agni (digestive/metabolic factors) causes the production of Ama (undigested materials) that blocks the Srotas (structural or functional channels) due to which Rasa Dhatu (primary product of digested food) becomes vitiated and subsequently other Dhatus (major structural components of the body) in the same way as Dhatu Poshana (nutrients supplement) has occurred in the body

and causes the production of Jwara. In Jwara, activity of Pachaka Pitta which is situated in between the Amashaya and Pakwashaya divides the food into Sara and Kitta becomes Manda but the activity of Dhatwagni (this transforms one dhatu into another namely Rasagni etc.) increases. According to Acharya Vagbhata, whenever there is an increase in Dhatwagni then there is a diminution of Dhatus or vice versa.

In the present study, it was found that maximum, i.e. 82% symptoms were of Rasagata Jwara followed by Raktagata and subsequently Mamsadi Dhatugata. It shows there is an involvement of Dhatu in a progressive manner but symptoms involvement of a particular Dhatu reduced subsequently, it could be due to the registered patients were not so chronic which causes

consequence on the deeper Dhatus and also due to the lack of facilities the patients with Shukragata Jwara Lakshana were excluded for the study. It was found that titres had a significant and direct correlation with the rate of Dhatugata Jwara lakshanas, i.e. Rasagata Jwara, Raktagata Jwara and Mamsagata Jwara. The result also indicates a direct correlation between titres and rate of involvement of Medagata, Asthigata and Majjagata Jwara lakshanas, but it is not statistically significant. As titer depends on the stage of the disease, antibodies production increases up to 3<sup>rd</sup>-4<sup>th</sup> week<sup>8</sup>. That means with the increasing level of titres, the rate of involvement of Rasa (primary product of digested food), Rakta (blood tissue) and Mamsadi (muscle tissue) Dhatu increases with the advancement of the disease.

When Dasha-Dushya-Samurchana of disease invades the Dhatus, it is known as Dhatugatvasta. This condition can happen in any disease and the severity of symptoms is greater when dhatus like Asthi (bone tissue), Majja (bone marrow tissue) and Shukra (reproductive fluid) are involved. Dhatugatvasta in deeper dhatus like Asthi, Majja and Shukra is Asadhya (incurable disease). According to Acharya Charaka, Jirnavastha occurs due to the weakness of Dhatus and described the concept of Jirna Jwara in Chikitsa sthana<sup>9</sup>. Pittoulbana Sannipataja is also a type of Jirna Jwara as after 3 weeks Nava Jwara becomes Jirna Jwara which is Yapya (incurable but manageable disease) and Krichasadhya (disease curable with difficulty).

The superlative treatment of any disease depends on the diagnosis and prognosis of the disease. The timely diagnosis is necessary; if interventions are given early, then the chronicity of the disease can be prevented. In chronic diseases, the Dhatus are depleted due to Dhatu paka which is an advanced stage along with loss of strength and elimination of dhatus through Mutradi excreta<sup>10</sup>. If this destruction is progressive, the condition of the patient becomes incurable. The Dhatu assessment is necessary in Pittoulbana Sannipataja Jwara as Acharya Charaka has mentioned that Rasagata, Raktagata, Mamsagata Jwara as Sukha Sadhya (easily curable disease), Medagata and Asthigata Jwara as Krichasadhya and Shukragata Jwara as Asadhya<sup>11</sup>. If the patient is diagnosed with first dhatu involved or first stage of a disease without wasting time in investigations, then early management can be done by seeing the patient's Dhatugata Jwara Lakshana. Thus, with the chronicity there is progressive involvement of Dhatus or Doshas penetrate the gambhir dhatu and causes disease to become incurable, which is demonstrated in the present study. Various modern investigations are employed to diagnose the disease, but still there are many loopholes in respect of false positives and false negatives. There are no parameters for the assessment of the severity of disease, in Ayurveda for which progressive Dhatugata involvement assessment can be a ray of hope.

## CONCLUSION

The present study was a preliminary effort to assess the dhatu as a prognostic tool in the patients of Pittoulbana Sannipataja Jwara. Based on Dhatugata Lakshana and Widal titre, it was found that this procedure can be exploited as a diagnostic and prognostic tool. In the patients of Pittoulbana Sannipataja Jwara, it has been found that with the increase in titres, there is progressive involvement of furthermore dhatus with chronicity of the disease. So, we can conclude that with the increase in the chronicity of the

disease the severity of Pittoulbana Sannipataja Jwara and symptoms involvement of Dhatugata Jwara increases with increasing widal titres.

Since this is the first attempt to show the assessment of Dhatu involvement and study has shown interesting results, it is recommended that the study should be carried out in many patients to evaluate and analyze the results. Due to the time-bound study and limited facilities, it was not easy to assess chronic patients. So, chronic patients of Typhoid fever should be assessed to evaluate the involvement of deeper Dhatus.

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