A review article in the role of liver function test in Annavahasrotas Vyadhi (Ajirna & Amlapitta)

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ABSTRACT

A person's diet and food patterns play a significant role in their overall health and well-being. Unhealthy food patterns can contribute to the development of various lifestyle disorders and chronic diseases. In current modern scenario we see a large proportion of population is affected by Gastric disorders. Unhealthy and incompatible foods, drinks, unhygienic lifestyle lead to disturbance in Agni and GI functions in human, and also harming the most powerful organ which is also seat of Agni i.e., Yakrit. Liver perform and govern majority of metabolic activities but when it get damages the Bhutagni Paak Kriya’s disturbance leads to disrupted state of Agni, then two main disorder related to Annavahasrotas Vyadhi mentioned i.e., Ajirna and Amlapitta occurs. Acharya Sushrut has stated Pitta and Agni are same as the Karma and features of Pitta and Agni are equivalent hence in Ajirna and Amlapitta disease we can see sign of hepatic damage in Liver Biomarkers (LFT).

Key words: Ajirna, Amlapitta, Annavasrotas Vyadhi, Yakrit, Agni, Liver Function Test

INTRODUCTION

Fast-track life style has made man restless to achieve his unlimited desires in a very short period of time. These desires produce different types of anxiety, worry, anger, fear and depression which directly or indirectly lead to various types of gastrointestinal tract disorders. In short, we can say that Hurry, Worry & Weather are the main causes of GI disorders. Thus, this type of pattern may also lead to the development of the disease Annavahasrotas like Ajirna, Amlapitta, Agnimandya etc.

Annavaha Srotas is the channel for transportation, digestion and absorption of food. Its Mool are Amashaya, Vamparshwa as per Charak[¹] and Amashaya-Annavahini Dhamani as per Sushruta.[²] Agnimandya is a condition in which food is not digested properly due to diminished power of Jatharagni. Any vikriti i.e. disturbed functioning of the Agni is prime cause of pathogenesis of any disease.[³]

Normally whatever type of food consumed, is firstly acted upon by Jatharagni in the gastro-intestinal tract (Ch. Chi 15/5), there upon it is transported to the liver for Bhutagni Paka and thereafter the product of nutrition is processed in the tissues by the Dhatavagni.

Dushti Lakshan[⁴]

Not willing to take food, diminished desired towards food, unable to digest the food, nausea and vomiting...
Concept of Agni and Pitta

The origin of Pitta is derived from "Tapas," which refers to processes of digestion and combustion, providing nourishment and maintaining the body's heat, color, and luster. There have been varying opinions among different scholars regarding the relationship between Pitta and Agni. Some believe that Pitta is Agni, while others hold different views.

According to Acharya Sushruta, there is no Agni in the body without Pitta. Acharya Marichi also emphasizes that the quality of Agni, whether it is normal or deranged, depends on the state of Pitta.

Chakrapani explains that the role of Pitta in the body is not actual combustion but rather providing the heat for Agni. Additionally, Acharya Sushruta describes five types of Agni as different manifestations of Pitta. Acharya Bhoj also considers Pitta as Agni, including the digestive fire responsible for various enzymatic activities such as digestion, stimulation, and penetration.

Hemadri describes Pitta as having five divisions located within the Pakvashaya and Amashoya, composed of the five elements. It lacks liquidity despite being a liquid due to the predominance of the Tejas element. It is referred to as "Anala" because of its cooking function, dividing food into essence and waste. It supports other Pitta and Dhatvagni in the body, providing them with strength and is known as "Pachaka Pitta".

While there are examples in ancient texts that suggest Pitta and Agni are synonymous, certain doubts arise regarding this concept. For instance, aggravating factors such as pungent and heating substances are known to weaken Agni instead of strengthening it. Another example is Ghrita, which pacifies Pitta but enhances Agni. Additionally, the quote from Acharya Sushruta, "Samadoshah Samagnishcha" clearly indicates that Pitta and Agni are not the same.

Agni is responsible for breaking down the food into its constituent elements and transforming them into the body's tissues and energy. When Agni is strong, it can digest food efficiently and produce high-quality nutrients that nourish the body. When Agni is weak, improper digestion of Ahara leads to formation of Ama in the body, which can cause a variety of health problems.

According to Acharya Sushruta, five types of Agnis are illustrated, viz. Pachakagni, Ranjakagni, Alochakagni, Sadhakagni and Bhrjakagni. However, there is an indirect reference of five Bhutagnis underlying in the brief description made to the transformation of food stuff. (Sh.Su.21/10.)

Vaghbata has described different types Agni, viz. – Bhutagnis-5, Dhatvagnis-7, Dhoshagni-3 and Malagni-3.

Sharangadhara has recognized five pittas only (Pachak, Bhrjak, Ranjak, Alochaka and Sadhak) (Sha.Sa.Pu.Kh.-5/32).

Bhavamishra has followed Acharya Charaka and Vaghbata (Bh.Pu.Kh.-3/169,180).

Types of Agni include (Total 13): (Ch.Chi.15/38).

Jatharagni - This is the digestive fire located in the stomach and small intestine.

Bhutagni - This is the fire responsible for transforming the five elements (Panch Mahabhut) into the body's tissues.

Dhatvagni - This is the fire responsible for transforming the tissues into the body's energy.

Ajrina (Indigestion)

Ajrina is a disease which is caused by Agnimandya. Which indirectly related to Agni of Pittadhara Kala. According to Ayurveda, Agni is considered as the key factor for digestion and it is responsible for good health of an individual.

Nidana

Profuse drinking (Atyaambupaan), inappropriate food intake, over eating, too fast or slow eating, devoid of natural urges (Veg Dharan) irregular food timing, untimely sleeping pattern (Swapnviparyay), psychological factors i.e., emotional disturbance, fear,
anxiety, and stress also causes disturbances in Digestion.

Roopa/Lakshan\textsuperscript{[7]}

Lakshan or Rupa of Ajirna shows variety of symptoms which includes heaviness, lethargy, nausea, delusion, backpain, body ache, excessive thirsts fever, vomiting, tenesmus, indigestion, anorexia, tastelessness and is like poison.

Samprapti\textsuperscript{[8]}

Samprapti (Pathogenesis) – Due to excessive usage of the above factors the power of Agni or digestive fire becomes very weak, hence it cannot digest the food properly even in a very small amount. In this disorder, Pachakapitta, Samanvata, and Kledak Kapha are vitiated mostly. Vitiation of Tridosha specially Kapha dominating.

Intake of Aaharaj, Viharaja, Mansika, Agantuj Nidan ↓

Vitiation of Tridosha specially Kapha is dominating ↓

Impairs Jathragni ↓

Agnimandya (digestive Insufficiency) ↓

Ajirna (Indigestion)

Samprapti Ghataka

- Dosha - Samanvata, Pachaka Pitta.
- Dushya (Pachakagni, Rasa) - Rasadhatu.
- Adhisthana - Amashya, Grahani.
- Srotas (Annavaha) - The disease involved Amashya, Grahani, and Pakwashaya, Srotas seem to be mainly concerned but Rasavaha Srotas which is the first Ama produced due to Agni may get involved.
- Vyadhi - Amashayothana.
- Dushtiparakara - Sanga

- Agni - Mandagni
- Marga - Abhyantara

Bheda\textsuperscript{[9]}

- Vishtabdha Ajirna - causes due to vitiation of Vata Dosha. It is characterized by pain in abdomen, pain all over the body, fatigue, non-elimination of stools and flatus.
- Vidagdha Ajirna - caused due to vitiation of Pitta Dosha. It causes burning sensation, different kinds of pain, increased feeling of thirst, tiredness, fainting and giddiness.
- Ama Ajirna - cause due to vitiation of Kapha Dosha. The feature of this are puffines around the eyes and face, frothy and increased salivation in the mouth, nausea, repeated belching.
- Rasa Sesa Ajirna - This is caused due to heavy and excess quantity of taken food, most of the part is digested and some part of food still remain undigested which causes belching, heaviness in chest, salivation.
- Dinpaki Ajirna\textsuperscript{[10]} - According to Vijayrakshita, In Dinpaki Ajirna digestion completes within one day and one night. This due to overages of quantity and timings of food and waiting alone is required for such condition and its not harmful.
- Prakrita Ajirna\textsuperscript{[10]} - According to Vijayrakshita, Prakrita Ajirna prevails till the consumed food is completely digested. After the completion of digestion it manifest symptoms like hunger, thirst, defecation, etc. Clinical features of Ama like tympanitis are not seen.

Amlapitta

Definition & Etymology of Amlapitta\textsuperscript{[11]}

The word Vidaha means half digested. The pitta which attains excessive Amlata because of Vidagdha Paka is called Amlapitta.

‘Amlapitta’ is a combination of two words Amla and Pitta. Among these two words the word Amla denotes
the Rasa (Sour taste) and the Pitta denotes the Dosha involved in this disease.

Amla according to Charaka is considered as the Prakruta Rasa of Pitta whereas Acharya Sushruta says that Katu is the Prakruta Rasa of the Pitta and it attains Amlata in VIdagdhavastha. The condition where the natural Katu Rasa of Pitta is replaced by Amlata due to VIdagdhapaka can be called Amlapitta.

Nidana[12]

Excessive intake of unhealthy, spicy, hot and sour junk food, new grains, untimely food, intake of alcohol, suppression of urges, oily food psychosomatic disorders delayed sleeping disturbs digestion and results in aggravation of Pitta. This increase in pitta turns in to Amlapitta Vyadhi.

Purvaroopa

In ancient Ayurvedic texts, no specific Purvarupas are given for Amlapitta. But while going through the patient’s history, Ajirna is the common symptom reported before the actual symptom (i.e., Rupa). In Ajirna, Amla and Drava Guna of Pitta are increased. In this stage if the patient continues the Nidana Sevana, it leads to production of Annavisha which when mixed with vitiated Pitta Dosha, creates Amlapitta.

So, the symptoms - Ajirna & Annavisha can be described as Purvarupas of Amlapitta.

Roopa[13]

Indigestion, fatigue, nausea, sour belching, heaviness, burning sensation in throat and chest, tastelessness, burning sensation in body are the symptoms of aggravated Pitta due to Nidan Sevana showing the cardinal features of Amlapitta Vyadhi.

Samprapti[14]

According to Acharya Kashyapa, the Nidana Sevana causes Doshsaprakapa especially Pitta Dosh. This eventually creates Mandagni due to which ingested food become Vidagdha form and attains Shuktibhava). This Vidagdha and Shuktibhava of food creates Amlata in Amashaya. This condition is called Amlapitta (K.S.16/10-12).

Nidan Sevana

↓

Doshdushti specially pitta

↓

Mandagani Rasa dhatudushti

↓

Ajirna (if apathy is taken continuously)

↓

Annavisha (Vidagdha and attains shukti bhava)

↓

Increased Amla and Dravaguna of Pitta in Amashaya

↓

Amlapitta

Samprapti Ghataka

<table>
<thead>
<tr>
<th>Dosha: Tridosa (mainly Pitta)</th>
<th>Dushya: Rasa, Rakta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Srotasa: Annavaha</td>
<td>Agni: Jatharagni</td>
</tr>
<tr>
<td>Ama: Jatharagnimandhyajanya</td>
<td>Udbhavasthano: Amashaya</td>
</tr>
<tr>
<td>Adhisthana: Adhoamashaya</td>
<td>Sanchara: Annavaha</td>
</tr>
<tr>
<td>Swabhava: Chirkari</td>
<td>Pradhanta: Pitta Doshapradhana</td>
</tr>
</tbody>
</table>

Bheda

Amlapitta is classified according to the Dosha Sansarga and Sthanadusti of the Srotasa. Bhavamishra has classified according to the Sthanadusti of the Srotasa.

(A) According to the Dosha Sansarga

Kashyapa Samhita: Vataja, Madhava Nidana: Vatadhikya

Pittaja Kaphadhikya

Kaphaja Vata - Kaphadhikya

Shleshma - Pittaja

(B) According to the Sthanadusti of the Srotasa

Madhava Nidana Urdbhvaga
Bhavaprakasha Adhoga

Sadhyasadhyata[15]

1. According to Acharya Madhava Nidana, Amlapitta with recent origin is Sadhya but in chronic stage it becomes Yapa or Krichhasadhyā.

2. According to Acharya Kashyapa, Amlapitta becomes Asadhya (incurable) when its associated with Upadrava.

Sapeksha Nidana

The symptoms of Amlapitta are similar to that of other diseases like Vidagadhajirna, Paittika Shoola and Grahani, etc. So, it is difficult to differentiate Amlapitta from other diseases. Some features of differentiating Amlapitta from other diseases are as follows:

<table>
<thead>
<tr>
<th>Vidagadhajirna</th>
<th>Amlapitta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute stage</td>
<td>Chronic stage</td>
</tr>
<tr>
<td>Mostly aggravated in Pachana Kala</td>
<td>No relation with food ingestion</td>
</tr>
<tr>
<td>Symptoms subsides in Jirna Kala</td>
<td>It is not necessary</td>
</tr>
<tr>
<td>Relieves by Pachana drugs</td>
<td>Aggravated by Pachana drugs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paittika Shoola</th>
<th>Amlapitta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain is severe</td>
<td>Pain is mostly absent or of mild nature</td>
</tr>
<tr>
<td>Relieved by administration of food</td>
<td>Not necessary</td>
</tr>
<tr>
<td>Aggravated in Paittika Kala</td>
<td>Bhojanottara</td>
</tr>
</tbody>
</table>

Liver Function Test[16]

As we all know the liver function test in short LFT is basis of diagnosing the function of liver by evaluating various physiological and biochemical biomarker in number of pathological conditions such as Jaundice, liver cirrhosis, hepatitis, heart disease.

Alkaline Phosphatase (ALP) high levels of ALP are seen in patients with Bile duct obstruction, Hepatitis, Cirrhosis, Liver cancer, Bone diseases.

Alanine Aminotransferase (ALT) is also known as serum glutamate-pyruvate transaminase (SGPT) Very high levels of ALT are seen in patients with acute hepatitis, moderately high levels of ALT are seen in patients with Chronic hepatitis, Blocked bile ducts, Cirrhosis, Liver cancer.

Aspartate Aminotransferase (AST) is also known as serum glutamic oxaloacetic transaminase (SGOT) High levels of AST are seen in patients with liver and muscle damage, However AST is not specific for liver damage and is measured along with ALT to diagnose a suspected liver disease.

Serum Proteins

Albumin is the main protein synthesized, Low levels of albumin indicates that liver is not functioning properly and can be seen in patients with Cirrhosis Chronic Hepatitis, Poor nutrition, Kidney disease, Infections.

Bilirubin - High levels of bilirubin are seen in patients with:
- Hepatitis.
- Liver cirrhosis.
- Bile duct obstruction.
- Gallbladder cancer.
- Gallstones.
- Genetic diseases like Gilbert’s syndrome.

Gamma Glutamyl Transferase (GGT).

Coagulation Profile

Prothrombin Time (PT)

Classification of Liver Function Tests

1. Tests that assess excretory function of the liver: Bilirubin in serum and urine, and urobilinogen in urine and faeces.

2. Tests that assess synthetic and metabolic functions of the liver: Serum proteins, serum albumin, serum albumin/globulin (A/G) ratio, prothrombin time (PT), and blood ammonia level.

3. Tests that assess hepatic injury (liver enzyme studies): Serum alanine aminotransferase (ALT),
serum aspartate aminotransferase (AST), serum alkaline phosphatase, serum γ-glutamyl transferase (GGT), and 5’-nucleotidase (5’-NT).

4. Tests that assess clearance of exogenous substances by the liver: Bromosulphthalein excretion test.

Symptoms due to raised LFT markers[17]

- Nausea and vomiting.
- Right upper abdominal pain.
- Diarrhoea (may have pale stools and dark urine).
- Steatorrhoea.
- Malaise.
- Flatulence.
- Indigestion.
- Jaundice.
- Fever.

MATERIALS AND METHODS

Sources of data

Literary review about disease Ajirna and Amlapitta is collected from classical text of Ayurveda, thesis of previous research, scientific journals, periodical magazines, monographs & other available sources.

Subjective Criteria

1. On the basis of etiological factors.
2. On the basis of sign and symptoms.

<table>
<thead>
<tr>
<th>SN</th>
<th>Ayurveda features of Ajirna / Amlapitta</th>
<th>Modern feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vibandho Atipravrutti</td>
<td>Constipation or Excessive elimination of faeces.</td>
</tr>
<tr>
<td>2.</td>
<td>Glanimaruta Moodhata</td>
<td>Exhaustion, Deviation of vata from its normal path</td>
</tr>
<tr>
<td>3.</td>
<td>Vistambho Gaurava Bhrama</td>
<td>Abdominal distension, heaviness and vertigo.</td>
</tr>
</tbody>
</table>

DISCUSSION

From the point of view of Ayurveda (Ch.Su.12/11), Pitta has been described as Agni (fire), since it performs fire-like actions i.e., Pako, which refers to Pachana (digestion); Dahana (burning, combustion or oxidation) including Bhinna Samghata (splitting), Tapan (heat production), Parninama (conversion), Paravritt (transformation), Prakasana (illumination), Ranjana or Vranakara (colouration) and (Prabhakar to cause lustre).[18]

Acharya Sushruta has mentioned in its text Sutrasthan.[19] The question if Pitta and Agni are identical or different has been raised and answered by Susruta in the 21st chapter of Sutrasthana. And is stated that Pitta is the same as Agni, since it performs Dahana, Pachana and similar actions performed by the fire, hence Pitta is known as Antaragni and also by evaluating Ayurvedic texts the composition (colour, consistency, taste and smell such as Shukla-Arunavarja or Panduvivarjita, Anadhika Sneah, Katu and Amla Visragandha, Vaigandhya and Putigandhya, Nila and Pita etc.) and features of Pitta is more familiar to the biliary secretions and also the site of these secretions are same i.e. in between Amashaya and Pakwashaya.
And whenever there’s imbalances occur due to any factor, we get variety of symptoms like flatulence, belching, impaired digestion, infrequent bowel evacuation etc. which is same as the Annavahasrotas Dushti Lakshana.

CONCLUSION

In our classical text it is clearly written as Pitta or Agni are most similar to each other and also by evaluating the literatures we found that the quality of pitta produce is very much linked to hepatic secretions in Grahini and also Pitta produced which is the part of which ultimately works on Ahara coming from Amashaya. Nearly all types of major metabolism or Bhutagni Paak which is happening in our body is govern by Yakrit itself, so whenever any type of hepatic pathology which can be of any source whether from bacteria, viral drug induced etc. it hampers the metabolism subsequently by decreasing Bhutagni Paak Kriya which ultimately leads to depreciation in all the metabolic activities related to digestion hence the quality of Pitta it produced is also get deprived therefore we see variety of Lakshan of Ajirna and Amlapitta.

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