Critical Analysis of *Yakrit Vikaras* with special reference to Contemporary Science

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**ABSTRACT**

*Yakrit* is considered as one of the *koshtanga* in human body. *Yakrit* is the *moolasthana* of *raktavaha srotas* which maintains the quality as well as quantity of *rakta*. *Raktadhatu* is formed in *yakrit* by the action of *ranjakapitta* on *rasa dhatu*. Liver being a multiple functioning organ in our body does the function of digestion, metabolism, regulation, detoxification, storage, synthesis and excretion. There is no description of *Yakrit vikaras* (liver disorders) as a separate entity in Ayurvedic classics only Bhavaprakasha mentioned it as a separate chapter. Descriptions are available in brihatrayis which explains the involvement of *Yakrit* in several disease conditions such as *Pittaja Pandu*, *Kamala* and its types, *Yakritdora*, *Yakrit vidradhi*, *Raktapitta*, *Madatyaya* and *Jwara*, *yakrit* or *kalakhanda* gets affected.

**KEYWORDS**

*Yakrit Vikaras*, *Kamala*, Jaundice
INTRODUCTION

Yakrit along with Pleeha are the seats of raktavaha srotas. They are the abodes of metabolism of rakta dhatu. Rasa is derived from the annavaha srotas as the end nutrient product of digestion. This initial ahara rasa is carried into the liver, where it gets admixed with rakta dhatu and becomes a homogenous liquid dhatu. This admixture of ahara rasa and rakta dhatu is facilitated by the ranjaka pitta. From here on the activity of dhatvagni begins. This initial rasa dhatu admixed with rakta dhatu is progressively transformed into different dhatus by the action of dhatvagni. All these activity of dhatvagnis is referred as dhatu parampara. Rakta dhatu by the action of raktagni is differentiated into 3 portions. Major portion becomes rakta dhatu, minor portion becomes mamsa dhatu and the third portion of this activity is mala pitta. This mala pitta is yellow in colour and is transported into the koshta from the raktavaha srotas which in turn imparts yellow color to the fecal matter. The nutrients absorbed from the gastrointestinal tract are taken into the liver and detoxified. Liver is responsible for protein metabolism, excretion of bilirubin and also synthesizes different components of the blood that include amino acids, albumin, prothrombin, fibrinogen, coagulation factors and thrombopoietin. All these activities can be attributed to ranjaka pitta. The levels of serum proteins, prothrombin time, SGOT and SGPT are the indicators of normal functioning of ranjaka pitta. The decomposition of the RBC and the production of the bile may be attributed to the activity of raktagni. So the normal values of serum bilrubin are indicators of normal functioning of raktagni. The stercobilinogen in the gastrointestinal tract derived from the bilirubin that imparts color to the stools may be termed as mala ranjaka pitta.

Yakrit is considered as one of the major organ that performs all major metabolic functions and the disturbance of which may result in many Yakrit vikaras. Constant and excessive use of pitta prakopa nidanas results in altered functions of Yakrit. Yakrit vikaras (Liver disorders) are comprehensively elaborated in samhitas where there is structural and physiological integrity of the liver is affected. The diseases include Pittaja Pandu, Kamala and its types, Yakritidora, Yakrit vidradhi, Raktapitta, Madatyaya and Pittaja Jwara.

KAMALA:

The word Kamala consists of two words, Ka=Kaya (body) +Mala=toxins which combines to form Kamala. As a whole it signifies accumulation of toxins in the body. In Charaka chikitsasthana Pandu
chikitsa adhyaya explains that a person suffering from pitta pradhana Pandu roga consumes pitta prakopa ahara and vihara, the vitiated pitta burns rakta and mamsa leading to Kamala. In Ayurveda Kamala is a disease condition which closely resembles the clinical manifestation of jaundice due to excess aggravation of Pitta. According to Sushruta Kamala is a synonym of Pandu and according to Charaka Kamala is a complication of Pandu. Two variants of Kamala are explained on the basis of pathogenesis and clinical presentation. They are Koshtashakhasrita and Shakhasrita Kamala. Koshtashakhasrita Kamala is bahupitta Kamala and shakhasrita kamala is alpapitta kamala because of Kapha pradhana dosha and ashayyapakarsha of normal pitta. (Table 1)

<table>
<thead>
<tr>
<th>Table 1 Classification of Kamala</th>
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<tbody>
<tr>
<td>Charaka</td>
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<tr>
<td>Koshtasritha Kamala (Hepatocellular Jaundice)</td>
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<tr>
<td>Shakhaasritha Kamala (Obstructive Jaundice)</td>
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**Paratrantra Koshtashakhasrita Kamala (Prehepatic/Hemolytic jaundice):**
Indulgence of etiological factors that causes morbidity of pitta dosha by a patient suffering from pandu roga leads to the manifestation of paratrantra kamala. There will be morbid rakta and pitta within the yakrit and abnormality of raktagni leads to excess generation of mala pitta. Excess accumulation of mala pitta in the shakha is clinically characterized by jaundice and excess accumulation of mala pitta in koshta is characterized by the discoloration of the stools. Involvement of ranjaka pitta is indicated by the reduced hemoglobin in the blood and morbid raktagni is indicated by increased unconjugated hyperbilirubinemia in the blood.

**Svatantra Koshtashakhasrita Kamala (Hepatic/ Hepatocellular jaundice):** The second variety of Kamala is characterised by excess production of mala pitta. This belongs to the category of bahu pitta Kamala as morbid pitta is present both in koshta and shakha. Altered functioning of raktagni can be identified by increased levels of conjugated and unconjugated bilirubin associated with marked elevation of liver enzymes (SGOT, SGPT). It will be clinically characterized by yellowish discoloration of eyes, skin, nails and face of the patient, burning sensation, indigestion, weakness and anorexia.
**Shakhasrita Kamala (Post hepatic/Obstructive/Cholestatic Jaundice):** This type of Kamala is characterized by impaired excretion of *mala pitta* into the *Koshta*. *Mala pitta* continue to form normally due to the action of *raktagni* but the clearance of *mala pitta* is affected thus it gets accumulated in *shakha* and manifests as Shakhashrita Kamala. Since *mala pitta* is not reaching *Koshta*, *Malaranjana* is not taking place properly resulting in SwetaVarchas (Clay colored stools). Altered functioning of *raktagni* can be identified by increased conjugated bilirubin levels and obstruction to the clearance of *mala pitta* can be diagnosed by the increased levels of alkaline phosphatase.

**Kumbha Kamala (Portal Hypertension):**

*Kumbha* means *Koshta*. This type of Kamala occurs as a complication of Svantantra Kamala. When Kamala persists for a long time then it will result in Kumbha Kamala. Since *mala pitta* is not reaching *Koshta*, *Malaranjana* is not taking place properly resulting in SwetaVarchas (Clay colored stools). Altered functioning of *raktagni* can be identified by increased conjugated bilirubin levels and obstruction to the clearance of *mala pitta* can be diagnosed by the increased levels of alkaline phosphatase.

**Halimaka (Hyperbiliverdinemia):** It is also called *lagharaka* and *alasa* according to Sushruta. In this variety of Kamala, *Vatapitta* dominant lakshanas are seen. There will be symptoms like *mridu jwara* (febrile illness), *bhrama* (dizziness), *trishna* (morbid thirst), *bhrama* (drowsiness) and *angamarda* (debility). The color of the *mala pitta* will change from yellowish to blackish green due to addition of morbid *vata dosha*. Hyperbiliverdinemia (HBLVD) is a clinical sign seen in conditions like Liver cirrhosis or hepatocellular carcinoma. The impairment of bilirubin/biliverdin pathway may result in green jaundice and a green discoloration of body fluids.

**Pittaja Pandu (Hyperbilirubinemia due to shunt bilirubin):** *Rasa* is formed into *rakta* in *Yakrut* by the action of *ranjaka pitta*. The production of *rakta dhatu* itself is affected due to poor conversion of *rasa* into *rakta* due to the impairment of *ranjaka pitta* resulting in *pandu varna*. Further the *rakta dhatwagni* when abnormally increased results in more production of *pitta mala* which is yellow in color. This *mala pitta* is taken into *hridaya* and is circulated all over the body. Further this *pitta mala* is from a combination of increased flow into the portal circulation and/or increased resistance to portal blood flow. This can be diagnosed by abdominal USG.
deposited in the eyes, nails and skin manifesting as *pittaja pandu*. There will be symptoms like *jwara* (fever), *daha* (burning sensation), *murcha* (fainting), *trishna* (thirst), *amlaudgara* (sour erec-tations), *vitbhedha* (diarrhea), *dourbalya* (weakness). The pathophysiology of *pittaja pandu* is similar to the hyperbilirubinemia due to shunt bilirubin. Primary shunt hyperbilirubinemia (PSHB) is characterized by increased levels of unconjugated bilirubin associated with ineffective erythropoiesis and a hyperplastic bone marrow. In certain forms of anemia like sideroblastic anemia, megaloblastic anemia the pathology is characterized by presence of immature and defective red blood cells.

**Yakritodara:** *Yakritodara* is one among the eight types of *udara* where there is direct involvement of the organ has been mentioned, etiopathogenesis of *yakritodara* and *plihodara* are similar except the anatomical location. It is classified into five types as *vataja*, *pittaja*, *kaphaja*, *sannipataja* and *raktaja* and again based on the etiopathogenesis it is classified into *chyuta* and *achyuta yakrut vriddhi*. One by *chyuta* (displacement) and other by *achyuta vriddhi* (not displaced). *Chyuti* means displacement from its own place. In *achyuta* type, *dusta rasadi dhatu* is considered in the pathogenesis of *yakrutodara*.

**Yakrt vrudi/udara by Sthanachyuti:**

**Hepatoptosis (Wandering liver)**

*Atisankshobhadi* (Activities like travelling or heavy exercises that involve violent jerk movements of the body) results in *abhighata* (external injury) to *shareera* and if it happens to *udara pradesha* (abdominal region), there is a possibility of *sthanat chyuti* of *yakrut* (structural displacement of Liver). Because of the *agantu hetu*, *vyadhi* develops all of a sudden and simultaneously *dosha kopa* develops. *Abhigata* (external injury), *atisankshobha* (excessive irritating food) etc results in vata prakopa. *Sramsana* is one of the vata prakopa lakshana. *Sramsana* refers to *sthanat cyuti*(prolapse/dislocation).

**Yakrit vrudi/udara by Vyadhikarshanjanya (Sthanatachyuta):**

**Hepatomegaly**

*Yakrut vruddhi/udara* may also occur by *sonitha vruddhi*. When vikruta *sonitha vruddhi* takes place it is likely to vitiate the *moola-yakrut/pleeha*. The *dusta sonitha vruddhi* takes place because of *raktadustikara hetu* and *dusti* of other srotas. In the *samprapti* of *achyuta yakrut vriddhi* it is clearly mentioned *rasa* and *raktavaha sroto dusti* results in *rakta vruddhi* there by *yakrutodara*. *Chakrapani* has added *mamsvaha srotodusti* responsible for *rakta vruddhi*.
Rasa pradoshaja diseases like jwara, pandu, hridroga are likely to produce shotha, kamala and yakrut roga. Going through the descriptions of pittaja, kaphaja, san nipapaja, vishama and dhatugata jwara, very frequently we get lakshana of kamala, pandu, shotha, raktapitta etc.

Susrutha while explaining the nidana of kamala says, this disease may manifest after pandu or anyaroga. That means a patient suffering from pittapradhana rasapradoshaja vikara likely to develop pittapradhana raktapradoshaja vikara. In this way, rasapradoshaja vikara acts as nidana for raktapradoshaja vikara and in due course it may result in raktavaha sroto mula vikruti there by yakrutodara.

Chyutha and Achyuthavrudhi lakshana
(Symptoms of hepatoptosis and hepatomegaly)

Vardhaman Pliha (There will be progressive enlargement of the Yakrit. Liver becomes stony hard initially and on palpation feels like a tortoise back and if neglected the enlarging yakrit puts pressure and expands over the kukshi, remaining part of the abdomen and agniadhisthana, dourballya(debility), arochaka (lack of taste in the mouth), avipaka (indigestion), varchagraha(Constipation), mutragraha(retention of urine), tampa pravesha(Darkness infront of the eyes), pipasa (excessive thirst), angamardha(malaise), chardi(vomiting), moorcha (Transient loss of consciousness), angasada (Tiredness of body parts), kasa(cough), swasa(dyspnoea), mridu jwara (mild fever), anaha (flatulence), agninasha(loss of appetite), karshya (emaciation), asyavairasa (abnormal taste in the mouth), parvabheda (pain in joint of the digits), Koshtashoola(abdominal pain), Vatashoola (abdominal pain due to morbid vata), Udara arunavarana (red discoloration of the abdomen), Udara vivarna,(discoloration of the abdomen) udara neelaharitaharidra raji (appearance of network of veins having blue, green or yellow color).

Yakrit vidhradhi (Hepatic abscess): Vidradhi is characterized by sheekhra vidha ha (rapid inflammation). Vidradhi is divided into bahya(external) and abhyantara (internal). Yakrit is one of the locations of antarvidradhi (intra abdominal abscess). An abscess in the liver is identified by the classical clinical sign of breathlessness with morbid thirst. This can be correlated with amoebic, pyogenic liver abscess and Hydatid cyst (echinococcus) of the liver.
**Table 2** Yakrit Vikaras and its probable clinical correlation

<table>
<thead>
<tr>
<th>Yakrit Vikaras</th>
<th>Probable modern diagnosis</th>
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<tbody>
<tr>
<td>Koshta-sakhasrita Kamala</td>
<td>Hepatocellular jaundice (Viral hepatitis, hepatoma)</td>
</tr>
<tr>
<td>Sakhasrita Kamala</td>
<td>Obstructive jaundice of varied etiology</td>
</tr>
<tr>
<td>Kumbha Kamala</td>
<td>Portal hypertension</td>
</tr>
<tr>
<td>Halimaka</td>
<td>Hepatic encephalopathy</td>
</tr>
<tr>
<td>Panaki</td>
<td>Chronic hepatitis</td>
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<tr>
<td>Jalodara</td>
<td>Ascitis with portal hypertension</td>
</tr>
<tr>
<td>Yakrutvidradhi</td>
<td>Amoebic, Pyogenic liver abscess, Hydatid cyst</td>
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**CONCLUSION**

The diseases of *Yakrit* are characterized by the involvement of *ranjaka pitta, rakta dhatvagni, mala pitta* and *dhamani* arising from the *Yakrit*. *Peeta/Haridra netra* (Icterus) is one of the commonest clinical sign of *Yakrit vikaras*. This sign is described in diverse disease conditions like *Kamala* and its variants, *Pittaja pandu, Pittaja Jwara, Koshtashakhasrita Kamala* can be correlated with prehepatic and hepatocellular jaundice due to viral hepatitis and hepatocellular carcinoma. *Shakhasrita kamala* can be correlated with obstructive jaundice of varied aetiology. The pathophysiology of *pittaja pandu* is similar to hyperbilirubinemia due to shunt bilirubin. Complications of *Koshtashakhasrita Kamala* such as *Kumbha Kamala* and *Halimaka* matches with Portal hypertension and hyperbiliverdinemia. The hemorrhagic complications of hepatic failure are identified as *Raktapitta*. Ascitis developing as a complication of hepatic cirrhosis is identified as *Jalodara* (Table 2). In this way primary diseases of liver and its pathological consequences are named with diverse disease conditions in Ayurveda.
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