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Research Article

# A CONCEPTUAL AND FUNDAMENTAL GLIMPSE REGARDING BILIRUBIN METABOLISM AND ITS CLINICAL CONNOTATION W.S.R. TO PATHOGENESIS OF KAMALA (JAUNDICE)

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### ABSTRACT

Devoid of the knowledge of physiology, pathology and treatment of ailment is not possible because pathology is a disturbed physiology in disease person and treatment is a comprehension to re-establishment of physiology of diseased person. Unfortunately in ayurvedic text, the normal bilirubin metabolism is described but which is not ample for better understand to pathology, diagnosis and treatment of jaundice so there have need to customary basic elementary and useful concept on the account of contemporary science. The nature of pitta and its formation, transportation and elimination are the same phases in bilirubin metabolism in both sciences. On the basis of pathogenesis, kamala has been classified in two categories, koshthaashrita and shakhashrita kamala. In shakhashrita kamala, there is enhance only the production of pitta and thereafter increase the pitta in the body, so it is also called Bahupitta kamala (haemolytic jaundice) but in other type of kamala, there is only hampered the excretion of pitta from the liver into the koshtha. Therefore theses pitta is reabsorb into the circulation and increase into the blood, so it is also called Alp-pitta kamala (Hepato-cellular jaundice).

**Keywords:** Shakhaashrita, Koshthaashrita Kamala, Raktvaha Srota, Dhatu, Brajak Pitta.

### INTRODUCTION

This is very important in Ayurveda, liver & spleen is the residence or *chemical factory* of *pitta* as well as root of *raktavaha srotasa*. It means, this place is responsible for production of *pitta*, because *pitta* is the desecrate product of *rakta dhatu*<sup>1</sup>. Because both having the intimate co-existence to each other as well as *pitta* having the capacity to vitiate the *rakta*. In addition, from the point of view of both color & smell, *pitta* is a homologue of *rakta*. Further *rakta* & *pitta* has a common site in *pleeha* (spleen) & *yakrit* (liver).

The physical characteristics & merit of the *pitta* described in *Ayurvedic* texts, more or less resemble with hepatic bile (mixture of bile & pancreatic juice). Because, it has been proved that bilirubin is produced by destruction of R.B.C. (blood), in modern medical science<sup>2</sup> & excreted through the bile. In the support of this correlation *Acharya Vagbhata* saying that an increase of *pitta* causes yellowness of urine, feces, eyes, & skin, increased appetite, thirst, burning sensation in body & insomnia<sup>3</sup>. These sign & symptoms chiefly, yellowish discoloration of eyes, skin, urine, & feces are much similar to the condition of hyperbilirubinaemia of

jaundice<sup>4</sup>. In addition of it, in reference of *shakhashrita-kamala*, the non excretion of the pitta in *koshta*, give a characteristic color to feces i.e. *shwetvarch* (whitishness) because normal color of stool is provide by *pitta*, known as *malaranjaka*<sup>5</sup>. The same allusion is stated in modern medical science i.e. the normal color of stool due to the presence of bilirubin. From the above implications, we can say that *pitta* & bile more or less same thing.

In *Ayurveda* there are major two factors only which are responsible for giving normal color & complexion of body i.e.

- **Rakta (Haemoglobin + Bilirubin)**<sup>6</sup>:- Blood contain mainly two pigments which are give the normal colour of skin<sup>6</sup>.
- **Bhrajaka pitta (melanin)**<sup>7</sup>:- The *pitta* which is located in skin is spoken as *bhrakakagni*, inasmuch as, it enables the digestion (and utilization) of substance used for *abhyang*, *parisheka*, *avagahana*, *lepana* etc. It irradiates the glow of one's natural complexion and located in upper most layers (*avabhasini*) of skin.

In modern medical science, it has been proved that, the normal color of skin is given by mainly three pigments namely

melanin, haemoglobin & bilirubin. In both sciences, it is clear that, in case of jaundice, the yellowish discoloration of eyes, mouth, nails & skin is due to increase concentration of *pitta vikara (bilirubin)* in the blood.

**AIMS AND OBJECTIVES:**

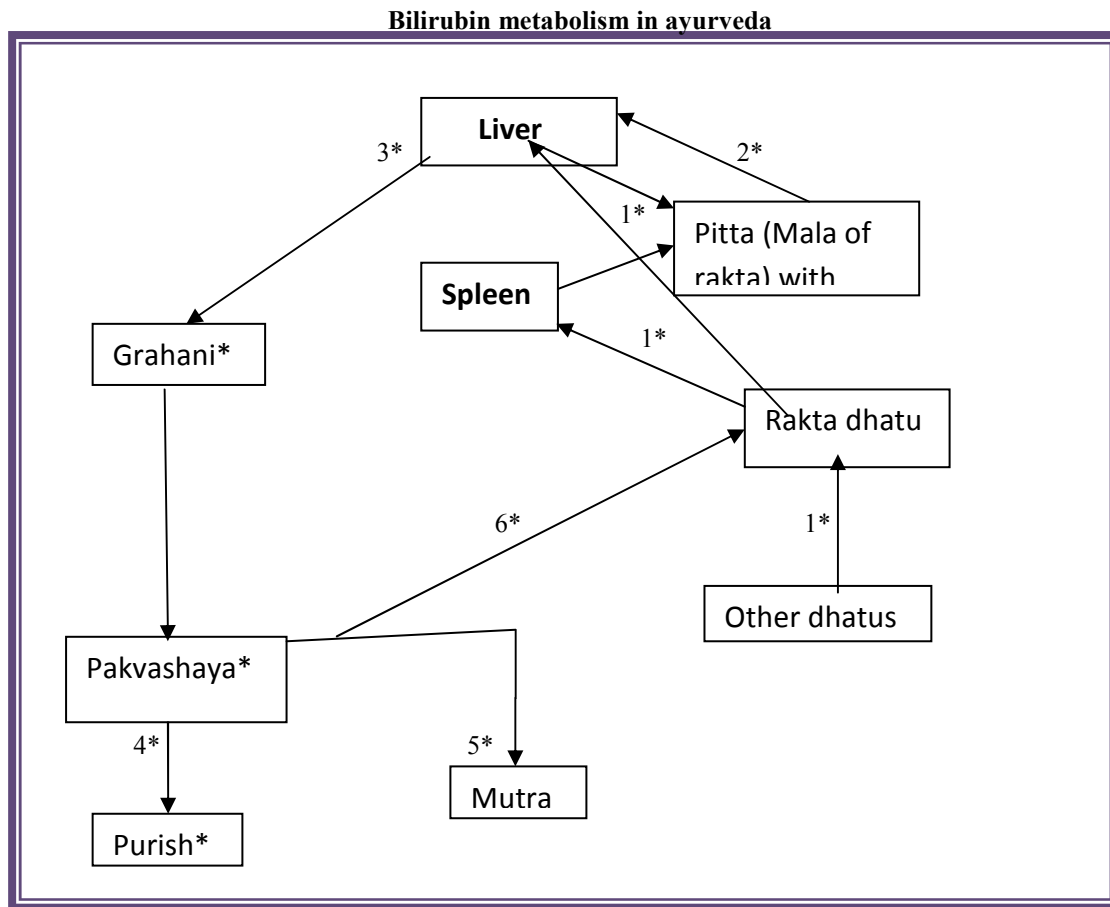
The existing scientific and deep-seated fundamental review is done with following objectives:

1. To make available a scientific and conceptual ideas about normal bilirubin metabolism ( including production, transportation, conjugation and excretion of bilirubin)

2. To institute the clinical consequence of bilirubin metabolism w.s.r. to pathogenesis of jaundice.
3. To endeavor to establish all above facts of the article on modern science.
4. To advocate a liaison in ancient and modern view about facts of the article.

**MATERIALS AND METHODS**

During the script of this elementary article, authors were concerned to several Ayurvedic texts, text books of modern medical science, different kind of encyclopedia, journals and websites etc.



**1\*Source of bilirubin:-**

**1\*Source of bilirubin:-** In modern medicine has proved that production of bilirubin takes place due the destruction of erythrocytes in reticulo-endothelial system specially liver, spleen & bone marrow, in which of primarily in liver & spleen<sup>8</sup>. The remaining 15-20% of bilirubin comes partly from non-haemoglobin haem-containing pigments such as myoglobin, catalase & cytochromes & partly from ineffective erythropoiesis<sup>9</sup>. In Ayurveda, liver & spleen is the residence or *chemical factory of pitta* as well as root of *raktavaha srotasa*<sup>10</sup>. It means, this place is responsible for production of approximate 80-85% of total *pitta*, and remaining 15-20% comes from destruction of mansh dhatu. It may be correlated with the destruction of myoglobin and catalase etc.

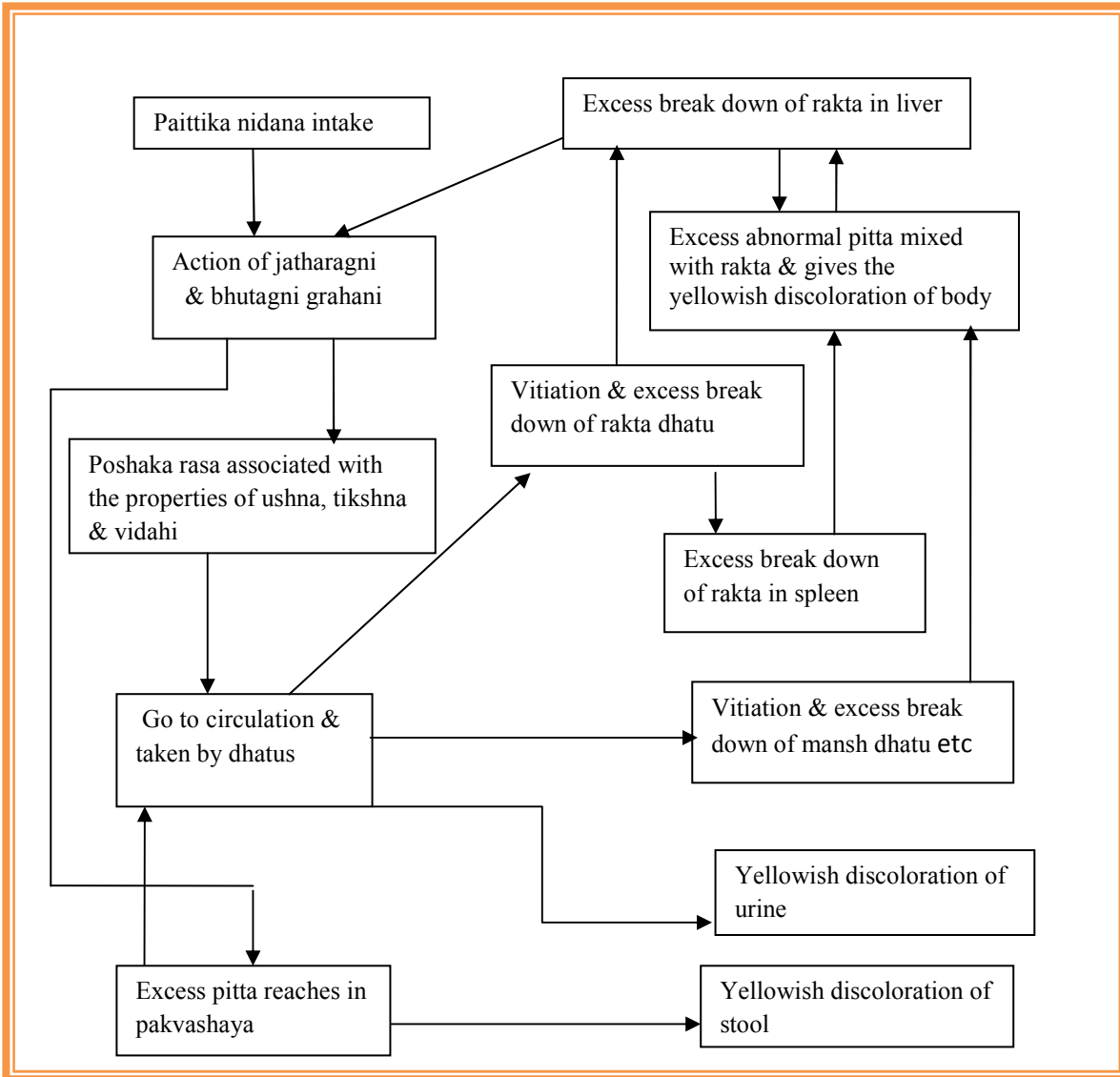
**2\* Transportation of bilirubin:-** Bilirubin is transported from production site to liver by ways, first by bind to the albumin and second through the by dissolving with blood. But in ayurveda, Liver, spleen & bone marrow drains, their *pitta* into circulation & reach to the liver by above mentioned phenomena. Because of same dwelling, they are easily miscible to each other.

**3\*Conjugation and excretion:-**The conjugation of bilirubin is done only for the purpose of excretion from the body. In ancient philosophy, conjugation like process does not elaborated. But it is mentioned that *pitta* is excreted into the *pachyamanashaya* as a *achchha-pitta* (bile & pancreatic juice).

4,5&6\*Intestinal phase:--In case of *shakhashrita-kamala*, whitish color of stool pass out due to the absence of pitta, yellowish color of urine due to retention of *pitta*<sup>11</sup>, & treatment should be done until, the feces attends its normal

color<sup>12</sup>. With this evidence, we can say that some moiety of *pitta* re-absorb into the circulation through entero-hepatic cycle & some fraction of it come into stool & urine, give normal color

**Pathogenesis of Koshtaashrita Kamala (Hemolytic jaundice)<sup>13</sup>**



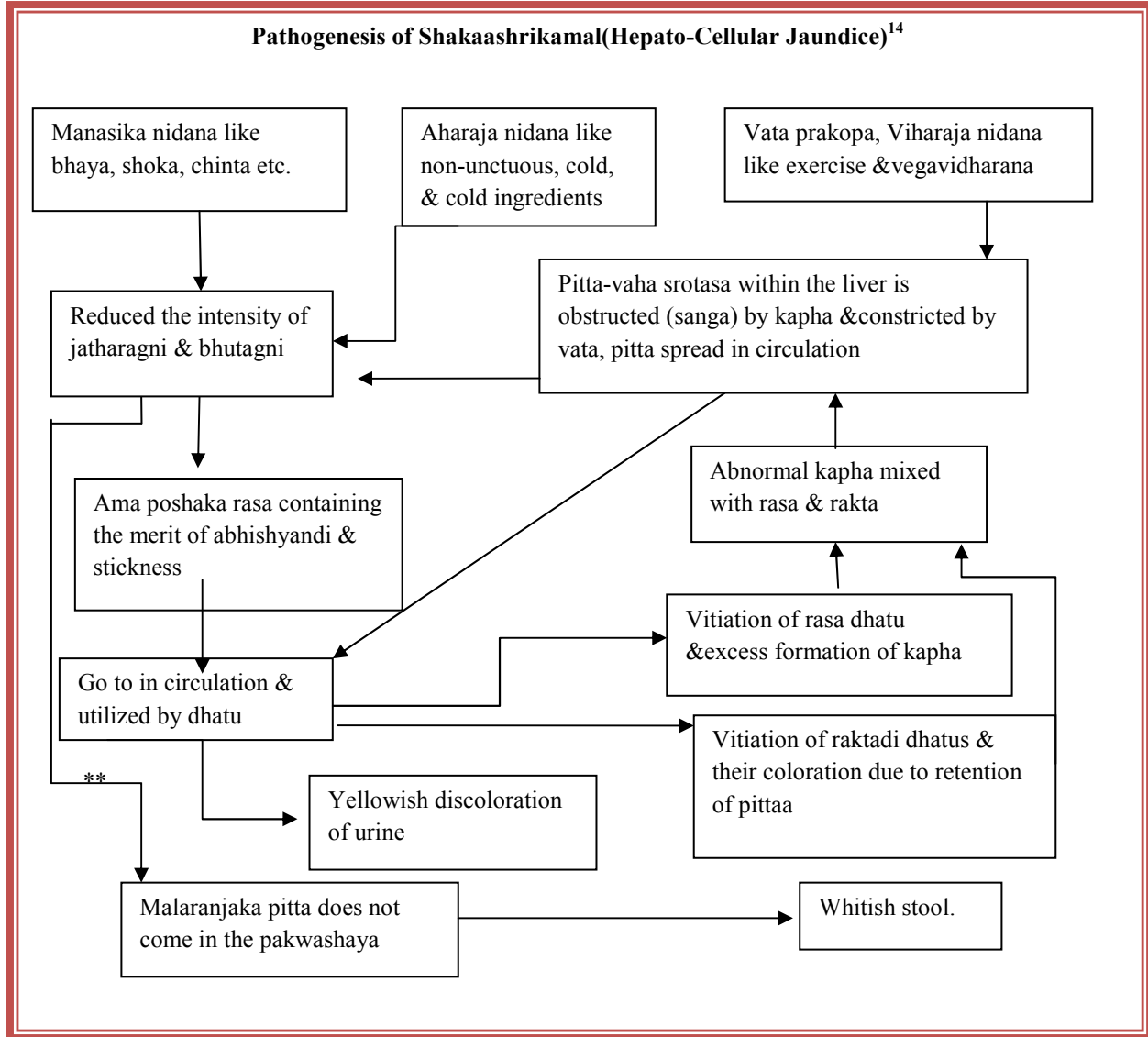
**RESULTS AND DISCUSSION**

1) Pitta is not a single chemical containing liquid substance rather it is a complex of different chemicals those provide the various color and functions to the pitta. So Pitta having the several colors except Aruna and Shukla(black and white). The yellow color of pitta may be due to the presence of bilirubin. Because, when the abnormal pitta gets accumulated in the skin due to improper excretion, then the color of whole body becomes *greenish yellow* just like a frog of rainy season, it explain that why the *kamala rogi* has *bhekavarna*. In case of Halimaka, the color of body depends upon the ratio of bilirubin & biliverdin in the blood which are yellowish & greenish in

colour respectively, but after prolonged cholestasis, the some bilirubin oxidized into biliverdin and manifest as a greenish yellow discoloration of body.  
 2) The bilirubin metabolism in Ayurvedic text and contemporary science are much similar in several aspects such as production of bilirubin; according to both sciences, seat of production of bilirubin is reticuloendothelium system of body. The sources of bilirubin are blood and myoglobin according to modern science, the same illustration is also given by ayurveda that bilirubin is formed by the destruction of rakta dhatu and mansha dhatu which is much similar to Hb of blood and myoglobin of mansha dhatu.

- 3) Like contemporary science, there is also described two type of kamala.
- I. Koshthaashrita. It is much more similar to Pre-hepatic (hemolytic) jaundice in several aspect like physiopathology
  - II. Shakhaashrita. It has the similar characteristic to the hepatic jaundice.

In ayurveda, pos- hepatic jaundice is not narrated because this jaundice is also called surgical jaundice. It means this jaundice is only cured with surgery but scientist Charaka has been treated only with medicine. If they are required to surgery for treatment then those refer to the dhanvantary sampradaya(surgery department) honestly like mentioned in other disease like sotha, raktaj gulma, Asmari etc.



## CONCLUSION

The conceptual, fundamental and practical thought regarding to bilirubin metabolism of ayurveda is very scientific and more or less similar to modern science in various aspect. The nature, source and production of pitta are just equal to the source and production and their elimination of the bilirubin. Clinical significance of bilirubin is described in both sciences as disease jaundice and its pathogenesis and treatment protocol is also much more similar to each other.

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