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Portal Hypertension in Ayurvedic understanding

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ABSTRACT

Introduction: *Raktapitta*, is a bleeding disorder which is associated with the vitiation of *Rakta* and *Pitta*. Excessive indulging in *Pittakara Aahara* and *Vihara* will lead to *Pitta Prakopa* which in turns leads to vitiation of *Rakta* which will attain similar qualities as that of *Pitta*. Parallel investigation into modern anatomy and physiology of the hepatic portal system provides an overall understanding of the circulatory dynamics, highlighting the relevance of the portal vein and its tributaries. **Materials and Methods:** Literature related to *Raktapitta* and portal system with portocaval anastomoses will be collected from *Bhrahattrayee*, other classical books, modern anatomy, physiology and clinical textbooks including journals, presented papers and previous work done. **Discussion:** This study mainly shows the correlation between *Ayurvedic* principles and modern medical understanding of *Raktapitta* in relation to the portal hypertension. **Conclusion:** Integrating the *Ayurvedic* concept of *Raktapitta* with modern knowledge of portal hypertension and its complications provide an overall understanding of bleeding disorders.

Key words: *Raktapitta*, portosystemic communication, oesophageal varices, haemorrhoids

INTRODUCTION

Raktapitta is a bleeding disorder wherein the *Rakta* vitiated by *Pitta* flows out of the orifices of the body. It is considered as one of the *Mahagada*.^[1] Vitiated *Pitta* will acquire colour and odour as that of *Rakta*. It is caused due to intake of excessive *Katu* (pungent), *Amla* (sour), *Lavana* (salty), *Kshara* (alkaline), *Ushna* (hot), *Tikshna* (irritant) *Aharas* like *Nishpava* (a type of *Dolichos lablab* Linn.), *Masha* (*Phaseolus radiatus* Linn.),

Kulatta (*Dolichos biflorus* Linn.), *Kshara* (alkalies), *Dadhi* (curd), *Katvara* (sour buttermilk), *Amlakanji* (sour congee), *Sura*, *Souviraka*, *Sukta* (alcoholic beverages) and *Pittakara Viharas* and by excessive *Krodha* (anger), *Shoka* (grief), *Bhaya* (fear), *Ayasa* (exertion) and will cause bleeding from upward or downward direction or in both directions.^[4]

MATERIALS AND METHODS

Literature related to *Raktapitta* and portal vein with portocaval anastomoses is collected from *Bhrahattrayee*, other classical textbooks, modern anatomy, physiology and clinical textbooks including journals, presented papers and previous work done and analysed critically.

Samprapti

According to *Sushruta*, the *Pitta* which becomes *Vidagdha* by *Nidana Sevana* quickly reaches the *Rakta* and causes its *Vidaha*. This *Rakta* flows out of the orifices in the *Urdhwa* or *Adhomarga* or in both *Marga*.^[5] In normal condition *Rakta* which is carried in

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Raktavaha Srotas does not enter *Koshta* i.e., *Amashaya* (Oesophagus and Stomach) or *Pakvashaya* (Intestine). But in case of vitiation, it may reach *Amashaya* and come out through *Urdhwa Marga - Nasa* (Nose), *Akshi* (Eyes), *Karna* (Ears), *Aasya* (Mouth) or it may reach *Pakvashaya* and come out through *Adhomarga - Medhra, Yoni* or *Guda* (Anus) or may come out from both the directions. Some trace the movement of blood from spleen and liver and then to the *Amashaya* and *Pakvashaya*.^[6]

Bleeding disorder is the condition characterized by difficulty in blood clotting process. Haemorrhage refers to excessive bleeding either externally or internally. It can result from trauma, injury or blood vessel abnormalities, medications, infections, blood disorders etc. In conditions like portal hypertension there can be increased pressure in the portal vein leading to altered circulation of collateral vessels to redirect blood flow. This may further lead to bleeding from the collateral sites.

Hepatic Portal System

It is a unique circulatory system which collects blood from the abdominal part of the alimentary canal, the gallbladder, the pancreas into the liver where it breaks into the sinusoids and will be drained by the hepatic veins into the inferior vena cava.

Formation

Portal vein is formed by union of two main veins, superior mesenteric vein and splenic vein whereas Inferior mesenteric vein drains into splenic vein. It is called as portal vein because its main tributary, the superior mesenteric vein begins in one set of capillaries (in the gut) and the portal vein ends in another set of capillaries in the liver. It is about 5cm long and is formed behind the neck of the pancreas at the level of second lumbar vertebra.

Course

It can be divided into extrahepatic and intrahepatic parts.

Extrahepatic Part

It moves upwards and a little to the right and passes behind the neck of pancreas and then behind the first

part of duodenum and lastly in the right free margin of the lesser omentum.^[7]

Termination

It then runs upward and open into the lesser sac to the porta hepatis and divides into right and left terminal branches.

Tributaries

The tributaries of the portal vein are the

- Splenic vein
- Superior mesenteric vein
- Left gastric vein
- Right gastric vein
- Cystic veins

Splenic vein

This vein emerges from the hilum of the spleen and passes to the right in the splenorenal ligament which is present below the splenic artery. It joins with the superior mesenteric vein behind the neck of pancreas and forms the portal vein. It receives tributaries from the short gastric vein, left gastroepiploic vein, inferior mesenteric vein, pancreatic veins.

Superior mesenteric vein

This vein moves above in the root of mesentery of small intestine on the right side of the artery. It passes in front of the third part of duodenum and joins the splenic vein behind the neck of the pancreas. It receives the jejunal, ileal, ileocolic, right colic, middle colic, inferior pancreaticoduodenal and right gastroepiploic veins.

Left gastric vein

It runs to the left along the lesser curvature, receiving the oesophageal veins. It opens directly into the portal vein.

Right gastric vein

This vein drains the right portion of the lesser curvature of the stomach and drains directly into the portal vein.

Cystic veins

These veins either drain the gallbladder directly into the liver or join the portal vein.^[8]

Intrahepatic Part

Right and left branches of portal vein supply right and left lobes of the liver respectively.

Portal blood circulates in the liver successively through: Portal vein → Portal canal → hepatic sinusoids → central veins → sub lobular veins → hepatic veins → inferior vena cava.^[9]

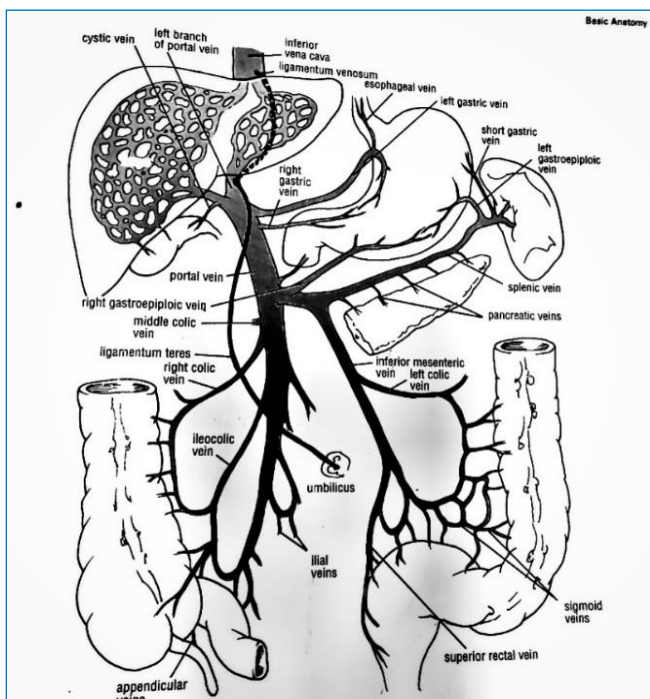


Fig 1: Tributaries of Portal vein

Portosystemic communications / Portocaval anastomoses

It refers to the connection or communication between the portal venous system and the systemic venous system. When there is an obstruction or increased pressure in the portal vein, these connections provide alternative pathways for blood to flow. These anastomoses are clinically significant because they can lead to complications such as bleeding if the vessels become dilated and fragile due to increased portal pressure often because of many medical conditions like liver cirrhosis etc.

The communications are as follows:

1. At the lower third of the oesophagus, the oesophageal branches of the left gastric vein (portal tributary) anastomose with the

oesophageal veins draining the middle third of the oesophagus into the azygos veins (systemic tributary).

2. In the anal canal, the superior rectal veins (portal tributary) which drains the upper half of the anal canal anastomose with the middle and inferior rectal veins (systemic tributaries).
3. The paraumbilical veins connect the left branch of the portal vein with the superficial veins of the anterior abdominal wall (systemic tributaries).
4. The veins of the ascending colon, descending colon, duodenum, pancreas, and liver (portal tributary) anastomose with the renal, lumbar, and phrenic veins (systemic tributaries).^[10]

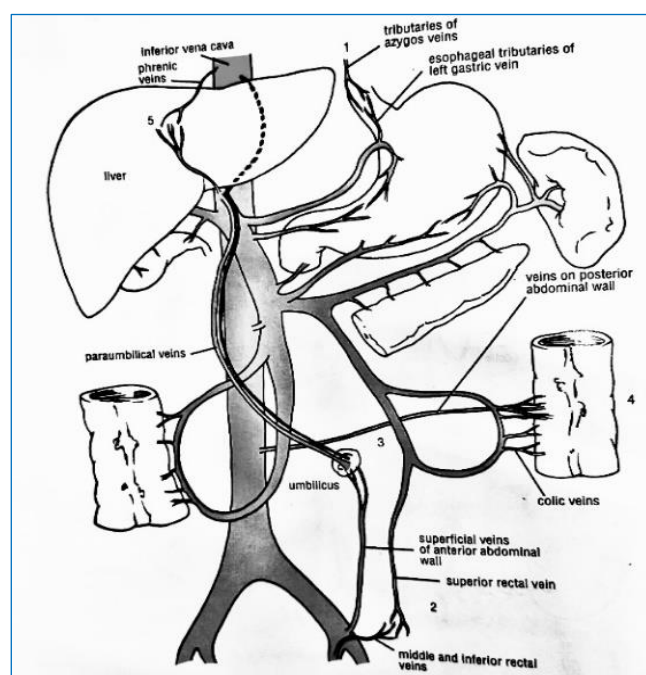


Fig 2: Important Portal-Systemic anastomoses

Portal Hypertension

It is defined as an increase in portal vein pressure above the normal level of 5 to 15mmHg. Portal hypertension is due to obstruction somewhere in the portal vein or its tributaries (pre-hepatic), in the portal venules and sinusoids in the liver (hepatic) or in the hepatic veins draining into the inferior vena cava (post-hepatic). When there is obstruction to the portal veins, nature tries to reduce portal pressure by diverting blood from portal system to systemic system through

a few known collaterals. When the obstruction is pre-hepatic, collaterals between the portal vein distal to the obstruction and the portal vein proximal to the obstruction enlarge whereas when the obstruction is intrahepatic, collaterals between the portal and the systemic systems dilates and transfer the blood from the high-pressure portal system to the low-pressure systemic system. Dilatation and tortuosity of the collaterals near oesophagus may cause oesophageal varix and if ruptured, bleeding may occur causing haematemesis and is known as variceal bleeding. Collaterals around the lower third of the anal canal may dilates and causes haemorrhoids.^[11]

DISCUSSION

According to *Ayurveda*, *Yakrit* and *Pliha* are considered as *Moola* for *Raktavaha Srotas*.^[12] In modern science Erythropoiesis and Haemolysis, both are having relation to liver and spleen. The liver is involved in the production of proteins like Transferrin, Hepcidin which are required for erythropoiesis. It stores iron, an essential element for haemoglobin synthesis in RBCs. The liver also produces erythropoietin, a hormone that stimulates the bone marrow to produce red blood cells. The spleen helps in the removal of old or damaged red blood cells from circulation by phagocytosis. It also acts as a reservoir for blood, releasing stored RBCs into circulation when needed. The spleen also plays a role in immune function, helping to filter blood and remove foreign particles.^[13]

Here the movement of vitiated *Rakta* to *Amashaya* in *Urdhwaga Raktapitta* can be linked to the conditions such as oesophageal varices where enlargement of veins in the lower part of oesophagus occurs. These are often asymptomatic until they rupture, leading to the manifestations like hematemesis, melena (dark, tarry stools), abdominal pain in both cases.

Adhogaraktapitta where vitiated *Rakta* moves from *Yakrit* and *Pliha* towards *Pakvashaya* and expelled out through *Adhomarga*. Here we can consider *Pakvashaya* as parts of large intestine. The internal rectal venous plexus drains mainly into the superior rectal vein, but communicate freely with the external plexus and thus with the middle and inferior rectal

veins. Therefore, the internal plexus is an important site of communication between the portal and systemic veins. The sacular dilatation of internal rectal venous plexus leads to internal piles. The symptoms are rectal bleeding, pain or discomfort, itching or irritation, swelling, mucus discharge, painful bowel movements.

CONCLUSION

In conclusion, the hepatic portal system plays a crucial role in directing blood from the abdominal organs to the liver, facilitating nutrient absorption and detoxification. The formation, course, termination, and tributaries of the portal vein illustrate its intricate anatomy and physiological significance. Portosystemic communications, or portocaval anastomoses, provide alternative pathways for blood flow, particularly in conditions of increased portal pressure, such as liver cirrhosis. From an Ayurvedic perspective, *Raktapitta* is considered a significant disorder involving the vitiation of *Pitta*, leading to bleeding manifestations. The Ayurvedic understanding of *Raktapitta* involves the movement of vitiated *Rakta* to either *Amashaya* or *Pakvashaya* (*Koshta*), eventually leading to bleeding either upward or downward. In conclusion, integrating the ayurvedic concept of *Raktapitta* with modern knowledge of portal hypertension and its complications provide an overall understanding of bleeding disorders.

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