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ROLE OF APARA DUSHTI IN PREGNANCY INDUCED HYPERTENSION AND ITS COMPLICATIONS - AN AYURVEDIC PERSPECTIVE

***[1]V. S. Madhumithaa and [2]Dr. Papiya Jana**

[1]PG Scholar, Department of Prasuti Tantra and Stree Roga, Sri Kalabyraveshwara Swamy Ayurveda Medical College and Research Centre.

[2]Professor, Department of Prasuti Tantra and Stree Roga, Sri Kalabyraveshwara Swamy Ayurveda Medical College and Research Centre.

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***Corresponding Author**
V. S. Madhumithaa
PG Scholar, Department of Prasuti Tantra and Stree Roga, Sri Kalabyraveshwara Swamy Ayurveda Medical College and Research Centre.

ABSTRACT

Hypertensive disorders remain among the most significant problems in obstetrics. These disorders complicate 5 to 10 percent of all pregnancies and contribute greatly to maternal morbidity and mortality rates. According to the contemporary understanding, the physiological changes during pregnancy involving the increased demand from the growing fetus that leads to changes in the uteroplacental circulation and when the maternal system is not able to cope up with the changing environment, there could be conditions like Hypertension and subsequent placental insufficiency. Hence increased awareness regarding these disorders, their causes and treatment strategies should be made to avoid serious complications to the mother and the fetus. *Ayurveda*, being a holistic system of approach, gives high importance to pregnancy care and ensuring proper Poshana for the development of garbha. Garbha poshana depends upon the Rasa Dhatu of the mother, the Apara and Nabhi Nadi that is responsible for carrying the Poshaka Dhatu. Anupahata Sthithi of these ensure proper Garbha Vridhi. Apara Dushti is a term used to denote the set of pathologies that impairs the proper formation and functioning of the Apara that leads to a compromised state of mother and garbha. Placentation abnormalities can be seen as a disruption of the Vata Dosha's regular functioning. As the disease worsens, Pitta and Kapha also become involved. Intervention should start before conception in women who have had preeclampsia in the past or not. Pregnancy-induced hypertension can be prevented

and managed by using Garbhini paricharya, Garbhasthapaka Dravya, Rasayana Dravya, Masanumasika Garbhasravahara Dravya, and other remedies. These measures can improve the health of both the mother and the foetus.

KEYWORD: PIH, *Apara*, *Garbha poshana*, IUGR, Uteroplacental insufficiency.

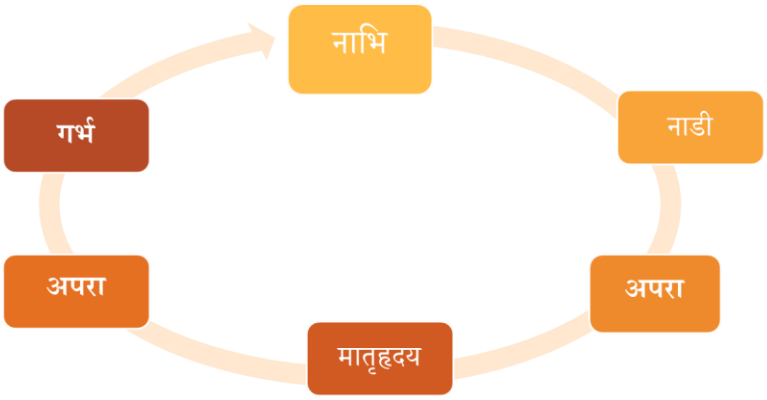
INTRODUCTION

In pregnancy, as a result of disturbance in the physiological adaptation mechanism, the mother often develops conditions such as pregnancy induced hypertension. The term "pregnancy induced hypertension" is defined as hypertension that develops as a direct result of gravid state. Hypertensive disorders significantly increase the risks of maternal morbidity and mortality and complicate 5–10% of pregnancies.[1] Although there is no direct reference of pregnancy-induced hypertension (PIH) in ayurvedic classics, but the manifested symptoms can be explained within the purview of *ayurveda* like Garbhini Shotha,[2] Garbhini Akshepaka[3] are some of the conditions which are observed to be similar to Pregnancy induced hypertension and Garbha Vyapad as its complications.[4] *Ayurveda* has importance to the role of Apara in Garbha Poshana. However, there will be compromised state where there is failure of this function due to the vitiation of doshas leading to Garbhini and Garbha Vyapat. This according to the contemporary understanding, disturbance in the formation and functioning of placenta is a major causative factor for Pregnancy induced hypertension that can subsequently lead to Uteroplacental insufficiency. PIH usually develops in the second or third trimester of Pregnancy, marked by high blood pressure and high level of protein in the previously healthy woman's urine. This diagnosis is made in women whose blood pressures reach 140/90 mm hg or greater for the first time after mid pregnancy (20th week), but in whom proteinuria is not identified.[5]

Concept of Apara and Its Relation To Maternal Circulation

In the description of Apara, it has been clearly elicited that Apara is the bridge between the Garbhini and the Garbha which maintains the Garbha Poshana. The intrauterine existence of Garbha is dependent on the structure and functions of Apara. The formation of Apara is from the Artavavaha Strotas that is blocked during pregnancy that ascends upward to form the Apara.[6] According to Acharya Bhoja, Apara, also known as Jarayu is formed from the Rakta whereas the Nadi is formed from Rasa.[7] The Apara along with the Nabhi-nadi take over the responsibility of Garbha Poshana being transferred from the mother to the Garbha. Acharya

Vagbhata explains the role of circulation through garbha nabhi, matru hrudi nadi in terms of kedara kulya nyaya, it fits apt into the fact that garbha poshana occurs adequately.[8]



***Apara Dushti* - The Etiopathogenesis of PIH**

Apara is the medium of blood circulation between the mother and the fetus. Due to maternal causes like Asatmya Ahara Vihara or changes in the maternal intrinsic environment due to disturbance in the physiology of pregnancy adaptation, Tridoshas predominantly Vata gets vitiated as Vata is the major factor responsible for Garbha and Apara formation by means of its Chala Guna and Vibhajana karma.[9] Sthanasamshraya of the aggravated Doshas in the minute channels of Apara leads to Dushti in the Sthanika Garbhashaya Gata Strotases. This influences the maternal circulation and Matru Hridaya. Matru Hrudaya being the Moola Sthana of Rasa Dhatu and Dasha Dhamanis,[10] the entire system is influenced by the dosha vitiation resulting in *Vata Prakopa* and *Rasa Dhatu Dushti* thereby affecting the normal functioning of the maternal and fetal circulation. Hence pregnancy or the Garbhini Avastha becomes the prime causative factor for the pathogenesis of PIH. As mentioned by Acharya Kashyapa, there are certain conditions which develop during Garbhini Avastha and get resolved after termination of the pregnancy for example in the context of Kroshana Jataharini. According to Acharya Kashyapa, in Kroshana Jataharini, garbha creates various complications in the Kukshi of the mother. After delivery of the fetus, most of the symptoms disappear.[11]

The phase of pregnancy increases the demand for blood and nutrient supply from the mother to the fetus through the placental circulation. To facilitate this supply without much burden on the maternal vascular system, there are certain adaptations that take place in the vascular structure during placental formation. Remodeling of the uterine arteries is a key event in early pregnancy that begins after implantation. Invasion of the cytotrophoblast leads to.

- ü Replacement of endothelial lining
- ü Replacement of musculoelastic media by fibrinoid material

In the uterine spiral arteries, endovascular trophoblastic invasion creates "High flow and low resistance" circulatory system. The uterine spiral arteries are converted into large bore uteroplacental arteries.

It is believed that PIH, and particularly PE, is a multifaceted illness. Several explanations have been proposed regarding the pathophysiology of this clinical entity. Endothelial dysfunction and severe vasospasm, which damage nearly all arteries, particularly those in the brain, kidney, placental bed, and uterine, are the fundamental pathologies of pre-eclampsia. Trophoblasts infiltrate the walls of the uteroplacental bed's spiral arterioles during a typical pregnancy. The invasion reaches the decidual segments in the first trimester and the myometrial segments in the second, causing the spiral arterioles to enlarge, become tortuous, and take on the shape of a funnel. Pre-eclampsia is characterized by aberrant placentation that compromises blood supply to the fetoplacental unit due to failure of the second wave of trophoblast invasion. Reduced production of prostaglandins (PGI2), which are vasodilators, and increased synthesis of thromboxane (TXA2), a vasoconstrictor, indicate an imbalance in the various prostaglandin components. Nitric oxide shortage also coexists. Angiotensin II causes an increase in vascular sensitivity while decreasing angiotensinase activity. Inflammatory mediators play a significant influence in endothelial damage. In addition to causing endothelial damage and dysfunction, aberrant lipid metabolism also produces oxidative stress. The disease is further compounded by the imbalance of angiogenic and antiangiogenic proteins in the placental vascular bed.

Hence, after the delivery of the fetus and the placenta, the vascular changes slowly reverse and the maternal hematological status gets back to her pre pregnant state about 12 weeks after delivery.[12]

Symptomatology of PIH[13]

1. Hypertension – when there is an absolute rise of blood pressure to at least 140/90mmhg (if the previous BP reading is not known).
2. Pre-eclampsia - is defined as a multisystem disorder of unknown etiology characterized by development of hypertension to the extent of 140/90 mmHg or more with proteinuria after the 20th week of gestation in a previously normotensive and non proteinuric woman.

3. Eclampsia - Pre eclampsia when complicated with grandmal seizures (generalised tonic clonic convulsions) and/or coma is called eclampsia.

Despite the lack of direct reference for PIH in *ayurveda*, the symptoms can be described within the purview of certain Garbhini Vyadhis such as

- Garbhini shopha: Edema - Padasopha is one of the Vyakta Garbha Lakshana can be considered as physiological oedema of pregnancy,[14] whereas Sopha described in Garbha Upadrava according to Hareeta Samhita can be athological oedema.[15] Garbhini Padasopha is one among Asadhya Mudagarbha Lakshana according to Kashyapa Samhita.[16]
- Garbhini Akshepaka: Convulsions in case of eclampsia - Kashyapa has described the Chikitsa of Garbhini Akshepaka and Apatanaka which can be considered as the manifestation of eclampsia in Garbhini.[17] Akshepaka is one of the Asadhya Mudagarbha Lakshana according to Susruta[18] and Vagbhata[19]

Sequelae of Garbhini Vyadhi To Garbha Vyapad – Fetal Complications of Pih

As Apara is majorly concerned with Garbha Poshana, persistent pathology of the Apara and its circulation causes Vikruti to both mother and the Garbha.

One serious complication of PIH is compromised fetal nourishment because of uteroplacental insufficiency leading to IUGR. In *Ayurveda*, the spectrum of fetal disorders is grouped under Garbha Vyapad. Among the Garbha Vyapads, Upavishtaka explained by Acharya Vridha Vagbhata depicts the pathogenesis of Uteroplacental insufficiency.[20]

यस्या पुनर्महति जातसारे गर्भे वर्ज्यानामवर्जनात् पुष्पदर्शनम् स्यादन्यद्वा योनिस्रवणम् ततो नाड्याम् दोषैः कुल्यायामिव तृणपत्रादिभिः प्रतिछन्नायाम् रसस्यासम्यग्वहनाद्गर्भो वृद्धिमवाप्नुवन् उपविशति उपशुष्यति वा (A.San.2/11,12)

Just like paddy in a field does not grow properly when the water channels are obstructed with leaves/grass etc and the water does not reach the crops, similarly vitiated dosas block *Rasavaha Nādī* blocking the nourishment to fetus causing *Upavishtaka* or *Upasushka* which can be correlated as IUGR that severely impairs the growth and development of the baby.

Intrauterine growth restriction (IUGR) has been defined as the rate of fetal growth that is below normal considering the growth potential of a specific infant as per the race and gender of the fetus. The main pathological feature of PIH is the insufficient modification of uterine

spiral arteries during pregnancy thereby increasing the resistance to blood flow in the placental bed. Hence reduced placental perfusion leads to uteroplacental insufficiency, hence hampering the supply of nutrients and oxygen to the growing fetus. Intrauterine growth retardation or death is a common complication is pregnancies associated with hypertensive disorders.[21]

So here, the pathogenesis which causes *Strotorodha* in the *Rasavaha Nadis* shows the insufficiency in the uteroplacental circulation. Based on the intensity of the vitiated doshas affecting the uteroplacental blood flow, the severity of IUGR can be elicited.

DISCUSSION

During pregnancy there is progressive anatomical, physiological and biochemical change not only confined to the genital organs but also to all systems of the body. This is principally a phenomenon of maternal adaptation to the increasing demands of the growing fetus. Most pregnancy related changes are prompted by the fetus and placenta. Smooth transition of the maternal system to these changes results in an uneventful pregnancy and delivery. Disturbance in this process causes physiological imbalance that may result in adverse maternal and fetal outcomes. Studies have shown that PIH significantly affects the placenta by reducing its weight and dimensions. These changes may cause placental insufficiency because of compromised utero-placental blood flow and therefore, have an adverse effect on the neonatal birth weight. PIH has definite influence on morphology, histology of placenta, and thus affects the growth of the fetus. Thus, extensive research is required to effectively diagnose and manage PIH.[22]

According to *Ayurveda*, Pregnant woman is treated like a pot filled with oil where slight oscillation may cause spillage, likewise even a slight carelessness may lead to abortion or miscarriage.[23] According to *Acharya Vagbhata*, when *Garbhini Paricharya* is not followed appropriately and when the woman adopts *Garbhopaghatakara Bhavas*, she is more likely to suffer from diseases where *Dosha Dushti* takes place and may affect the *Garbha Poshana*.[24] *Apara Dushti* can have its effect on maternal health as well as fetal wellbeing. One of the *Vikaras* because of *Apara Dushti* is PIH which is otherwise known as *Garbha Janya Vishamayata*.[25] There are scattered references regarding these symptoms in ayurveda. All these symptoms are classified under *Garbhini Vyadhi*.

Line of approach to management of PIH and its complications should be as follows

1. Control the symptoms till the safe delivery of the fetus
2. Vata hara line of treatment
3. Improve *Garbha Poshana*

Some measures that have been subjected to trials for its efficacy in PIH and its symptoms are

- Prabhakara Vati- According to clinical evaluation, Vata and Raktadushti doshas are the primary doshas involved in PIH. Prabhakara Vati primarily affects the Vata and Kapha doshas, relaxing the arterial smooth muscles resulting in vasodilation. They also have strong penetration and circulation, which enhances uteroplacental circulation and maintains appropriate circulation to the fetus. The components of Prabhakara Vati are beneficial for poor blood circulation.[26]
- Gokshura Sidha Yavagu: Gokshura is proven to have potent diuretic Property which helps in reduction of both, edema as well blood pressure in preeclamptic females.[27]
- Rudraksha Churna :Rudraksha churna having ushna virya and vatakaphashamana action acts as a vasodialator correcting the increased blood pressure and pedal edema.[28]
- Kramatah shodhana is advised in women with risk factors in order to improve Beeja Karmukata.[29]
- Intake of Masanumasika Garbhasravahara Dravya, Garbhasthapaka Dravya and Rasayana dravya improve maternal and fetal outcome in pregnancy. Garbhasthapaka Dravya counteracts the Garbhopaghatakara bhava and increases the chances of positive fetal outcome.[30]

CONCLUSION

Pregnancy induced Hypertension is a disorder of the pregnancy that can severely impair the maternal and fetal health. In ayurveda, PIH can be described as caused by *Vata Dushti* in the *Apara* and the *Garbhashaya Gata Strotatses* that affects the circulation between the mother and the *Garbha*, while on one side it can affect the *Hrudaya* of the mother causing maternal symptoms, on the other hand it impairs *Garbha Poshana* leading to *Garbha Vyapad*. *Apara dushti* is therefore an important cause of the PIH pathogenesis. Prolonged undiagnosed cases of PIH can severely affect the maternal health during pregnancy as uncontrolled Hypertension and fetal health by Low birth weight and IUGR.

Hence PIH needs to be effectively diagnosed and managed to avoid serious further complications. In ayurveda, medications that reduce the maternal symptoms such as

increased BP and pathological edema and those that reduce the *Vata* and improve *Garbha Poshana* are effective.

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