



UNDERSTANDING GARBHA MATRU PARATHANTRATA WITH RESPECT TO FETO-PLACENTAL CIRCULATION

C S Bhuvana^{1*}, H M Spoorthi Prasad², Kamath Nagaraj³

^{1, 2} PG Scholar, ³Associate Professor, Department of Kriya Shareera,
Sri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan, Karnataka, India.

*Corresponding Author: Dr. Bhuvana. C.S

ABSTRACT

Introduction: The concept of Garbha Matru Parathantrata is concerned with the dependency of fetus on its mother for its proper growth and development. The transport of Rasa (nutrients) between the mother and fetus shows the Garbha Matru Parathantrata. Dependency of fetus on mother can be understood by feto-placental circulation. **Aims and Objectives:** To know the Garbha Matru Parathantrata with reference to feto-placental circulation. **Materials and Methods:** Ayurveda classics were searched regarding the references and explanations for Garbha Matru Parathantrata and Aparā. Also the feto-placental circulation and functioning of placenta was studied from modern embryology, obstetric, physiology and anatomy text books and relevant research articles. **Discussion and Conclusion:** The concept of Garbha Matru Parathantrata relates to the dependency of fetus on its mother for its nutrients. The Aahara Rasa from mother being conveyed to the Garbha via two anatomical structures namely Aparā and Garbha Nabhi Nadi for its growth and development. Since Maturahara Rasa is the major source of nourishment for the fetus which will be obtained to it through feto-placental circulation via umbilical vessels, understanding detailed knowledge about it is important as dysfunction in fetal circulation can lead to respiratory distress in the fetus or neonatal hypoxemia which can be fatal.

KEYWORDS: Garbha Matru Parathantrata, Feto-placental circulation, Aparā, Garbha Nabhi Nadi

INTRODUCTION

Swastha Sharir is a need for achieving the Purusharatha Chatushtaya i.e., Dharma, Artha, Kaama and Moksha. Maintenance and protection of Swastha Sharir is the main aim of Ayurveda science. Historical aspects of vedas have the concept that mature age of woman including physical and psychological both are an essential factor for a good progeny¹. The union of Shukra (sperm), Shonita (ovum) and Atma (soul) in the Garbhashaya (uterus) is termed as Garbha². Health and wellbeing of the fetus depends upon the health and nutrition of the mother. The health of the fetus during gestation plays a major role in its survival post-delivery. Health is provided by the proper nutrition and care. This begins in the mother's womb. From the time of fertilization till its birth, the fetus receives nutrition and care from its mother. Nourishment of body gets established just after conception which causes the gradual development of fetus. Fetal growth is largely dictated by the availability of nutrients in maternal circulation and the ability of these nutrients to get transported into fetal circulation via placenta. Everything that affects the health of mother has an impact over the fetus.

AIMS AND OBJECTIVES

To critically analyze the concepts of Garbha Matru Parathantrata given in Ayurvedic literature with special reference to the concept of feto-placental circulation.

MATERIALS AND METHODS

Ayurveda classics were searched regarding the references and explanations for Garbha Matru Parathantrata and Aparā. Also

the concepts of fetoplacental circulation and functioning of placenta was studied from modern embryology, obstetric, physiology and anatomy text books and relevant research articles.

OBSERVATIONS AND RESULTS

Due to constant use of congenial diet by the pregnant woman the Garbha (fetus) grows normally and gets delivered at appropriate time with all Indriyas, complete body parts, Bala, Varna, Satva and Samhanana along with Matrja, Pitrja, Atmaja, Satmyaja and Rasaja Bhavas having constant association of Mana³. The Matura Ahara Rasa reaches the Aparā and through the Garbha Nabhi Nadi it travels and reaches the Garbha and nourishes the Shareera Dhatu of Garbha. The fetus is connected by the umbilical cord to the placenta, the organ that develops and implants in the mother's uterus during pregnancy. The circulatory system of the fetus is connected to the maternal circulatory system through the placenta. Nutrients and oxygen from the mother's blood pass through the placenta to the fetus, and waste products from the fetus pass back through the placenta for elimination. Through the blood vessels in the umbilical cord, the fetus receives all the necessary nutrition, oxygen and life support from the mother⁴. Hence the relationship between the mother and the developing fetus is crucial for the proper growth and development of the fetus.

DISCUSSION

Garbha Poshana is mainly occurring through the Matru Ahara Rasa because of its Apakwa Dhatu. After the Pachana Kriya,



formed *Ahara Rasa* from the *Matru* reaches the *Apara* which conveys the *Matru Ahara Rasa* to the *Garbha* through *Garbha Nabhi Nadi*⁵. This *Rasa* gets metabolised by *Garbha Kayagni* present in *Pakvashaya* and utilized for *Garbha Shareera Pushti*. Major *Pachana Kriya* is not necessary in *Garbha* as *Rasa* is available in *Prasada Rupa*. *Matru Ahara Rasa* forms the *Ambu* part of the *Garbhotpathhi Samagri (Ritu, Kshetra, Ambu and Beeja)*⁶. It refers to lymph- chyle containing nutritional substance and is formed in the *Amapakwashaya* later reaches the *Hrdaya* after which it is called as *Rasa Dhathu* and this *Rasa* is directed to the whole body through *Rasavaha Dhamani*. This *Rasa* nourishes the *Shareera Dhathu* of *Garbha*. Soon after fertilization till the implantation, cytoplasmic contents of ovum as well as the secretions from the uterine tube provide the necessary nourishment to the embryo⁷. From the time of implantation till the formation of placenta the secretions from trophoblastic cells, uterine tube and endometrial cells provide nourishment. After the formation of placenta, the fetal circulation is established and it becomes the major nutritional source for the fetus. Fetal circulation is a complicated process as in this case, the placenta functions similar to the lungs of the newborn after birth. The placenta even functions as the gastrointestinal tract, liver and kidneys for the growing fetus. Oxygenated, nutrient-rich blood from the placenta is carried to the fetus by the umbilical vein. This blood enters through the inferior vena cava. After oxygenated blood arrives at the right atrium, it flows through the foramen ovale to the left ventricle, then into the aorta. Some amount of blood from the aorta flows to the two umbilical arteries and re-enters the placenta, where carbon dioxide and other waste products from the fetus are taken up and enter the maternal circulation. The placenta accepts the blood without oxygen from the fetus through the umbilical arteries. In the placenta the blood picks up oxygen and returns to the fetus via umbilical vein. The oxygen-rich blood that enters the fetus passes through the fetal liver and enters the right atrium of the heart. Blood returning back from the fetus also enters the right atrium through the superior vena cava and coronary arteries. This doesn't shunt through the foramen ovale, but the fetus is able to send this oxygen-poor blood from the right atrium to the right ventricle. Most of the blood that leaves the right ventricle in the fetus bypasses the lungs through the ductus arteriosus. The ductus arteriosus sends the oxygen-poor blood to the organs in the lower half of the fetal body. This allows for the oxygen-poor blood to leave the fetus through the umbilical arteries and get back to the placenta to pick up oxygen. Circulatory system of mother is not directly connected to that fetus, so the placenta functions as the respiratory centre for the fetus, site of filtration for the plasma nutrients and excretion of waste products through the umbilical cord⁸. Fetus breathes and sleeps in unison with the mother. Fetus depends on its mother for its *Kshud, Pipasa* when inside the womb⁹. The *Garbha* is dependent upon the mother for all its activities¹⁰. The concept *Matru Paratantrata*, which emphasize that *Matru Ahara Rasa* gets absorbed by the *Garbha* can be compared with the *Kedaara Eva Kulya Nyaya* where the *Garbha* can be compared to the *Kedaara* and *Matru Ahara Rasa* to the *Kulya* as the *Ahara Rasa* is transported from the *Matru* (Higher concentration) to the *Garbha* (Lower concentration) for the *Poshana* of *Garbha*. It can be referred to the systemic fetal circulation. According to modern science

nutrients, oxygen and antibodies are provided to the fetus from the maternal circulation. Major activities like oxygenation, digestion and absorption are not yet started and these will start after birth i.e., nutrition through feeding and oxygenation through breathing. Other than *Matru Ahara Rasa*, the development of fetus is also influenced by *Matrujadi Shad Bhava* and *Panchabhootatmaka Bhava*. Their influence is more towards the neurological aspects like faulty of sense, tactile sensations and individuality development. *Maatruja Ahara Vihara Dosha*¹¹ refers to improper diet and regimes of mother during *Garbhadana Kala* are one of the contributing factors for *Garbha Vikruti* and *Anuvamshika Vyadhi*¹². Development of healthy fetus and to prevent the nutritive anomalies of the fetus, *Ayurveda* has elaborated *Garbhini Ahara Paricharya* and also importance of *Garbhini Ahara Rasa* is mentioned in terms of *Masanumasika Ahara*. If we compare the concept of *Garbha Poshana* and foetal nourishment explained in *Ayurveda* and modern science, a similarity related to dependency of fetus on mother can be established. Fetus gets nourished by fetoplacental circulation similar to the concept told in *Ayurveda* that *Garbha* acquires *Poshana* through *Matru Ahara Rasa*. All the *Bhrihatrayees* have explained the relation between the fetus and mother as the former's dependency on the latter for its nourishment and a safe environment for its development. Dysfunction in fetal circulation can cause respiratory distress in the fetus or neonatal hypoxemia which can be fatal. The balance and health of this fetoplacental circulation are essential for the well-being of both the mother and the unborn child.

CONCLUSION

The concept of *Garbha Matru Parathantrata* relates to the dependency of fetus on its mother for its nutrients. The *Ahara Rasa* from mother being conveyed to the *Garbha* via two anatomical structures namely *Apara* and *Garbha Nabhi Nadi* for its growth and development. After placenta formation fetus gets nourished through the circulation from placenta to fetus through fetal placental circulation. *Maturahara Rasa* is the major source of nourishment for the fetus which will be obtained to it through fetoplacental circulation via umbilical vessels. Since *Rasa* is the major source of nourishment for the fetus, the knowledge about *Garbha Poshana* can be used in both prevention and treatment of *Garbha Vikruti*. So, understanding about it, is important as dysfunction in fetal circulation can lead to respiratory distress to the fetus or neonatal hypoxemia which can be fatal.

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