



Research Article

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ANATOMICAL ENTITY OF NABHI MARMA: AN OBSERVATIONAL STUDY

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ABSTRACT

The Nabhi is the site of Prana, also Moolasthana of Sira. The Nabhi Marma is located between the Pakvashaya and Amashaya of the body (Udara Marma), Sira Marma. Injury to Nabhi Marma can cause immediate death or death within seven days (Sadhyahara Pranahara). Measurement of Nabhi Marma is about 4 Angula Pramana. It is also a surface landmark of the anterior abdominal wall. The exact location & structure of Nabhi Marma is not mentioned in the classics; scattered references are available in classical texts of Ayurveda about Nabhi, which does not make a proper interpretation. So, there is a need to properly review & observation to assess the possible location & structure of Nabhi Marma.

Keywords: Nabhi, Marma, Umbilicus, Umbilical Cord, Udara Marma

INTRODUCTION

Ayurveda is the most reliable, novel and complete ancient medical science, which have its signature over time immemorial. Even though the theories of modern science are changing from time-to-time Ayurveda has maintained its genuine nature to date. So, to fulfil the aim of Ayurveda, the knowledge of Shareera Rachana is equally essential. Acharyas had mentioned 107 Marma in our body if persons injured in the vital spots die immediately; if anyone survives by the physician's efficiency, he may suffer from deformities¹. Acharaya Sushruta has described each Marma are constituted by Mamsa, Sira, Snayu, Asthiand Sandhi. But according to the predominance of each structure present in that area, such as Mamsa Marma, SiraMarma, Snayu Marma, Asthi Marma and Sandhi Marma². Nabhi Marma is a Sira Marma situated between Amashaya & Pakvashaya; injury to Nabhi marma leads to immediate death³.

AIMS & OBJECTIVES

1. To assess the location, structural composition of Nabhi Marma.
2. To analyze the clinical importance of vascular structure around Nabhi Marma.

MATERIALS AND METHODS

Literary study - Classical textbooks of Ayurveda & contemporary science, journals, publications, articles, e-journals etc.,

Observational study - Dissection was performed in the P.G Department of Rachana Sharir, Sri Ganganagar College of Ayurvedic Science & Hospital, Sri Ganganagar, Rajasthan. The

region of Nabhi Marma & the surrounding area was dissected & a complete anatomical study was done.

Assessment Criteria

Based on cadaveric dissection, the surface and regional anatomy of the Nabhi Marma (around the umbilicus region & anterior abdominal wall) was determined. With the help of literary and observational study, the location and anatomical structure of Nabhi Marma was approximated. The applied importance is also analysed by studying published articles, journals & various surgical books.

LITERARY REVIEW

Classical review

The word Nabhi is derived from 'Nah', which means to bind, tie or cause together and banded. This is compared to the axle of a wheel keeping its spikes bonded to the central point. Details of Nabhi Marma are described in (Table 1).

Table 1: Features of Nabhi Marma

Features	Details
Name	Nabhi Marma
Location	In between Amashaya & Pakvashaya
Number	One
Type (predominant structures)	Sira Marma ⁴
Injury effect	Sadhyahara Pranahara
Measurement (Pramana)	Four angula ⁵

Silent features of Nabhi

There is 700 Sira in the human body. Nabhi is the origin point of Sira⁶; all the Siras are connected to Nabhi in radiating manners like spokes of a wheel. Prana is located at the site of Nabhi⁶. Acharya Vagbhata in Ashtanga Hridayam includes Nabhi as one among the ten seats of Jeevita⁷ (Dasajeevitadhamani), while Ashtanga Samgrakaram mentioned Nabhi as one of the Dasapranayatana⁸. Acharya Sharangadhara said there is twenty-four Dhamani, which are connected to Nabhi. In twenty-four Dhamni, ten goes upward, ten downwards & four transversely. Dhamani carries Rasa & nourishes the body.

The concept of Nabhi Naadi has great importance in Garbha Sharir. It is the only pathway to connect between the mother and fetus during embryonic life. According to Vagbhata, Nabhi connects the fetus with the mother's Hrudaya. It helps to provide nutrition to the fetus⁹. Sushruta opines that the Nabhi Nadi of the fetus is associated with the Rasa Vaha Naadi of the mother, which conveys the essential parts of food and vitality from the mother to the fetus the body. From the time of fertilization, till all the major and minor details which are undeveloped become clearly differentiated and developed fully, the fetus derives its nourishment by Upasneha way through the Rasa Vaha Dhamani, which are spread obliquely in all parts of its body¹⁰.

Contemporary review

The umbilicus, popularly known as the navel, is a median surface depression represented as a remnant of the fetal end of the umbilical cord¹¹. It is composed of cicatricial tissue, a weak point of the anterior abdominal wall. The abdominal wall at the umbilical region is composed of skin, superficial fascia and more or less fat, three flat muscle of the anterior abdominal wall (external oblique, internal oblique & transverse abdominis), rectus abdominis, fascia transversalis, extraperitoneal connective tissue & peritoneum. It usually is situated at the level in between L₃ & L₄ vertebrae in adults but newborns little lower position¹². The umbilicus is supplied by branches of the superior and inferior epigastric arteries, which are anastomose at the side of the umbilicus and form an essential alternative channel for blood flow in case of aortic coarctation. The paraumbilical veins (portal system) connect with superior epigastric, inferior epigastric, superficial epigastric vein, lateral thoracic, posterior intercostals & lumbar vein, forms an important venous anastomosis (porta-caval anastomosis)¹³. The umbilicus is innervated by T₁₀.

The umbilical cord is a soft, tortuous cord with a smooth outer covering of amnion. It extends from the umbilicus of the fetus to the centre of the placenta. This structure allows for the transfer of oxygen and nutrients from the maternal circulation into fetal circulation while simultaneously eliminating waste products from fetal circulation maternally. The Umbilical cord's formation begins around the 4th to 8th week of embryonic life; around the 12th week, the umbilical cord has fully formed¹⁴. Its length ranges from 50 cm to 60 cm, with about 1 - 2 cm diameter. The cord is composed of the umbilical vein, remnants of vitello-intestinal duct, a pair of umbilical artery & remnants of allantois situated within the tube of amnion. It allows free movement of an embryo within the amniotic cavity¹⁵.

OBSERVATION & DISCUSSION

After removing the anterior abdominal wall layer, the area around the umbilical region (4 Angula Pramana) was approximated. Following vascular structure was observed- The abdominal aorta, inferior vena cava, superior mesenteric vessels& inferior

mesenteric vessels with its branches, anastomosis between superior epigastric and inferior epigastric arteries (Figure 1-3).



Figure 1: Location of Umbilicus



Figure 2: Superior Mesenteric Vessels



Figure 3: Abdominal Aorta, Inferior Mesenteric Artery

Nabhi Marma is a Sira Marma situated between Amashaya & Pakvashaya. Measurement about 4 Angula, injury to Nabhi Marma leads to immediate death. According to Sir Monier Williams dictionary, the word meaning of Sira is a stream; any tubular vessels of the body, nerve, vein, artery, tendon¹⁶. The umbilical scar contains four fetal structures: the umbilical vein, umbilical arteries & the urachus¹⁷. Towards birth, the vitelline duct and its vessels and the yolk sac usually disappear, leaving only three umbilical vessels, namely, two arteries and one vein.

The fetal umbilical vessels become obliterated and fibrosis by time to form ligaments. The umbilical vein forms the ligamentum teres (round ligament) that connects the umbilicus with life after birth. The proximal portions of the intra-abdominal umbilical arteries become the internal iliac and superior vesical arteries, while the distal portions are obliterated and form the medial umbilical ligaments¹⁸. At the same time, the urachus "remains of fetal allantois" is obliterated and includes the median umbilical ligament.

The superior & inferior epigastric artery may be injured by any surgical procedure, such as Laparoscopic surgery. The superior epigastric artery (SEA) is one of two terminal branches of the internal thoracic (also known as internal mammary) artery that runs just lateral and posterior to the sternum, and it supplies the rectus abdominis musculature bilaterally until it anastomoses

with the inferior epigastric artery approximately at umbilicus level. The inferior epigastric artery is a branch of the external iliac artery that originates just above the inguinal ligament. It courses superiorly and medially towards the umbilicus.

Surgically, the epigastric arteries along the abdominal wall are vital for many procedures such as trocar placement in laparoscopic surgeries, percutaneous endoscopic gastronomy (PEG) tube placement, inguinal hernia repair, paracentesis, and drain placement during cardiothoracic surgery. The inferior epigastric vessels injury is uncommon (2%) in operative laparoscopic procedures during insertion of lateral trocars¹⁹. Damage to the inferior epigastric artery may cause necrosis of the rectus muscle if sufficient blood flow does not maintain via the superior epigastric artery or collaterals²⁰. In the case of aortoiliac occlusive disease, the inferior epigastric artery plays a vital role in collateral blood supply to the leg by reversing the blood flow; its occlusion or injury may increase leg ischemia²¹.

Rectus Sheath Hematoma (RSH) is a rare case most often associated with abdominal wall trauma or anticoagulation. Clinical presentation is often non-specific may present with pain and swelling/mass in any four abdominal quadrants (typically the lower quadrants). Rectus sheath hematoma occurs due to injury to an epigastric artery or its perforating branches within the rectus muscle. This sheath protects the superior & inferior epigastric artery. So, increased abdominal pressure due to violent muscle contraction can easily damage the epigastric vessels²².

The term portal hypertension refers to elevated pressures in the portal venous system. Portal hypertension may be caused by intrinsic liver disease, obstruction, or structural changes resulting in increased portal venous flow or hepatic resistance. Patients with liver cirrhosis may present with cutaneous manifestations such as visible varicose veins on the abdominal wall called caput-medusae. The term caput is a Latin word for head, and medusa was a monster with hair made of snakes, moving in all directions. Caput medusa means the appearance of distended and engorged umbilical veins surrounding the umbilicus²³.

The Cruveilhier Baumgarten syndrome is used for cases of portal hypertension due to any cause in which a loud venous murmur can be heard over the upper abdomen. In 1833, Pegot reported the first case of portal hypertension in which a loud venous hum was heard at the umbilicus, elaborated by Cruveilhier but in 1908, Baumgarten also reported a similar case. It occurs due to congenital patency of the umbilical vein associated with congenital hypoplasia of the liver and portal system. It is present with prominent umbilical/para-umbilical veins, abdominal venous hum with thrill, splenomegaly, normal or small liver without evidence of cirrhosis, portal hypertension with esophageal varices, mildly altered liver function & slightly increased bilirubin (Specially conjugated) and alkaline phosphatase²⁴.

Inferior vena cava syndrome (IVCS) is caused by physical invasion or compression by a pathological process or thrombosis within the vein. The pathogenesis of IVCS due to the vena cava obstruction and compression by adjacent structures. Carcinoma of organs near the IVC, such as renal cell carcinoma, gastric adenocarcinoma, pancreatic adenocarcinoma, primary or metastatic hepatic cell carcinoma or tumour of any organ surrounding the IVC can compress, which leads to obstruction of venous return to the heart²⁵.

CONCLUSION

The Nabhi Marma, situated between Amashaya & Pakvashaya, measures about 4 Angula. So, based on the literature review and cadaveric observation, Nabhi Marmacan's location is approximated at the umbilical region of the anterior abdominal wall. It is Sira Marma, but around the umbilicus region, several structures were observed. However, Sira is a vascular structure. The vascular structures under the umbilical region are - abdominal aorta, inferior vena cava, superior mesenteric artery with its branches, anastomosis between superior epigastric and inferior epigastric arteries. The region of Nabhi Marma, the surrounding area of the anterior abdomen, is also vital. But the effect of injury will be less as there is no direct involvement of significant vessels like the abdominal aorta. These injuries may cause a severe injury which can lead to death later.

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