

OBSERVATIONAL STUDY OF UDARPHALAK WITH RESPECT TO SUSHRUT SAMHITA AND DISSECTION METHOD

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ABSTRACT

Charak, Sushrut & Vagbhat are three main founders of *Ayurveda*. Hence we call them as *Brahattrayi* of *Ayurvedic* science. Principles of *Ayurvedic* sciences are unchangeable from ancient times. Various information regarding body has been explained very clearly in *ayurvedic Samhitas*. These *samhitas* written according to various divisions as *Sharirsthana* (Anatomy and Physiology) *nidanasthana* (diagnosis) *Kalpasthan* (various drug information), *chikistasthan* (treatment). In *Ayurveda* description of body structure & their functions is given in '*Sharirsthana*'. In *sharirsthana* all structures along with muscles are given. Numbers of muscles, their functions and types are mentioned nicely in this chapter. These muscles are arranged in head-neck, thorax-abdomen & four extremities. Individual information of muscles, number of muscles in specific region is given by *Sushrut*. But *Sushrut* commentator *Dalhan* keenly added regarding muscles of *Uar & Udar* and he told that these muscles of the abdomen form a *phalak* and given name as a *Udarphalak*. *Dalhan* given same description as given in modern science and we can see it by dissection also. Thus concept of *Udarphalak* is elaborated with the help of modern anatomy and by dissection method. This gives clear idea about *Ayurvedic* terminology to medical students.

Keywords: *Udarphalak*, anterior abdominal wall, muscles, *peshi*, aponeurosis, *udar*.

INTRODUCTION

According to modern science human anatomy is developed in last 4 to 5 centuries. It is developed due to various inventions are made in the medical field to see minute structures like cell structures seen by microscope. But in *Ayurveda* various information is given which we can prove on the modern basis. In case of *Udarphalak* a bit of information is given but we can see now-a-day by dissection also. According to modern anatomy six regions are Head-neck, Thorax-abdomen & four extremities *Ayurveda* divides body in six parts. Four *Shakha* (ex-

trimities) *Shir* (head neck) a *Madhyasharir* (*Uar & Udar*) (thorax & abdomen) *Dhalana* again clears concept of *madhasharir* *Madhyamida kantadigudparyantacha* |1

Madhya means a region from base of *Kantha* or cervical part upto or anal region. Cervical region mean the part near Adam apple. The parts from larynx or pharynx where trachea and esophagus starts. These parts come under *Uar* (thorax) region. *Madhyasharir* has thoracic cavity abdominal cavity & pelvic cavity. This cavity contains various important organs like heart, lungs,

liver, kidney, bladder etc. The musculo-skeletal wall of thorax is flexible & consists of segmental arranged vertebrae, ribs & muscles & and sternum. Thorax is bounded by sternum anteriorly which is called as *Uarphalak* by *Dalhana*.|2

The thorax is an irregularly shaped cylinder with a narrow opening called superior thoracic aperture & relatively large opening inferiorly called inferior thoracic aperture. The superior thoracic aperture is open allowing continuity with neck & inferior thoracic aperture is closed by diaphragm.|

The abdomen is roughly cylindrical chambers extending from inferior margin of thorax to superior margin of pelvis & the lower limb.|4

Antradhi Sharirmadhyabhaga iti

Anataradhi madhama-marge, madhyabhag are synonyms of mid part of body or thorax abdomen region. Some says it as *kostha*.|5

Thorax & abdomen is defined as middle part of the body. The wall consists partly of bone but mainly of muscles. The skeletal element of wall is formed by various muscles.|6 *Nabhihradayanataram tatha griva hradayanataram pratyaka dwadashagula mehananabhyanatara dwadashagula* |7 The distance from Umbilicus (*Nabhi*) to heart & heart to neck is 12 *Angula*. Also the distance from umbilicus to root of penis is also 12 *Angula*. Hence total distance from the neck to root of penis is 36 *Angula*. Thus extension of madhasharir from neck to penis or penial region also described by the our ancient scholars.

Trayo Rog marga iti shakha marmashisandaya kosthacha...Punrucchate mahastrotae Sharirmadhy Mahanimsnamamupakwashay cheti paryay shabade stantarasa Rogmarga Abantara |8 *Charak* says

that there are 3 paths of disease *Shakha, marma asthi-sandhi, & khota*. Mainly extremities, joints, bones and *marma* are *bahya-rogmarga* and region of thorax and abdomen is *kotha* or also called as *abhatanar Roga marga*. i.e. path of diseases. *Madhyasharir* is divided into *Uar & Udar* according to ancient science.

Manasavayava Parasapar vibhakti peshi itichute |9

Body's main constituent is *Dhatu*. There are 07 *dhatu* which build up human body & one of main factor of the body is *Mansa*. When this *Mansa Dhatu* divides into various parts, each part is called as *peshi*. This *peshi* makes *lepana karma*. *Lepan* means to cover the body or cover the organs or bones.

Pancha Peshishtani bhavati | tasa chatawari shatani shakhasu Koshthe Shatapati gariva Praturdhave chaturrishanti|10

There are 500 hundred muscles in the human male body and 520 in the female body. Out of 500 nearly 400 hundred present in the *shakha* or 04 extremities 66 in the *Koshthasharir* or thorax & abdomen & 34 in the *shirbhag* or head & neck region. Muscle of abdomen & thorax are nicely described by *Susruta*. Out of 66 muscles present in *madhyasharer* some muscles present in anal region, some in penis & in perineal ligature, in spermatic cord, in heart, in bladder, in liver, spleen & stomach etc. *Sushrut* has described that 5 muscles are present in the anterior abdominal region.

Panchodare |11 *Sushrut* gives number of muscles of the abdomen are 5 and these muscles forms the abdominal wall. He hadn't given specific names for these muscles. There are five muscles in anterior abdominal wall or anteriolateral group. Three flat muscles whose fibers begins posteriolaterally pass anteriorly & are replaced by ap-

oneurosis as the muscles continuous towards the midline by external oblique, internal oblique & transverse abdominis muscles. Each of these five muscles has specific actions but together these muscles are critical for maintenance of many normal physiological functions by their portioning they form firm, flexible, wall and are replaced by aponeurosis as the muscle continuous towards the midline external oblique, internal oblique & transverse abdominis muscle. Two vertical muscles near the midline which are enclosed within a tendinous sheath formed by aponeuroses of flat muscles. Anterior abdominal wall is formed by large rectus abdominis and small pyramidal [12] The *sushrut* commentator *Dallhan* write in his comment, *Gayi* says that the anterior abdominal wall forms *phalak*.

Tistro valisadhaka gude basti Shirasi Saptaudarphalake yakrutadibhi [13] *Atharadhi* has abdominal and thoracic part having thoracic cavity, abdominal cavity & also pelvic cavity various parts like *yakrut* or liver, heart, lung, kidney, bladder, spleen, pancreas are present in this cavities the organs are protected as well as kept in position due to these abdominal muscles. The musculotendinous diaphragm separates the abdomen from thorax. It is structure pass between two regions. Diaphragm fills inferior thoracic aperture. [14] In *Sanskrit* distance meaning *phalaka* is given as *Patta*, (flat strip) *Shila* (plane stone), *Patal* or layered structures. These all meaning indicates that plane, flat & long band like structure & *Udarphalak* resembles as a *phalak* given in *Sanskrit* dictionary that is strip like structure or long muscle. [15] *Charak* gives explanation regarding *kostha*. Mainly anterior abdominal wall is made up by the muscles posteriorly or laterally by vertebral column

and quadratus lumborum, psoas major, iliacus. Lateral part of abdominal wall is formed by 3 layers of muscles that are transversus abdominis, internal oblique & external oblique. Anteriorly segmented part of rectus abdominis muscles on each side.

IV) Material & Methods :-

Material –

1. To collect available literature regarding *peshi & udar*. Also literature regarding muscles of the abdominal wall.
2. For dissection purpose a dissection materials forceps, scalp, blade, gloves, apron etc. & a cadaver for dissection.

Methodology:-a) literary Study:-

1. Collection of necessary reference regarding *uar* and *udar kostha* from *Sushrut Samhita & Dalhana Tika*. -4
2. Also various references collected from grey's anatomy & other anatomy books

b) Cadaveric study:- Dissection of anterior abdominal wall of cadaver done in dept of Sharir Rachana of ADAMC, Ashta from lower end of neck to pubic symphysis. The superficial fascia, deep fascia, & muscles of the abdominal wall is observed. Dissection is done according guidelines of Cunningham manual of practical anatomy.

c) Literary study & observed things at time of dissection verified

d) Correlated literary data & observed things and conclusion is drawn.

V) Observations: - The abdomen wall is dissected according to direction of Cunningham manual of practical anatomy. The sections are taken according to directions of Cunningham for thorax and abdomen. Firstly skin is reflected then superficial layer & deep layer has been seen along with superficial vessels & nerves. After deep dissection three flat muscles & two vertical muscles are seen.

Sr.No.	Muscle	Origin	Insertion
1	External oblique	outer surface of lower eight ribs	Lateral lip of iliac crest aponeurosis ending in midline raphe
2	Internal oblique	Thoracolumbar fascia & iliac crest and lateral 2/3 of inguinal ligament	Inferior border of lower four ribs aponeurosis ending in linea alba
3	Transverse abdominis	Medial lip of iliac crest and lateral 1/3 of inguinal ligament	Aponeurosis ending in linea alba, pubic crest & pectineal line.
4	Rectus abdominis	Pubic crest, pubic tubercle, pubic symphysis	Costal cartilages of V to VII ribs and xiphoid process
5	Pyramidalis	Front of pubic & pubic symphysis	Into linea alba.

(Table no. 1)

The rectus abdominis & pyramidalis muscles are closed in aponeurotic tendinous sheath called rectus sheath formed by unique layering of aponeurosis of external & internal oblique & also transverse abdominis muscles. |16

DISCUSSION

Ayurvedic sharir is well described in ancient literatures. But reference of sharir is in scattered form as in abstract form. In Fifth chapter of Sharirasthan information regarding various parts or organs and their numbers nicely described. As Ayurveda mentioned six regions of the body, same has been described in the modern science. The Peshi is also formed by the division of mansa dhatu and it works as lepan Karma. Lapan means the cover or protect internal parts or organs also help in the location. Nearly 500 muscles present in the body. According to Sushrut 400 muscles present in Shakra or extremities, 66 in the thorax & abdomen & 34 muscles present in head neck region. out of 66 muscles 5 muscles are present in the abdominal region. Anterior abdominal wall extends from the process which lies at the level of 9th thoracic vertebra to the pubic

symphysis which lies at the level of coccyx. The skin of anterior abdominal wall is capable of undergoing enormous stretching. Undue stretching forms whitish streaks in the skin of the lower part of the anterior abdominal wall linea alba. Superficial fascia of abdomen below the level of the umbilicus, is divided into a superficial fatty layer & the membranous layer. According to modern aspect abdominal wall is muscular and formed by external oblique, internal oblique, transverses abdominis, rectus abdominis, pyramidalis & cremaster muscles. The external oblique muscle-The upper four slips of the origin of the muscle interdigitate with those of the serratus anterior & the lower four slip with those of the latissimus dorsi. The Internal oblique Muscle-The aponeurosis takes part in the formation of rectus sheath up to the lateral margin of rectus abdominis. Transversus Abdominis Muscle-The muscle arises by two tendinous heads – lateral head & medial head. The fibers run vertically upwards. Rectus Abdominis Muscle- Muscle is enclosed in a sheath formed mainly by aponeurosis of the flat muscles of the abdominal wall. There are three transverse fibrous bands which divide the muscle

into smaller parts. Pyramidalis is small triangular muscle present in lower abdomen. If we compare these muscles with modern anatomy, there is nearly similarity to ayurvedic literature. Kostha is middle part of the body it extends from neck region to anal region. Actually in modern science it has been extended upto inguinal region. But if we consider abdominal cavity, then the last part of the alimentary canal is anus. Hence ayurvedic definition & limitation of kostha is quite right. Proportion of the umbilical region to of penis also umbilical region to neck lower border of neck is 1:2. This is ideal proportion given by Ayurveda. Distance from the umbilicus to penis is 12 angula and umbilicus to heart is also 12 angula and heart to neck 12 angula. Total distance from neck to anus is 36 angula. In the upper half of the Madha Sharir that is thorax region sternum bone is present anteriorly. This is called as Udarphalak. It keeps anterior region plane. Same work was done by antview abdominal wall which is formed by 5 muscles. Panchodare 1 The same is given in modern anatomy & discription is mentioned in Ayurveda, also we can see by dissection method. Transverse abdominis, external oblique, internal oblique, Rectus abdominis & pyramidalis they five muscles forms anterior & lateral abdominal wall.

CONCLUSION

a. Ayurvedic concepts of muscles of anterior & lateral abdominal wall is quite same as compare to modern anatomy. Ayurveda given panchodare means five number of muscle in abdomen. Same muscle 1) External oblique 2) Internal oblique 3) Transversus abdominis 4) Rectus abdominis 5) pyramidalis are present in the abdomen according to modern anatomy

b. According to Dalhana Tika, phalak is flattened structure forms flat muscular network in anterior abdominal wall called as udarphalak he consider udarphalak as saptaudarphalake is flat & plan arrangement having layers. There are 7 layers in the abdomen 1) Superficial fascia 2) deep fascia 3) Rectus abdominis 4) Ext. oblique muscle 5) internal oblique muscle 6) Transverse abdominis last is 7) peritonium which covers organs of the abdomen.

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