

CONCEPTUAL STUDY OF *DASHPRANAYATANA* W.S.R. TO *BASTI* AND ITS ANATOMICAL AND PHYSIOLOGICAL CONCEPT

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ABSTRACT

Ayurveda is an ancient science which deals with life. The Ayurvedic classical texts has unique concepts of *Prana*. According to Acharya Charaka as long as the *Prana* in corelation with *Sharira* we can sustain our life; presence of life depends on *Prana*. The word *Ayatana* means the place where the *prana* predominantly resides in our body, so for the knowing the science of life this is essential to study the *Dashapranayatana* where the the *Prana* predominantly resides. Among these *Dashapranayatana Basti* is one of the important *Pranayatana* which is also included in *Tri Marma* hence it has been studied in detail by its classical and modern concepts.

KEYWORDS: *Dashapranayatana, Basti, Marma, Bladde.*

INTRODUCTION

NIRUKTI: In the word *Dashapranayatana* *Dasha* means ten and *Prana* means life and *Ayatana* means resting place so the word *Dashapranayatana* means ten resting places where *Prana* predominantly resides in Human body.^[1] In classical texts of Ayurveda *Basti* has been mentioned vastly. *Mutrashaya* is the another term used for *Basti*. *Basti* has been included in three important *Marma* i.e. *Tri Marma*. Acharya Charaka and Acharya Vagbhata has considered *Basti* in *Dashpranayatana*.

AIM: To study concepts of *Dashapranayatana* W.S.R. to *Basti*.

OBJECTIVES

- 1) To study detailed literature of concepts of Dashapranayatana
- 2) To study detailed concepts of Basti as given in Ayurvedic classical texts
- 3) To study modern literature given in Modern texts

MATERIALS AND METHODS

- 1) Literature has been collected from classical texts of Ayurveda
- 2) Literature collected from Modern texts.
- 3) Indexed journals were reviewed to get additional information.

The collected literature from different sources has been analyzed to review the precise position of *Basti Marma* in pelvic region and the prognosis of injury at this *Marma*.

• Ayurvedic literature

A. Dashapranayatana as given in various Ayurvedic samhitas

No	Charak Samhita ^[2]	Sushrut Samhita ^[3]	Ashtang Sangraha ^[4]
1.	2 Shankh Pradesh	Murdha	Murdha
2.	Shir	Kanth	Jivha Bandhan
3.	Hridaya	Hridaya	Kanth
4.	Basti	Nabhi	Hridaya
5.	Kanth	Guda	Nabhi
6.	Rakta	Basti	Basti
7.	Shukra	Oja	Guda
8.	Oja	Shukra	Shukra
9.	Guda	Shonit	Oja
10.		Mamsa	Rakta

TRIMARMA^[5]

Marma Traya are included in *Pranayatana* i.e. site of *Prana*. As the base is destroyed, the dependent is also destructed. Likewise, the destruction of any of the three *marma* may destroy the *Prana*. One should protect these three *Marma* from external as well as internal injuries. *Trimarma* included in *Sadyahpranahara Marma*.

Shira: All the sense organs and the channels carrying the sensory and vital impulses from the *Sirah* are like the rays from the sun. This verse truly signifies *Sirah* as a *Trimarma* as it correlates it completely to the Brain.

Hridaya: It is a structure which resembles a *Pundarikena*, *Kamalamukulakaram* (lotus) in

inverted position. When body is in active phase it expands and contracts in inactive phase.

Gross Anatomy of Basti

Acharya Charaka also quotes the importance of *Basti* as a *Trimarma* saying that it means that the region named Basti is in the middle of *Sthula Guda*, *Mushka*, *Sevani*, the *Nadi* (channels) transporting *Mutra* and *Shukra*. It acts as the Reservoir of *Mutra*. As different rivers fill the ocean in similar fashion all the *Ambuvaha Srotas* (channels) transporting water fill the Basti.

Basti is an organ acts as a receptacle or reservoir of urine. This is Alabu shaped and is fixed all side by *Snayus* and *Siras*.

Basti is located in the *Madhya Shareera* (trunk, abdomen). It is present in the *abhyantara Kati* – within pelvic cavity. It is also called as *Mutrashaya*. (*Mutra* = urine, *Ashaya* = viscera, residence). *Basti* is made up of *Mamsa* (flesh, muscles) and a small quantity of *shonita* (blood).

अल्प मांस शोणितो अभ्यन्तरतः कट्यां मूत्राशयो वस्तिः नाम, तत्र

अपि सध्यो मरणम् अश्मरी व्रणादृते तत्र अपि उभयतो भिन्ने न जीवति,

एकतो भिन्ने मूत्र स्रावी व्रणो भवति, स तु यत्नेन उपक्रान्तो रोहति।(सु.शा.६)⁶

WHAT IS BASTI MARMA

It is situated in *Kati Pradesh* (pelvic region) & is surrounded by *Sthoolguda* (rectum), *Mushka* (scrotum), *Sevani* (perineal sutures), *Shukravaha* (seminal vesicle) & *Mutravaha nadi* (urinary channels). It is considered as one of the *Sadyo pranahara Marma*, *Snayu Marma*, *Udaragata Marma*, *Shad Marma*, *Maha marma* & *Pranayatan*. Shape- The shape of *Basti marma* is like *Dhanurvakra* i.e. like a curved bow. Size- *Swapanital* (4 angul= approximately 7 cm). So, a semicircle arch of 7 cm radius drawn above from the inferior border of pubic symphysis gives the area of *Basti Marma*.^[7]

Structure associated with Basti Marma

The structures related to the area of this arch can be considered as structures of Basti marma

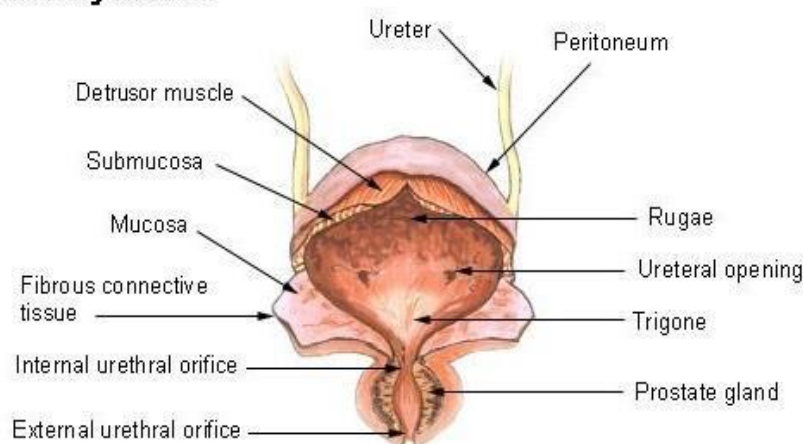
1. Urinary bladder & its associated structures (terminal part of ureter, vas deference & seminal vesicle)
2. Ligaments of bladder i.e. puboprostatic/ pubo vesical ligament and another ligament of bladder.

3. Arterial supply of bladder i.e. internal iliac artery & its branches.
4. Venous drainage of bladder i.e. internal iliac vein & its tributaries from urinary bladder.
5. Nerve supply of bladder i.e. braches from inferior hypogastric plexus & pelvic splanchnic nerve.
6. Lymphatic drainage of bladder.
7. Prostate & prostatic urethra.

The injury of these structures may cause death if proper medication is not given in time.

ANATOMY AND PHYSIOLOGY^[8]

Urinary Bladder



The urinary bladder is a hollow muscular organ situated at the base of the pelvis in humans that stores urine from the kidneys before disposal by urination. In humans the bladder is a distensible organ that sits on the pelvic floor. Urine enters the bladder via the ureters and exits via the urethra. The typical human bladder will hold between 300 and 500 ml before the urge to empty occurs, but can hold considerably more.

In gross anatomy, the bladder can be divided into a broad fundus, a body, an apex, and a neck. The apex is directed forward toward the upper part of the pubic symphysis, and from there the median umbilical ligament continues upward on the back of the anterior abdominal wall to the umbilicus. The peritoneum is carried by it from the apex on to the abdominal wall to form the middle umbilical fold. The neck of the bladder is the area at the base of the trigone that surrounds the internal urethral orifice that leads to the urethra. In males the neck of the urinary bladder is next to the prostate gland.

The bladder has three openings. The two ureters enter the bladder at ureteric orifices, and the

urethra enters at the trigone of the bladder. These ureteric openings have mucosal flaps in front of them that act as valves in preventing the backflow of urine into the ureters, known as vesicoureteral reflux. Between the two ureteric openings is a raised area of tissue called the interureteric crest. This makes the upper boundary of the trigone. The trigone is an area of smooth muscle that forms the floor of the bladder above the urethra. It is an area of smooth tissue for the easy flow of urine into and from this part of the bladder - in contrast to the irregular surface formed by the rugae.

The walls of the bladder have a series of ridges, thick mucosal folds known as rugae that allow for the expansion of the bladder. The detrusor muscle is the muscular layer of the wall made of smooth muscle fibers arranged in spiral, longitudinal, and circular bundles. The detrusor muscle is able to change its length. It can also contract for a long time whilst voiding, and it stays relaxed whilst the bladder is filling. The wall of the urinary bladder is normally 3–5 mm thick. When well distended, the wall is normally less than 3 mm.

Blood supply

- Vesicle Arteries
- Vesicle Veins

Nerve Supply

- Superior and inferior hypogastric plexuses
- Pelvic splanchnic nerves.

Effect of Injury

तत्र अपि सध्यो मरणम् अश्मरी व्रणादृते तत्र अपि उभयतो भिन्ने न जीवति,

एकतो भिन्ने मूत्र स्रावी व्रणो भवति, स तु यत्नेन उपक्रान्तो रोहति।(सु.शा.६)⁹

Sushruta has explained that injury to *Basti* (urinary bladder) causes death except in case of calculus but if it is injured on both side due calculus then the patient doesn't survive, if it is injured on one side then it heals with difficulty after great effort. The above description of Sushruta indicates towards Bilateral intravesical ureteric calculus, If the renal stone may get impacted at intramural part or ureteric orifice of bladder on both sides then there is the chance of death within seven days due to backflow of urine.

BLADDER INJURY^[10]

Bladder injury can result from External trauma (82%), Iatrogenic causes (14%) and Spontaneous bladder rupture (1%)²¹. External trauma is either due to blunt injury or penetrating injury. Blunt injuries may be caused by road traffic accidents (car accidents, bike accidents), blow or kick due to sudden fall from height and penetrating injuries may occur due to gunshot (85%), stab wound (15%). The Iatrogenic causes are Obstetric trauma (may occur during forceps delivery/prolong labor i.e. pressure from fetal head to mother pubis), Gynecological trauma (may occur during vaginal /abdominal hysterectomy), urologic trauma (may occur during biopsy, endoscopy, cystolitholapaxy), orthopedic trauma (may occur during internal fixation of pelvis). These injuries may cause bladder rupture either extraperitoneal or intraperitoneal or combined.

Intraperitoneal rupture

It occurs in 20% of cases of bladder rupture and usually occurs in a fully distended bladder because the bladder dome or superior surface is the only portion of bladder covered by peritoneum so any injury to this surface cause intra peritoneal rupture. This rupture of bladder cause leakage of urine into peritoneal cavity resulting in peritonitis. Peritonitis is one of the major causes of acute abdomen and may cause death within in 7 days following septic shock. The injury may cause damage to internal iliac artery and its branches in pelvic region resulting in hypovolemic shock.

Extraperitoneal rupture

It is the more common than intraperitoneal rupture, occurs in 80% of bladder rupture cases. It occurs commonly in a nondistended bladder & it is secondary to pelvic fracture leading to avulsion tear at puboprostatic and pubovesical ligament. This rupture may cause death within seven days due to shock. Extraperitoneal rupture → Collection of urine & blood in pelvic cavity → Pain, abdominal fullness, inability to micturate → Often associated with shock & other injury. The clinical features of extraperitoneal rupture are-There is collection of urine and blood in the extraperitoneal space in front, with fullness, diffuse pain & tenderness in lower abdomen, swelling in the scrotum or labia and abdominal wall, strangury & inability to pass urine, often clotted blood in the external meatus is noted, features of shock & other associated injuries may be noted. These clinical features are correlative to traumatic features of Basti Marma.

Pelvic fracture^[11]

Pelvic cavity is mainly supplied by internal iliac artery & its branches so any injury to this cavity there is chance of arterial hemorrhage (mainly in vesical artery supplied to bladder), this arterial hemorrhage may cause death within 7 day. Arterial hemorrhage is the most serious problem associated with it. Mortality rate of pelvic fracture with hemorrhagic shock is 36% to 54%. These fractures are 3 types i.e. anteroposterior, vertical, lateral. Complication of this fracture are hypovolemic shock (due to internal bleeding), visceral injury, Nerve damage, DVT (deep vein thrombosis) & other complications.

RUPTURE OF POSTERIOR URETHRA

Posterior urethra can also be included in the area of Basti marma. Rupture of posterior urethra is usually associated with pelvic fracture commonly due to road traffic accidents. In any injury to pubic symphysis there is the chance of internal bleeding due to tear in bladder wall by puboprostatic ligament which leads to hypovolemic shock and death within 7 day. The other causes of rupture of posterior urethra are urethral instrumentation, calculus passage, catheterization & during prolong labor. The clinical features are Blood at external urinary meatus and inability to micturate, supra pubic tenderness & dullness, features of shock due to blood loss, extravasation of urine in to peritonium.

CONCLUSION

The *Dashpranayatana* are the vital places in the body where prana resides. *Basti marma* is amongst the *dashpranayatana*. *Basti Marma* is situated over lower abdomino-pelvic region. The tissues involved in *Basti Marma* are urinary bladder, terminal part of ureter, prostate & prostatic urethra puboprostatic/ pubovesical ligaments and other ligaments, vesical branches of internal iliac artery, internal iliac veins and its tributaries from bladder, sympathetic and parasympathetic nerves from inferior hypogastric plexus etc. In ancient era the penetrating injuries due to sharp weapons used in the war were the major cause of bladder injury but these days the blunt trauma due to road traffic accidents and sports injury are the main causes of bladder injury. These injuries can damage the bladder extraperitoneally, intraperitoneally or both. The extraperitoneal injuries are inevitability related to pelvic fracture and tear due to avulsed ligament of bladder, perhaps this is the reason why Sushruta has classified this *marma* under *Snayu Marma*. The intraperitoneal injuries of bladder cause peritonitis and death may occur following septic shock if proper medication is not provided in time. Now a days mortality from bladder injury has been greatly decreased due to reduced time interval

between trauma and medical service, knowledge of mechanism of injury, accurate diagnosis by uro-radiological investigation, quick availability of blood and other fluid supplements and prompt surgical repair.

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