

SURGICO ANATOMICAL IMPORTANCE OF BASTI MARMA AND ITS SADHYA-PRANAHARATVA W.S.R. TO BLADDER INJURIES ALONG WITH URINARY-PERITONITIS**Dr. Manoj Mathuriya*¹, Dr. Mahendra Kumar Sharma² and Dr. Anamika Vyas³**¹PG Scholar, Department of Rachana Sharir, PGIA, DSRRAU, Jodhpur.²Professor and HOD, Department of Rachana Sharir, PGIA, DSRRAU, Jodhpur.³Assistant Professor, Department of Rachana Sharir, Merchant Ayurved College, Mehsana.***Corresponding Author: Dr. Manoj Mathuriya**

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Article Received on 03/04/2024

Article Revised on 24/04/2024

Article Accepted on 15/05/2024

ABSTRACT

Ayurveda is the science of life. The science of *Marma* is given by physicians and surgeons of ancient *Vedic* period to prevent death and treat the people suffering from trauma in any type of war. However there are some narration in *Ayurvedic* texts which indicates the importance of *Basti Marma* such as *Sadhyapranahara Marma*, In *Ayurveda*, *Acharya Sushruta* describes the *Marma* according to surgical and anatomical point of view. The human body consists of 107 *Marmas* out of them 19 are *Sadhyapranahara*, their involvement in homeostatic function is responsible to sustain the life of an individual. Anatomically, *Basti Marma* as urinary bladder and its relationship with peritoneum is also essential to consider in respect of trauma to this particular *Marma* in its *Sadhyapranaharatva*. Any injury to *Basti Marma* may causes various life threatening conditions such as generalized peritonitis, septic shock, disseminated intravascular coagulation, Pseudo renal failure, urinary ascites, multiple organ failure associated with spontaneous urinary bladder rupture (SBR), trauma on *Basti* region with SBR can causes sudden death due to hypovolemic shock, obstructive shock like pulmonary embolism, So there is a need to review the anatomical position of *basti* and other related delicate structures found around *Basti Marma* to show fatality or *Sdhaya-pranaharatva* in present era for future practices. Now a days blunt trauma i.e. road traffic accidents, sports injury, has become the leading cause of pelvic injury. So it is very essential to understand about the *Basti Marma* and traumatic effect on the urinary bladder in the light of contemporary science. In this article an attempt has been made to show its fatality or *Sdaya-pranaharatva* in context to peritonitis along with we will gain some knowledge related to important structures around *Basti*, though we can prove the surgico- anatomical importance of *Basti Marma* to highlight its *Sadhyapranaharatva*.

KEYWORDS: *Basti Marma*, *Sadhyapranahara Marma*, Generalized Peritonitis, Spontaneous Bladder Rupture, and Urinary Ascites.

INTRODUCTION

Ayurveda is the oldest medical science which deals with physical and psychological health of the human being. To achieve the purpose of life, that is *Dharma*, *Artha*, *Kama*, *Moksha*- one should concentrate on having long life. *Marma* science is one of the unique concept of *Ayurveda*. In 9th chapter of *Siddhi -Sthana*, it has been rightly stated that 107 *Marmas* descried all over the body are precisely situated, i.e. *Shiro*, *Greeva*, *Madhya Sharir* and *Shakha*. In view of significance, the *Marmas* situated over the trunk carry more importance in comparison to those situated over the extremities. Structures getting involved at the site of *Marmas* have been muscles, blood vessels, nerves, tendons, ligaments, bones, and their joints. Any trauma to any one of these *Marma*, is likely to cause unbearable pain or result to death, syncope etc.as the

Chetana (conscious), *Prana* (life), are very close to these *Marmas*.

The knowledge of *Marma* is not only essential to understand where these *Marma* area resides in human body but also for surgeons and physicians in present days of advance surgeries. There should be clear-cut knowledge of vascular system, nervous system, muscular system, ducts and their courses, to save these vital areas so with the view to have an expertise operations on the patients to minimize the hazards and life threatening risks during medical interventions or surgical procedures.

AIMS AND OBJECTIVES

1. The purpose of this paper to explain the conceptual aspect of *Basti marma*.

- To explain the anatomical position and structural entity around *Basti Marma* find the knowledge of structures related to *Basti Marma* that affects the longevity of a person.
- To explain surgico- anatomical importance in context to Urinary-Peritonitis.

In *Vedic* literature, many references can be found regarding any injury at *Marma* areas and protection of one's *Marma* by wearing guards but now a days, road accidents, sports injuries are the main causes of pelvic injury resulting in urinary bladder trauma. So, to overcome these situations, individuals must know the location of vital areas of our body for protection and medication may be provided to the sufferer of bladder injury and any faulty procedure may be avoided during

surgery.

LITERATURE REVIEW

Classification of Marma

Marma word is derived from “*Mru*” *Dhatu* combined with “*Manin*” *Pratyaya* gives rise to word *Marma* which means *Jeevasthane*, *Sandhi Sthane* or *Taatparya*.

There are Total 107 *Marma's* in the human body.) Classification based on Tissue Involved *Mansa Marma* - 11, *Asthi Marma* - 8, *Snayu Marma* - 27 *Sandhi Marma* - 20, *Sira Marma* - 41.

On the basis of outcome of Injury of an Area- *Basti Marma* has been classified under *Sadhyo pranahara Marma*.

<i>Marma</i>	<i>Bhoutik</i> constitution	Effect of injury
<i>Sadhyo pranahara</i> -19	<i>Agni</i>	Injury to this <i>Marma</i> causes death within 7 days,
<i>Kalantara pranahara</i>	<i>Soma</i> + <i>Agni</i>	Injury to this <i>Marma</i> causes death within 15 days
<i>Visha lyaghna</i>	<i>Vayu</i>	Injury to this <i>Marma</i> , person survive until the foreign body remain at site of <i>Marma</i>
<i>Vaikalyakara</i>	<i>Soma</i>	- Injury to this <i>Marma</i> , deformity of that part
		occurs which are dependent on that specific <i>Marma</i> ,
<i>Rujakar</i>	<i>Agni</i> + <i>Vayu</i>	Injury to this <i>Marma</i> causes only pain.

Anatomical consideration of Basti Marma in Ayurveda- It is considered as one among 56 *Pratyanga*, 10 *Pranayatana* and 15 *Kosthanga*. *Basti* is the *Moolasthan* for *Mutravaha Srotas*. *Basti Marma* is related to *Jala Mahabhuta*. *Basti* (urinary bladder) is important part of *Mutravaha Samsthan* (urinary system) *Basti Marma* is situated in *Kati Pradesh* (pelvic region)^[1] and is surrounded by *Sthula Guda* (large intestine and rectum), *Muska* (testicles), *Sevani* (perineal raphe) and the *Shukravaha* (seminal vesicle) & *Mutra Vaha Nadi* (urinary channels)^[2] and has less *Mamsa* (muscle), *Rakta* (blood) and performs the function of reservoir of urine.^[3] *Basti* is considered as one of the *Sadyopranahara Marma*, *Snayu Marma*, *Udargata Marma*^[4], three *Pradhan Marma*^[5] (*Trimarma-Hridaya*, *Basti*, *Shira*) and *Pranayatananamuttamam*, the best among the organs hosting the *Prana*.

The shape of the *Basti Marma* is just like *Dhanurvakra*^[6] i.e., like a curved bow. Size of *Basti Marma* is *Swapanital* (4 *Angula* approximately 7 cm.) It acts as the *Adhara* of *Mutra*. As different rivers fill the ocean, in similar fashion all the *Ambuvaha Srotas* - channels transporting water fill the *Basti*.^[7]

Embryology of Basti

According to the fundamental principles of *Ayurveda* the human body is constituted on the basis of the *Panchmahabhuta* (five elements) and *Tridosha* (three bio-elements) at the time of combination of *Shukra* (sperm) and *Shonita* (Ova). These eight factors are responsible for the production of each and every organ during fetal life. The *Basti* is a hollow structure made by

the *Vayu* (Airy bio- element) entering in the combination of essence of *Rakta* (Blood), *Kapha* (Watery bio-element) and *Pitta* (fire bio- element).

It develops from *Matrij Bhava* from the essence *Rakta* and *Kapha* during embryonic life.

Anatomical Consideration of Basti - Ayurvedic texts are composed of various *Anga* (vital organ) related to urinary system, *Acharya Sushruta* has described the situation of the *Basti* in the middle of *Nabhi* (Umbilicus), *Mushka* (Scrotum) and *Shepha* (Penis), *Prishta* (back) and *Vankshan* (inguinal region). It is situated internally in *Gudasthi vivar* (pelvic cavity) and is related to *Paurush* (prostate) and *Vrishan* (testis) inferiorly and to *Guda* (rectum) posteriorly.

Urinary Bladder- It is a hollow muscular organ which serves as reservoir of urine The shape of the urinary bladder is oval, when it is filled with urine & is more similar with "Alabu". When the urinary bladder is empty then its shape is pyramidal. It is situated anterior to the pubic symphysis separated from the pubic symphysis by an anterior prevesical space known as the space of Retzius. The apex of the urinary bladder is related to the umbilicus by median umbilical ligament. The base is separated from rectum by recto vesical pouch and lower part is related to vasa deferens. It is enveloped by extra peritoneal fat and connective tissue. The dome of bladder is covered by peritoneum & bladder neck is fixed to neighboring structures by reflections of the pelvic fascia as well as by true ligaments of the pelvis. When the Urinary bladder gets filled then it becomes abdomino-

pelvic organ reaching up to the umbilicus or higher.

The body of the bladder receives support from the urogenital inferiorly & by the obturator internus muscles laterally. The superior fascia of the urogenital diaphragm is continuous and includes the pelvic, obturator, and endopelvic fasciae. The inferior fascia of urogenital diaphragm fuses with Colle's fascia and continues as Scarpa's fascia anteriorly. The dartos muscle and fascia in the scrotum as well as the fascia lata of the thigh are further continuations of this layer. From the above explanation, it can be said that the Urinary bladder and Basti has the same structural and functional anatomy.

Structure Associated with Basti Marma

1. Terminal part of ureter, vas deferens and seminal vesicle.
2. Ligaments of urinary bladder i.e., pub- prostatic or pubo-vesical ligament etc.
3. Arterial supply of the urinary bladder i.e., internal iliac artery and its branches.
4. Venous drainage of the urinary bladder i.e., internal iliac vein and its tributaries.
5. Nerve supply of the urinary bladder i.e., branches from inferior hypogastric plexus and pelvic splanchnic nerve
6. Lymphatic drainage of urinary bladder.
7. Prostate and prostatic urethra.

Some other anatomical structures involved in the region are Rectus Abdominis muscle, Detrusor muscle, various true and false ligaments of urinary bladder, external and internal iliac vessels, hypogastric plexus and pelvic, splanchnic nerves etc.^[8] Which are delicate and vital points of the body any injury of all these structures can cause sudden death if proper medication is not given at that time.

Urinary peritonitis (Uro- peritoneum) - The Uro-peritoneum is a particular type of peritonitis, defined as presence of urine in the peritoneal space. That has hidden and misleading symptoms which can delay the diagnosis long enough to endanger the patient's life. It is categorized as a difficult to diagnose clinical entity due to its poor manifestations.

Sign & symptoms – actual signs of hypogastric lesions (excoriations, haematomas)

1. Diffuse abdominal tension.
2. Vague hypogastric pain
3. Increase of abdominal volume, (ascites)
4. Muscle contraction firstly in pelvis than following superior abdomen
5. Kehr sign.
6. Abdominal distention due to paralytic ileus.
7. Partial or complete ceasement of urine or urine emission.
8. P/R reveals peritoneal irritation.
9. Flow of contrast substance in the peritoneal space.

These

Mechanism of injury- vesical rupture associated peritonitis is induced mainly by action of the injury agent directly on the inferior abdomen. in this condition a great and sudden pressure on the abdominal wall spades up to bladder, projects itself on the posterior wall of the pelvis and due to its resistance and come back towards the bladder (anterior), giving it a counter blow.

The amount of urine present inside the bladder at the moment of injury plays an important part.

While bladder is empty- it can be torned only through direct impact of the trauma on its walls because of its deep location in the pelvis and its protection by pelvic bones.

While bladder is filled- full bladder comes out of that protection and becomes an intra-peritoneal organ. Here vesical wall grows thinner in proportion with the quantity of urine and the flexibility of its muscular fibers decreases. Prone areas with least resistance are superior & posterior walls.

Factors responsible for decline in wall strength- Inflammation, vesical tumor, vesical scar from previous minor trauma, neurological lesions, during pelvic surgery, during endoscopy etc.

Vesical trauma following pelvis bone fracture is the most frequently involved in the Uro- peritoneum aetiology, followed by spontaneous vesical rupture. Bladder injury is a possible complication of laprscopic surgery. The patients may present with intense and persistent abdominal pain due to urinary peritonitis.

Types of Injury or Trauma on Urinary bladder – The probability of bladder injury varies according to the degree of bladder distention Maximum urinary bladder injury can result from external trauma (80%), Iatrogenic causes (14%) and spontaneous bladder rupture(1%). External trauma may be blunt injury or penetrating injury. Blunt injuries may be caused by motor vehicle collision, fall from height, assault, and penetrating injuries may occur due to gunshot & stab wound. The iatrogenic causes like obstetric trauma (may occur during forceps delivery / Prolonged labour i.e. pressure from fetal head to mother pubis), Gynecological trauma (during vaginal or abdominal hysterectomy), Urologic trauma (during biopsy and endoscopy).

All these injuries may cause the rupture of urinary bladder either extra-peritoneal (70%), intra-peritoneal (20%) and combined (10%).

Intra peritoneal rupture-the incidence of intra-peritoneal bladder rupture is significantly higher in children. The injury can result from penetrating trauma, or iatrogenic as a consequence of cystoscopy or surgery. Usually in a fully distended bladder because of its dome

shaped and its superior surface is covered by peritoneum. In this type of bladder injury cystography demonstrates intra-peritoneal contrast material around bowel loops, between mesenteric folds and the paracolic gutters. It reveals defect in the bladder dome.

Due to which the urinary bladder cause leakage of urine into the peritoneal cavity resulting in peritonitis which cause death within 7 days following septic shock.

The clinical features of intra-peritoneal rupture are^[9]

1. Sudden pain in suprapubic region and lower abdominal region, distension of abdomen.
2. Arrest of faeces and flatus, lost bowel movement.
3. Painful and frequent micturition passing only a small quantity of urine.
4. Muscle guarding is an indication of irritation of parietal peritonitis

All the above clinical features are similar with the traumatic symptoms of *Basti Marma* as described by *Acharya Charka* in *Sidhisthan*.

These are-

Vata Mutra Varchonigraha (retention of flatus, urine, faeces) – Similar with arrest of faeces and flatus

Vankshan Mehana Basti Shoola (pain in groin region, penis and bladder region) - Similar with pain in suprapubic region and lower abdominal region.

Basti Kundal (Spasm in urinary bladder)

Udavarta (upward movement of *Vayu* in abdomen)

Nabhi Kukshi Guda Shroni Upstambha (stiffness in umbilical, abdominal and pelvic region)-Similar with muscular rigidity.

Acharya Sushruta has mentioned that any injury to *Basti Marma* can cause immediate death. In case of severe injury to *Basti* bilaterally (on both sides), causing immediate death. While in case of urine leakage only through one side, the person can be saved. Trauma or any injury causes immediate death in following cases-

(a) **Mutrasanga** (urine obstruction)

(b) **Mutrajanya Udavarta** – Due to vitiation of *Vata Dosha*, obstruction of urine flow occurs, leading to tilting of the urinary bladder upside so the discharging of urine in upward direction (*Udavarta*) which leads to the pressure over abdominal organs and heart, flooding the pelvic cavity with urine, finally causing the death.

(c) **Mutra Ati Pravritti**- Excessive discharge of urine in pelvic cavity & abdominal cavity through the opening in the bladder caused due to any trauma which can also cause bleeding leading to death.

Extra peritoneal rupture- It is more common, occurs in 80% cases of urinary bladder rupture. It occurs in non-distended bladder and pelvic fracture leading to avulsion

tear at pubo prostatic and pubo-vesical ligament. This rupture may cause death within 7 days.

The clinical features of this rupture are collection of urine and blood in extra peritoneal space in front, diffuse pain and tenderness in the lower abdomen, swelling in the scrotum and abdominal wall, inability to pass the urine, features of shock and other associated injuries may be noted. These clinical features are more similar with traumatic symptoms of *Basti Marma*.

Combined rupture – (Intra and extra peritoneal rupture) It mostly occurs by penetrating injury in the fully distended urinary bladder. Extravasation of the urine from urinary bladder depends upon the location of laceration. If the perforation is antero-superior, then fluid can spread intra or extra peritoneal or both.

Pelvic fracture - If any injury to the pelvic cavity, there is chances of arterial hemorrhage because the pelvic cavity is supplied by internal iliac artery and its branches. So, this arterial hemorrhage may cause death within 7 days. Deep vein thrombosis is one of the complications of pelvic fracture in which a semi solid blood clot in the vein has get high tendency to develop pulmonary embolism and sudden death. There is the chance of formation of embolus in the internal iliac vein which may convert into pulmonary embolism which may cause sudden death. Patients with pelvic injury are at high risk of thromboembolic complication.

Other causes are –Urethral instrumentation, calculus passage, catheterization and during prolonged labour. The clinical features are blood at external urinary meatus, inability to micturate, suprapubic tenderness and dullness, shock due to blood loss, extravasation of urine into perineum.

Acute urinary retention- It is a very rare life-threatening condition seen in urethral trauma. Clinical features are painful distension of bladder, inability to pass urine, swelling in hypogastric region.

Spontaneous bladder rupture- it is a rare and often a life-threatening condition usually caused by abdominal or pelvic trauma.

Systemic complications during Uro-peritonitis- Bacteraemic shock, systemic inflammatory response syndrome, multi-organ dysfunction syndrome, death.

Ashmari – *Acharya Sushruta* has explained the term *Ashmari Vranadrti* given in original text suggests there are the rupture of the bladder. *Acharya Sushruta* in *Ashmari Nidana* mentions 8 *Marma* like *Sevani*, *Shukravaha Srotas*, *Mushka Srotas*, *Guda*, *Mutrapraseka*, *Mutravaha Srotas*, *Yoni* and *Basti*. If *Basti Marma* is injured on both sides then the patient doesn't survive, if it is injured at one side then it heals with difficulty. The above description indicates bilateral

intra-vesical ureteric calculus. If the renal stone may get impacted at ureteric orifice of bladder on both sides, then there is chance of death within 7 days due to backflow of urine.^[10]

DISCUSSION

From the above discussion we can infer that our *Acharyas* are pointing that *Basti* is situated behind the Symphysis Pubis and it is placed in a space where rectum, prostate are found. So it is related to lower pelvic cavity and connected to ureters, urethra which acts as transporting channels for *Mutra* and *Shukra*. It is most important for individuals to know the area of *Basti Marma* to protect that area of body from any injury or trauma.

The health of a person depends upon physician, this knowledge about *Basti Marma* will be also helpful for physicians and surgeons to save this *Marma* area during surgical procedures or any medical intervention. In the past period of history, the causes of the urinary bladder injury were the use of sharp weapons used in battle but now a days the main causes of bladder injuries are sports injury & road traffic accidents & ignoring the urge of urination due to busy lifestyle surgical procedures like Hysterectomy, LSCS, excision of rectum, etc. Due to these injuries, urinary bladder damages intra and extra peritoneally or both. Injury to this *Marma* may cause the obstruction of *Vata*, *Mutra* and Mala, pain in the groin, penis and bladder etc. So, requiring an immediate emergency treatment it is a medical condition which is life threatening.

In *Ashmari Nidan*, while describing 8 *Marmas Acharya* indicates towards seminal vesicles, vasdeferens, prostatic and testicular vessels, superior, middle and inferior vesical arteries which are branches of internal iliac arteries, vesical venous plexus, inferior hypogastric plexus of nerve fibers, renal blood vessels, ureters, urethra etc., if the vesical stone is to be removed out by surgical operation one has to be very much cautious to perform the lateral cystotomy as chances of leaking of urine leading may cause Uro-peritonitis with surrounding viscera are there. So *Acharya Sushruta* has clearly mentioned that lateral cystotomy on either side of the urinary bladder is extremely dangerous and likely to take away the life of person.

Anatomically, the urinary bladder and its relationship with the peritoneum is also essential to consider in respect of trauma to this particular *Marma*. The distended bladder may give rise extra-peritoneal and intra-peritoneal extravasation of the urine, resulting into the shock and death of the person by Urinary Peritonitis. So, from the above description, we should have the appropriate knowledge of surgico-anatomical concept of *Basti* is necessary for proper diagnosis of disorders of urinary bladder & proper medication given to the victim at that time of trauma or any injury on urinary bladder. *Basti* is *Sadhyapranahara Marma* which may cause

sudden death or death after some time if it gets injured.

CONCLUSION

From the above explanation, it is clear that the description of *Basti* in Ayurvedic texts closely resemble with the urinary bladder in modern science. It is important and vital part of the body, and everyone should know the appropriate knowledge of Surgico-anatomical concept of *Basti* for proper diagnosis of disorders of urinary bladder and Trauma or any injury on urinary bladder causes the rupture of bladder that may cause extravasation of the urine and leads to sepsis following peritonitis and even sudden death.

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