



VOLUME 10 ISSUE 1 2019

e ISSN 2350-0204

ijapc

www.ijapc.com

**Greentree Group
Publishers**



A Descriptive Study of *Basti Marma* in Relation to Trauma

Behera Sunita^{1*} and Chanana Amrish²

^{1,2}Dept. of Rachana Sharir, Ch. Brahm Prakash Ayurved Charak Sansthan, New Delhi, India

ABSTRACT

Marma science is one of the unique concepts of Ayurveda. Ancient scholars of Ayurveda have described a total of 107 *Marma* in the body. It is formed by the confluence of *Mamsa*, *Sira*, *Snayu*, *Asthi* and *Sandhi* and it is the site where vital energy resides. *Marma* are the vulnerable areas present in the body, any trauma on the *Marma* region may cause loss of function of that organ or site and even death may occur depending upon the site and strength of the trauma. Sushruta has described *Marma* areas from the view of surgery; Charak has given utmost importance to *Basti Marma* by placing it among the three major *Marmas* of body (*Shira/Head*, *Hridaya/Heart* and *Basti/Urinary Bladder*). *Basti Marma* is considered as one among *Sadyo pranahara*(instant fatal), any injury to this *Marma* may cause peritonitis, pelvic arterial hemorrhage, pelvic fracture and deep vein thrombosis that's why any trauma to *Basti* region causes death due to septic or hypovolemic shock and pulmonary embolism. The aim of this study is to review the position and the scope of instant fatality of *Basti Marma* in present era. In ancient times the main cause of injury in pelvic region was sharp weapons used in the battles between the two states but now-a -days penetrating and blunt trauma due to road accidents, sports injury has become the leading cause of pelvic injury, so the updated knowledge of *Basti Marma* and the symptoms, prognosis of traumatic bladder in the light of contemporary science is very essential so that proper management can be provided to the victims of bladder injury.

KEYWORDS

Marma, *Basti*, Peritonitis, Pelvic fracture, Septic shock, Hypovolemic shock



Greentree Group Publishers

Received 14/11/18 Accepted 08/12/18 Published 10/01/19



INTRODUCTION

Ayurveda; the science of life, is the most ancient medical science which has focused primarily on preventive aspect rather than curative aspect. The principles of Ayurvedic sciences are mainly based on observation rather than investigation. Marma science is one of the exclusive & unique concepts of Ayurveda. *Marma* are the vital & vulnerable areas of our body¹. These areas or spots are situated all over the body i.e head, neck, trunk & extremities. *Marmas* are formed by the conglomeration of muscles, vessels, ligaments, tendons, bones and their joints². These *Marma* areas have *Tridosha*, *Triguna*, *Bhutatma*³ & *Chetana dhatu*⁴, so any injury to these points may cause pain or even death. Other symptoms which appear on injury of *marma* are Giddiness, syncope, delusion, semi-consciousness, numbness etc⁵, so the knowledge of *Marma* areas is not only essential for individuals for protecting their vital and vulnerable areas of body from any injury but also for physicians & surgeons to save these areas during surgical procedures or any medical intervention.

Many references can be found in Vedic literature regarding injury at *Marma* region of soldiers of enemies & protection of one's *Marma* by wearing guards but these days

road traffic accident, sports injuries are the leading causes of pelvic injury resulting in bladder trauma. To overcome from these situations, we must know the precise location of vital spots of our body so that proper protection and medication may be provided to the victims of bladder injury and any faulty procedure may be avoided during surgery.

MATERIALS AND METHODS

The literature has been explored from the classical texts of Ayurveda, their commentaries, modern books on anatomy and trauma. Indexed journals were reviewed to evaluate the prognosis in the cases of victims of traumatic urinary bladder till date.

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*.

REVIEW OF LITERATURE

CLASSIFICATION OF *MARMA*

The word *Marma* is formed by the combination of two words i.e *Mri dhatu* + *Manin prataya* which means *Jiva sthan*(site of life)/ *Sandhi sthan*. The *Marma* are composed of all the five structural elements but has been classified into five categories



on the basis of predominant structural entity i.e. *Mamsa, Sira, Snayu, Asthi* and *Sandhi*, and five on the basis of *Parinam* (effect on

injury) i.e. *Sadyo pranahara, Kalantarapranahara, Vaikalyakara, Vishalyaghna & Rujakar*⁶.

| Name of Marma | Predominant Mahabhuta | Effect of injury |
|----------------------------|-----------------------|--|
| <i>Sadyo pranahara</i> | <i>Agni</i> | Causes death within 7 days due to loss of <i>Agni</i> |
| <i>Kalantara Pranahara</i> | <i>Soma + Agni</i> | Immediate loss of <i>Agni</i> & gradual loss of <i>Soma</i> causes death in 15-30 days |
| <i>Vaikalyakara</i> | <i>Soma</i> | Injury to this <i>Marma</i> causes deformity due to loss of <i>Soma</i> |
| <i>Vishalyaghna</i> | <i>Vayu</i> | After extraction of <i>Shalya</i> / foreign body there is chance of death due to loss of <i>Vayu</i> |
| <i>Rujakar</i> | <i>Agni + Vayu</i> | Causes severe pain due to loss of <i>Agni</i> & <i>Vayu</i> |

Basti Marma has been classified under *Sadyo pranahara Marmas* along with *Shringataka, Adhipati, Matrika, Shankha, Guda, Nabhi* and *Hriday*⁷.

GROSS ANATOMY OF BASTI

Sushruta has described that *Basti* is situated in the midst of *Nabhi* (umbilicus), *Muskha* (scrotum) and *Shepha* (penis), *Prishta* (back) and *Vankshyan* (inguinal region). The above description gives the superior, inferior, posterior and anterior relation of *Basti* respectively. It is situated internally in *GudasthiVivar* (pelvic cavity) & is related to *Paurush* (prostate) & *Vrishan* (testis) inferiorly and to *Guda* (rectum) posteriorly. It acts as receptacle of urine having a single orifice which is directed downward. The shape of *Basti* is like “*Alabu*” (gourd) i.e. oval in shape and is surrounded on all side by *Sira* and *Snayu*⁸. It is considered as one among 56 *Pratyanga*⁹, 10 *Pranayatan*¹⁰ & 15 *Kosthanga*¹¹ and develops from *Matrij bhava*¹², from the essence of *Rakta & Kapha*

during embryonic life¹³. It is the *Moolasthan* (primary organ) for *Mutravaha Srotas* (urinary system)¹⁴ and filled with urine after the process of *Mutra Nihsyandan* (seepage) as like river fills the ocean with water.

Urinary Bladder: - It is a hollow muscular organ which serves as reservoir of urine & is situated in the anterior part of pelvic cavity behind the pubic symphysis. When it gets filled it becomes abdominopelvic organ reaching up to the umbilicus or higher. The shape of full bladder is oval in shape that is more similar with “*Alabu*” shape of *Basti* and empty bladder is pyramidal in shape. The apex of bladder is related to umbilicus by median umbilical ligament, the base is separated from rectum by recto vesical pouch & lower part is related to vas deferens.

From the above description it can be said that *Basti* and urinary bladder has the same structural and functional anatomy.



WHAT IS *BASTI MARMA*

It is situated in *Kati Pradesh* (pelvic region)¹⁵ & is surrounded by *Sthoolguda*(rectum), *Mushka*(scrotum), *Sevani*(perineal sutures), *Shukravaha* (seminal vesicle) & *Mutravaha nadi* (urinary channels)¹⁶. It is considered as one of the *Sadyo pranahara Marma*, *Snayu Marma*, *Udaragata Marma*¹⁷, *Shad Marma*¹⁸, *Maha marma*¹⁹ & *Pranayatan*.

Shape- The shape of *Basti marma* is like *Dhanurvakra*²⁰ 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*.

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. branches 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.

BLADDER INJURY 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*²²

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.

Clinical features of intraperitoneal ruptures are: -

Pain: Sudden pain in suprapubic region and lower abdominal region, constant burning pain is a feature of peritonitis, distension of abdomen,

Bowel habit: arrest of feces and flatus is the usual accompaniment of peritonitis, bowel movement is lost due to paralytic ileus and bowel is distended,

Micturition: “Strangury” painful and frequent attempts at micturition passing only a small quantity each time in pelvic peritonitis, hematuria,

Muscular rigidity (Muscle guard): muscle guarding is an indication of irritation of parietal peritonitis,

Hypotension and shock.

The above clinical features are more similar with traumatic symptoms of *Basti Marma*

described by Charak in Sidhisthan. These are

- *वातमूत्रबर्चोनिग्रह* (retention of flatus feces and urine) – Similar with arrest of feces and flatus
- *वङ्कनमेहनवस्तिशूल* (pain in groin, penis, bladder region) – Similar with pain in supra pubic region and lower abdominal region.
- *वस्तिकृण्डल* (spasm in bladder)
- *उदावर्त* (upward movement of Vayu in the abdomen)
- *नाभिकुक्षिगुदश्रोणिउपस्तम्भ* (stiffness in umbilical, abdominal and pelvic region) – Similar with muscular rigidity (muscular guard)²³.

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*²⁴.

Combined rupture (intra and extraperitoneal rupture)

It mostly occurs by penetrating injury in a fully distended bladder. Extravasation of urine from bladder depends upon the location of laceration, if the perforation is anterosuperior, fluid can spread extraperitoneal, intraperitoneal or both.

Pelvic fracture²⁵

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 complication.

Deep Vein Thrombosis²⁶

It is one of the complications of pelvic fracture. It is the semisolid clot in the vein which has got high tendency to develop pulmonary embolism & sudden death. In pelvic fracture there is the chance of formation of embolus in the internal iliac vein which may convert into pulmonary embolism due to systemic circulation and this pulmonary embolism may cause sudden death. Iliac vein obstruction is rare but potentially fatal disruption of vascular system. Patient with pelvic trauma are at high risk of thromboembolic complication.

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 into perineum.



Acute urinary retention

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

***ASHMARI*²⁷**

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 Suhruta 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.

PREVIOUS STUDIES ON RUPTURE OF URINARY BLADDER

According to a study conducted by George C, Kaiser TF in 1950 the mortality rate of ruptured bladder was 86.7% up to year 1890 and after instituting proper surgical intervention & repair it declined to 48%. In another study by Cass AS in year 1976 he found that mortality due to bladder trauma has reduced to 11 %. A study on 41 cases of trauma of Bladder was done in the year 1989 at Shiraz University of Medical

Science, Iran by Khezri AA, in his study he found the mortality in bladder rupture was further reduced to 2%. A study on 55 cases of trauma of urinary bladder was done by M. R Fatahi et.al in the year 2000, in the study they found that the mortality due to bladder rupture was further reduced to 1% and the multiple injuries associated with bladder rupture were mainly responsible for this mortality rate. However, delayed in diagnosis & treatment of more than 24 hr. greatly increases the mortality rate²⁸.

Nathwani, et al: in his study "Prospective study of Urinary Bladder injury" reported that the mortality with lower urinary tract injuries has reduced significantly however the morbidity is still high. Previously these injuries were more due to trauma sustained during mining, quarrying & war but now a day's road traffic accidents & iatrogenic injuries are the major contributor for these injuries. Bladder rupture isn't a dreaded injury if it is treated promptly with the standard protocol²⁹.

CONCLUSION

The Marma are vital and vulnerable areas or points over the body and *Basti Marma* is situated over lower abdomino-pelvic region covering an area formed by an upward semicircular arch of radius 4 angula (approximately 7.5cm) from the lower



border of pubic symphysis. 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 times the penetrating injuries due to sharp weapons used in the battle 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 inevitably 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. Observing the previous studies, it is clear that 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 urological investigation, quick

availability of blood and other fluid supplements and prompt surgical repair.



REFERENCES

1. Shastri Ambikadutta, Sushruta Samhita Ayurveda Tattva Sandipika, Reprint Edition. Varanasi: Chaukhambha Sanskrit Sansthan; 2014. Vol.I, Page no-77.
2. Shastri Ambikadutta, Sushruta Samhita Ayurveda Tattva Sandipika, Reprint Edition. Varanasi: Chaukhambha Sanskrit Sansthan; 2014. Vol.I, Page no-67.
3. Shastri Ambikadutta, Sushruta Samhita Ayurveda Tattva Sandipika, Reprint Edition. Varanasi: Chaukhambha Sanskrit Sansthan; 2014. Vol.I, Page no-77.
4. Tripathi Brahmananda, Charak Samhita Charak Chandrika tika, Reprint Edition. Varanasi: Chaukhambha Subharati Prakashan; 2012. Vol.II, Page no-1050.
5. Sharma Shivaprasad, Astanga Sangarh Shashilekha Sanskrit Commentry, Reprint Edition. Varanasi: Chaukhambha Sanskrit Series Office; 2008. Page no-326.
6. Shastri Ambikadutta, Sushruta Samhita Ayurveda Tattva Sandipika, Reprint Edition. Varanasi: Chaukhambha Sanskrit Sansthan; 2014. Vol.I, Page no-68.
7. Shastri Ambikadutta, Sushruta Samhita Ayurveda Tattva Sandipika, Reprint Edition. Varanasi: Chaukhambha Sanskrit Sansthan; 2014. Vol.I, Page no-69.
8. Shastri Ambikadutta, Sushruta Samhita Ayurveda Tattva Sandipika, Reprint Edition. Varanasi: Chaukhambha Sanskrit Sansthan; 2014. Vol.I, Page no-313.
9. Pandey k, Chaturvedi G, Charak Samhita Vidyotini tika, Reprint Edition. Varanasi: Chaukhamba Bharati Academy; 2015. Vol.I, Page no-914.
10. Pandey k, Chaturvedi G, Charak Samhita Vidyotini tika, Reprint Edition. Varanasi: Chaukhamba Bharati Academy; 2015. Vol.I, Page no-913.
11. Pandey k, Chaturvedi G, Charak Samhita Vidyotini tika, Reprint Edition. Varanasi: Chaukhamba Bharati Academy; 2015. Vol.I, Page no-913.
12. Pandey k, Chaturvedi G, Charak Samhita Vidyotini tika, Reprint Edition. Varanasi: Chaukhamba Bharati Academy; 2015. Vol.I, Page no-862.
13. Shastri Ambikadutta, Sushruta Samhita Ayurveda Tattva Sandipika, Reprint Edition. Varanasi: Chaukhambha Sanskrit Sansthan; 2014. Vol.I, Page no-41.
14. Pandey k, Chaturvedi G, Charak Samhita Vidyotini tika, Reprint Edition. Varanasi: Chaukhamba Bharati Academy; 2015. Vol.I, Page no-711.
15. Kaviraja Gupta Atrideva, Astanga Hridayam Vidyotini tika, Reprint Edition. Varanasi: Chaukhambha Prakashan; 2016. Page no-266.
16. Tripathi Brahmananda, Charak Samhita Charak Chandrika tika, Reprint



Edition. Varanasi: Chaukhambha Subharati Prakashan; 2012. Vol.II, Page no-1051.

17. Shastri Ambikadutta, Sushruta Samhita Ayurveda Tattva Sandipika, Reprint Edition. Varanasi: Chaukhambha Sanskrit Sansthan; 2014. Vol.I, Page no-69.

18. Pandey k, Chaturvedi G, Charak Samhita Vidyotini tika, Reprint Edition. Varanasi: Chaukhamba B harati Academy; 2015. Vol.I, Page no-913.

19. Sharma Shivaprasad, Astanga Sangarh Shashilekha Sanskrit Commentry, Reprint Edition. Varanasi: Chaukhambha Sanskrit Series Office; 2008. Page no-305.

20. Kaviraja Gupta Atrideva, Astanga Hridayam Vidyotini tika, Reprint Edition. Varanasi: Chaukhambha Prakashan; 2016. Page no-266.

21. K. Rajgopal Shenoy, Anitha Shenoy, Manipal manual of surgery, 4th edition. CBS publishers & distributors; New delhi, 2014: page no-962.

22. Sriram Bhatm, SRB'S manual of surgery, 4th edition. Jaypee brother's medical publishers (P) ltd; New delhi, 2013: page no-1116.

23. Tripathi Brahmananda, Charak Samhita Charak Chandrika tika, Reprint Edition. Varanasi: Chaukhambha Subharati Prakashan; 2012. Vol.II, Page no-1053.

24. Sriram Bhatm, SRB'S manual of surgery, 4th edition. Jaypee brother's

medical publishers (P) ltd; New delhi, 2013: page no-1116.

25. Rajesh Malhotra or Surya Bhan, Text book of orthopedics, 1st edition. CBS publisher & distributors; New delhi, 2004: page no-408.

26. K. Rajgopal Shenoy, Anitha Shenoy, Manipal manual of surgery, 4th edition. CBS publishers & distributors; New delhi, 2014: page no-140.

27. Harsh Mohan, Text book of Pathology, 7th edition. The health science publishers; New delhi, 2015. Page no-73.

28. M.R Fattahi and A.A. Khezri, Rupture of urinary bladder: An experience with 55 cases in shiraz. MJIRI, vol.14, no-2, 127-131, 2000.

29. Nathwani P, Shamsukha D, Joshi NS, Joseph S, Pujari N. Prospective study of urinary bladder injury. Int j Sci Stud 2016; 4(5): 157-163.