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Review Article

STUDY OF TRAUMA ON ASTHI W.S.R TO ASTHIBHAGNA

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ABSTRACT
Ayurvedic science is being popularized worldwide. It has established history for the management of Bhagna in Sushruta Samhita. Ayurvedic philosophy is specific pertaining to the body constitution. The human body is composed of Dhatus. "Asthi" Dhatu is one of the main Dhatu in human body. "Asthi" is hard substance which remains even after most part of body has been decayed. Ayurvedic science has established history of trauma to Asthi (Asthibhagna). Ayurveda has aimed high for maintaining normal structure and function of deformed bones. It is high time to re-establish it by adopting proper research and methodology. The skeletal injuries are important incidences in human beings and they demand immediate management. The branch of science that deals with deformities of bones is known as Orthopedics, aimed for “maintenance of normal structure and function of deformed bones.” While bones are very strong they can break. Most often, breaks happen because the bone runs into a strong force, also repetitive force like from running can fracture a bone. High energy trauma result in bone fractures whether it is isolated fracture or dislocation. When a person goes through some form of trauma, as car accident or fall, the impact may break or fracture the bone. The bone fracture may be the result of high force impact or a result of certain medical conditions that weaken the bones such as Osteoporosis. Fracture is properly termed pathologic fracture but not trauma.

KEYWORDS: Asthi, Asthi Bhagna, Trauma, Bone-tissue, Fractures.

INTRODUCTION

Asthi: Asthi is a Dhatu. ‘Dhatus are the tissue humoral system of body. Asthi Dhatu is formed from Meda Dhatu. The synonyms used for Asthi

- Keekasa
- Kulyams
- Kapala
- Astri
- Medojam

Asthi is hard part which forms framework of body. Asthi is hard substance which remains even most part of body has been decayed. Asthi is substance which remain even after else very part like flesh muscles etc are shattered even after burying the body after death[1]. It remains as last identity of person even after demise. “Hada is synonym of Asthi which means hard substance[2]. Though every substance is made up of all five Mahabhutas (Akasha, Vayu, Agni, Jala and Prithivi) [3], Asthi has prominence of Prithivi and Vayu Mahabhuta. It is one of among Sapat Dhatus which is present in the Sharira. Form of Dhatu which is present in inside the Mamsa Dhatu is known as Asthi[4]. Thus both these Mahabhutas give characteristic qualities like toughness, roughness, dryness and hardness[5].

Asthi is meant for playing anchor role of frame work of body and is affectively by Snayu, Mamsa, Sira and Snayu. The Updhatu of Asthi is Danta (supported teetthes).[6]

Number of Asthi

- Charaka Samhita – 360
- Sushruta Samhita – 300
- Astanga Sangrah - 360
- Astangahridaya - 360
- Kashyapa Samhita - 360
- Bhela Samhita - 360
- Modern Science – 206

Distribution of Asthi in the Shadanga of Sharira as follows

- Shaakha: 140
- Shroni Parshva Prushtha Uras: 117
- Greevorordhva: 63
- Acc to Ashtanga Sangrah: 259
- Shaakha :140
Madhya Sharira: 120
Urdhva Sharira: 100

Asthi Bhedas (types) are depending upon the size shape, position they are differentiated. Asthi in body is divided as types of Asthi are \[^{7,8,9}\]

1. Kapala
2. Ruchaka
3. Taruna
4. Valya
5. Nalaka

Kapalasthi - These are flat in nature.

Location - These are present in Janu, Namba, Amsa Granda, Talu, Shankha, Vankshna and Madhyashia are known as Kapalasthi.

Valyasthi - There are round in shape particularly hemi circle in shape.\[^{10}\]

Location - Asthi in Pani, Pada, Uru, Parshva, Prushta are Valyasthi.\[^{11}\]

Tarunsthi - These are soft in nature\[^{12}\]. It means which have either not fully developed.

Location - As the present in the Grhana, Karna, Greeva, and Akshikuta are called Tarunsthi.\[^{13,14}\]

Nalaka - There are long like tuber and hollow from inside.

Ruchikasthi - The bones which are different from all and are utilized to chew food and enjoy the taste\[^{15}\]. These are for taste sensation.\[^{15}\]

Location - The Dashanas are known as Ruchakasthi. These are in all here Ruchkaie Danta teeth are also regarded as Asthi along with its various stiff parts.

Effect of Trauma on Asthi (Bones)\[^{16}\]

The word Bhagna is derived from the word bhanj-Dhatu and Katuprayatya meaning to break Bhanj means motion, which once again means to break. The bones sustain trauma in different ways. Acharya Susruta has paid due attention to this fact and observed that all the bones do not show similar type of effect due to trauma. He has then classified these effects in different groups and correlated with the types involved the same is mentioned below.

1. Tarunasthi (Cartilage) - Bend
2. Nalkasthi (Long bones) - Break
3. Kapalasthi (Flat bones) - Crack
4. Ruchkasthi (Teeth) - Fragmented
5. Valayasthi (Curved bones) - Cracker Break

Classification of Bhagna

The classification of Bhagna is given by Susruta, Madhavakara, Chakra-datta, Bhavaprakash. Vagbhatas opinion differs in this regard. Charaka has not given any classification.

Susruta's classification\[^{17}\]

On the basis of structure involved the skeletal injuries have been divided in two types-

1. Sandhimukta (Joint Dislocation)
2. Kandabhagna (Bone Fracture)

Vagbhatas classification: Vagbhata has mentioned same classification in different words like-

1. Sandhibhagna
2. Asandhibhagna

Apart from these classifications in Madhukoshvyakhya further divided the Bhagna on the basis of their clinical manifestation as-

1. Savrana Bhagna\[^{17}\] (compound fracture)- Fracture with the wound i.e., bone comes outside just after injury.
2. Aivrana Bhagna (closed fracture)- When bone is fractured but no visible wound on the skin is seen.

The dislocations have further been classified in to six varieties. And the fractures are sub-divided according to type of injury into twelve types. The Susruta's classification is universally accepted. Vagabhata has given different terminologies for some varieties. He has mentioned Vellita in place of Kandabhagna. Darita instead of Patita and Shoshita in the place of Chinna. Acharya Madhavakara has also used some other terminology like Vichurnita instead of Churnita. Astichallita in the place of Astichallita and Majagata in the place Majanugata.

1. Ekamanuvidaritam
2. Bahunuvidaritam

Acharya Sharangadhara has not followed Susrutas classification but he has described the eight varieties of Bhagna. These are similar to Susrutas classification.

1. Bhagnaprista
2. Vidarita
3. Vivartita
4. Vishishita
5. Adhogata
6. Urdhvagata
7. Sandhibhagna
8. Tiryakakshipata

Clinical Features

The presence of fracture can be made out by history and clinical findings. The clinical signs described in Ayurvedic texts stand as mentioned in any modern surgical text book. The Susrutas contribution in this aspect is so perfect that it has hardly any room for alteration even today. He has mentioned signs and symptoms as general and specific features.
General features of Kandab-Hagna\(^1^8\)

Shvyathubaulyam (marked swelling): Generally fracture, whether it is hairline ors will be associated with moderate to severe swelling.

Sparshasahisnutvam (tenderness): Tenderness is such a sign that it is in variably present in all types of fractures.

Avapidyamaneshabda (crepitus): Presence of crepitus is a definite indicative of fracture, can confirm diagnosis clinically.

Vividha vedana pradurbhavah (Different types of pains): The fractured bone before its reduction and immobilization produces variety of pain. This depends on nature of trauma, bone fractured, displacements of the fragments and nature of soft tissue injury.

Sarvasu Avasthasu Na Sharmalabha (Inability to get comfort in any position) - Fracture gives to pain and discomfor to the patient till immobilizing it. The discomfort is such that patient remains restless in any posture of fractured part.

Features of Individual Kandabhagna\(^1^9\)

1. Karkataka: The fracture which has a shape similar to crab is named as Karkataka. The case where the fractured bone is depressed at its two articular extremities and bulges out at the middle, resemble the shape of gland is called as karkataka\(^2^0\).

2. Ashwakaran: In this type fractured Asthi projects upwards like the ear of horse is called as Ashwakaran\(^2^1\).

3. Churnitam: The fractured Asthi is found to be shattered into fragments or the powder form. This Bhagna can be detected clinically by presence of crepitus.

4. Pichhitam: In this type of fractures, the Asthi is compressed between the two opposite forces, it gets expanded transversely and marked swelling occurs.

5. Asthichallita: In this type of fracture, the periosteum is splintered off, where the fracture fragments lightly elevates into one side, as the bark gets away from the main stem.

6. Kanda Bhagna: In this type of fracture the shaft of the bone is fractured. The fractured part shows abnormal movement.

7 Majjanugatam: In this fracture, one fragment gets impacted into another causing displacement of bone marrow, then it is said to be Majjanugatam. It may be resulted due to force of violence. This type of fracture is very difficult to diagnose because the signs and symptoms like transmitted movements crepitus etc are absent due to impaction.

9. Atipatitam: A case where the fracture occurs throughout the plane of the bone is named as Atipatita. Here the fragments are completely separated and the separated fragment strangulated.

10. Vakra: The Asthi get bent, but not broken, especially in Tarunasthi’s in children.

11. Chinnam: Fracture in which the continuity of the bone is breached atone side while the other side remains intact known as Chinnam.

12. Patitam: Fracture in which bone is partially fractured and cracked into multiple fissures resulting into severe pain in the affected part.

Sputita: In this fracture there will be pricking pain due to sharp points of bristles.

Bhagnachikitsa: The ancient Ayurvedic texts have described Asthibhagna Chikitsa thoroughly. This includes:

1. Principles of Bhagna Chikitsa.
2. General management of Bhagna.
3. Specific management for different types of fractures.
4. Medicinal preparations for different kinds of fractures.
5. Pathya- Apathya.
6. Clinical criteria of fracture healing.

Four Principles of Treatment\(^2^2\)

1. Anchan - To apply traction
2. Pidana- Manipulation by local pressure
3. Sankshep- Opposition and stabilization of fractured part of bone
4. Bandhan- Immobilization

Sushruta has mentioned the principles of reducing a fracture, which is still adopted today. According to him, surgeon should apply first traction from either side of the fragments (Anchan), then elevate depressed fragments order press the elevated fragments (Peedana). The far displaced or overlapping fragments should be brought in close contact with each other by manipulating them separately (Sankshepana). These four principles devote the efforts to achieve proper alignment of fractured fragments before final immobilization (Bandhana).

Immobilization\(^2^4\): An adequate immobilization of the fractured limb is one of the most essential methods in the management, for this step usage of splints has been adequately described by Sushruta.

Rehabilitation

The importance of Physiotherapy in a limb injury was also appreciated by Sushruta. He has prescribed the exercises starting in lighter manner,
which may be gradually increased at any rate, and exercises should not be prescribed all at once in the beginning.  

E.g. For rehabilitation of upper limb, in the beginning mud ball is held and then a heavier substance like a lump of rock-salt and finally harder object like stones. 

1) Mritapinda Dharana
2) Lavana Dharana
3) Pashana Dharana

Along with all these measures ancient Acharya have described numerous medicinal preparations for the faster union of the fractured bone. These are chiefly described as general tonics to provide liberal amount of proteins, fats, calcium and other supplements. These principles of “Bhagna Chikitsa” are still adopted today. According to that surgeons should apply first traction from either side of the fragments is called ‘Anchan’. Then elevate depressed fragments or depress the elevated fragments Peedana. The far displaced or overlapping fragments should be brought in close contact with each other by manipulation then separately (Sarkshepana).

These four principles devote the effort to achieve proper alignment of fractured fragments before final immobilization (Bandhana).

The Asthi sandhya drayas are also suggested to include in daily diet General tonics of liberal amount of protein fats, calcium and other mineral are prescribed balanced diet with nutrition and protein is also mentioned.

A case of fracture like occurring in a youth person, slightly deranged Dosha in a youth or a person, slightly deranged Dosha or (Alpadosha) in winter season hail to be easily curable with the help of aforesaid methods. A case of fracture like occurring in a youth gets healed in a month. In two months in case of middle aged man and three months in old age man.

CONCLUSION

Classification of Asthi is specifically given in accordance to type of Bhagna occurring commonly in it. Further Ayurvedic literature contains definition of Bhagna, its etiology, classification, general features and special feature. Ayurveda has given ample to Asthi Sharir. The principles of fracture management are mentioned in Ancient literature. This immense knowledge clearly depicts the understanding and far sightedness of Acharyas and these principles are applicable in present era with same efficacy. This shows that knowledge of osteology was fairly advanced in ancient period so we are proud on our glorified past of knowledge in field of Asthi Sharir.

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