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"CADAVERIC STUDY OF ANO-RECTAL APPARATUS WITH APPLIED ASPECT IN AYURVEDA"

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ABOUT THE ARTICLE

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ABSTRACT

This section deals with the anatomical structures of Guda and significance of the Gudavalis, complete plan proposed for study followed by the review of previous work, aims and objectives, materials and methods have been described. LITERARY REVIEW: The literary review has been divided into two parts viz. Ayurvedic review and modern review. The first part deals with Ayurvedic review and the detailed description of Guda, Gudavali, Uttarguda and Adharguda etc. The second part deals with modern review and the detailed description of ano- rectal anatomy and physiology. DISEASE REVIEW: This section deals applied anatomy with description of Gudagat Vikar (Arsha, Parikartika, Bhagandara and Guda bransh with its etymology, definition, synonyms, classification, Nidan, Purvarupa, Rupa, and Samprapti with various aspects described in different Ayurvedic classics. Along with it, a detailed description of ano-rectal diseases (piles, fissure, fistula and rectal prolapse) with its etymology, definition, classification, etiopathogenesis, symptomatology and complications also have been mentioned. MATERIAL AND METHODS: This study was aimed to clarify the existing conversation regarding Cadaveric and applied study of „Guda" to certitude Sushrutokta- "Gudavalitrye" accordingly deliberate attempt is made by considering various references from Samhitas, related textbooks of Ayurveda literature, Journals, research papers along with various database and collaborating it with supportive references from modern anatomy, physiology and pathology to understand the structures concerned. In this section, to clarify the anatomical structures related to Gudavalia the cadaveric study has been performed on two cadavers (male & female) in the department of Rachana Sharir GACH Patna.

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KEYWORDS: Guda, Gudavali, Uttarguda, Adharguda, Ano-rectal

INTRODUCTION

Amavata Swastha Rakshana and Vikara Prashamana are the prime goals of Ayurveda. Knowledge about structural and functional aspect of Sharira is considered as a key to reach these goals. Guda is one such structural entity explained in Ayurveda, which play a role in elimination of Pureesha and Apana Vata. In Basti Chikitsa, one of the prime treatment modality of Vata medicine usually administered through Guda Marga only. Present clinical study Cadaveric and applied study of „Guda' to certitude Sushrutokta- "Gudavalitrye" comprises of conceptual study of Gudavalis and to elaborate all the controversies regarding the anatomical structure related to Gudavalis and its function.

For the proper understanding of the Anorectal diseases, it is necessary to have a clear knowledge of their site of

manifestation. Detailed description regarding the anatomy of Guda is not available at one place. But a little light can be shed in this direction by collecting references scattered in various chapters. Till date many researchers and books tried to explain the anatomy of Guda specially related to Guda Vali. Scholar has tried to extend previous works in new prospective, updated the present knowledge, to visualize and verify all the anatomical structures related to Guda Sharira for its applied aspect in Gudagat Vikar. This makes it more applicable in Ayurvedic and other medical system.

1. The description about Gudavalia is available in ancient literature but the correlative interpretation and applied aspect of Gudavalia with modern parameters has not yet been done.

2. No one has explored in detailed the anatomical and physiopathological implication of Guda in the light of Ayurvedic ancient and modern literature.

AIMS AND OBJECTIVES

1. To elucidate the anatomy of Gudavalia as per description available in Sushrut Samhita and ancient literature and to analyze the physical structures that can be correlated with Gudavalia in the light of modern anatomy.

2. To study the applied anatomy of Guda and Gudavalia (Rings of Guda) by examining the patients having ano-rectal disease.

MATERIALS AND METHODS

Ayurveda is the sea of knowledge and to get a pearl out of it one should make a good effort to ensure the curiosity in Human Anatomy specially regarding “Gudavalitrye”. To elaborate the description of „Guda‟ and to certitude “Gudavalitrye” descriptions are illustrated in Modern and Ayurvedic texts. I have tried to correlate the layers of Guda as described in Ayurvedic text in scattered form with modern text to certitude Sushrutokta- “Gudavalitrye".

In ancient eras Acharyas used to do „Sambhasa Parishad’ before drawing any conclusion. „Tadvida Sambhasa’ is said to be the best method of enhancing knowledge according to Charkacharya, which indicate the importance of the discussion in the research work. After thorough discussion of all the observations found throughout the research work, one can draw a definite conclusion.

Acharya Charaka described that “A hypothesis can only call principle when it is gone through inquisition and got approved by many experts to give a right judgement.”

The entire discussion can be divided into several parts for proper understanding-

1. Literary study- The detailed description of Guda is not clearly mentioned in Ayurvedic text so, the main aims and objective of the study was to correlate „Gudavalis’ with modern science.

2. Cadaveric study- Cadavers were dissected in order to identify the structures regarding „Gudavalis’, as per its site mentioned in ancient scriptures and also to find out its modern anatomical correlation.

3. Clinical study- Clinical study of Gudasharira, comprehensive and correlative study of disease of Guda and anal canal.

Patients were closely observed in OPD and IPD of GACH, Patna suffering from Ano-rectal diseases.

1. Literary Discussion

A. Extents of Guda

Sushruta, basically a surgeon has described Guda in close proximity of Vasti, attached to the distal part of large intestine (Antra) which is four and half fingers in length. Guda and Mendra are considered as Bahyasrotas which opens on the surface of our body. From above explanation we can consider Guda as a tubular structure which opens on the surface of body i.e., on the perineal region. It is formed to carry out a specific function, Visarga i.e., evacuation or excretion of Purisha so it is also considered as Karmendriya.

Vagbhata and Sushruta described the extent of Guda in the prevailing measuring units as four and a half finger in breadth. Vagbhata also described the measurement of Guda as atmapanitala (ones own palm of hand). Dalhana, the commentator of Sushruta Samhita considered one angula as maximum width of thumb. Dr. K. R. Sharma (1968) took pains to calculate mean of the thumbs of 100 adult people and found it to be 2 cm approximately.

Therefore, in the literary review, it is found that though anatomically the length of rectum and anal canal is 16 cm according to modern view but according to Ayurvedic view the length of Guda is 4 ½ Angula which is roughly 9 cm so only lower 6 cm of rectum and 3 cm of anal canal is considered as Guda.

Table: Different References of Rectum and Anal canal measurements

S.N.	BOOKS	RECTUM	ANAL CANAL
1.	Last's Anatomy	12 cm	2-3 cm
2.	Clinical anatomy Snell	13 cm	3.5-4 cm
3.	New style of anatomy by Lord Zuckerman	15 cm	2.5 cm
4.	Sahana's human anatomy by Dr.Sahana	12 cm	3.8 cm
5.	Gray's anatomy	15 cm	2.5-5cm
6.	B. D. Chaurasia's Human Anatomy	12 cm	3.8 cm

A. Internal structure of *Guda*

Sushruta and *Vagbhata* have described the presence of three *valis* (folds) inside *Guda* from proximal to distal. These are - *Pravahini*, *Visarjani* and *Samvarni*. These are situated one over the other inside *Guda* at a distance of one and a half *angula* from each other. All of them are obliquely projectile in one *angula*, „*Shankhavartanibha'* (spiral like conch), and resembles colour of „*Gajatalu'* (palate of elephant) as reddish black. *Gudaustha* is situated at a distance of one and a half *yava* from „romanta‟ (hairy margin). The rest vali is at a distance of one *angula* from anal verge.

Tabale: *Ayurvedic* Classification of *Guda Sharira*

1.	***Rachana***	***1. Mansa marma (Su.)*** ***2. Dhamani marma (Vag.)***
2.	***Shadangatva***	***Madhya shariragata***
3.	***Pramana***	***4 ½ Anguli***
4.	***Parinama***	***Sadhay pranhara***
5.	***Aghataja lakshana***	***Sadhyo Marana***
6.	***Adhisthan***	***Udargat marma.***
7.	***Srotas***	***1.Bahirmukha Srotas 2.Purishvaha Srotas***
8.	***Avayava***	***Matruja Avayava***
9.	***Colour***	***Blackish-red, like elephant's palate(Gaja Talu)***
10.	***Structure***	***Internally resemble a Conch***
11.	***Karmendriya***	***Payu (guda)***

C. Physiological concept of Guda

Guda (ano-rectum) is situated in Koshtha / Madhya Sharira (thoraco-abdominal cavity). Here are two divisions of Guda (ano-rectum) mentioned in classical literature i.e. Uttara Guda (distal rectum) and Adho Guda (anal canal). Gudaushtha (anal orifice) is mentioned as lower most part of Guda (ano-rectum). Chakrapani gives commentary on both of the Guda (ano-rectum) part i.e. Uttara Guda (distal rectum) is a part of Guda (ano-rectum) where Purisha (feaces) stored or it is a reservoir of stool, on the other hand Adho Guda (anal canal) is a part which involved in the removal process of faecal material. Uttara means higher and proximal, so it means Uttara Guda (distal rectum) is located superiorly and it stores feaces. Uttara Guda (distal rectum) should have enough space for the storage.

According to modern science the rectums acts as a reservoir and accommodate faecal material and gas. The lower part of rectum lodges several longitudinal folds which become vanished during distention. Rectum is not involved in defecation until conscious decision has been taken to evacuate the stool. Relaxation of upper part of internal anal sphincter sampling and reflex response to rectal distention, it causes the leaking of the rectal content into upper most part of anal canal. This sampling occurs only to know either the content is faeces or flatus (gas). If it is gas then it pushes outside. If it is feaces then it pushes back to the rectum. The stool is pushed back because the external anal sphincter didn‟t relax. It can only relax voluntarily (on the urge to defecate), otherwise it is always in a state of tonic contraction. It simply proves that when rectum is full of stool it is distends till the area where upper most margin of external anal sphincter lies. The distended rectum never encroach the region where external anal sphincter lies. Another muscle called pubo-rectalis also plays a great role in continence. It also maintains a state of tonic contraction until it is voluntarily relaxed in the process of defecation. The fibers of external anal sphincter, internal anal sphincter and pubo-rectalis compose the anorectal ring. So the Uttara Guda (distal rectum) is above the anorectal ring. This anorectal ring seems like the area of differentiation for Uttara (distal rectum) and Adho Guda (anal canal). Adho means lower part, so it is the lower region of Guda (anal canal) and its function is to remove feaces from body. In the procedure

of defecation colon, rectum, intra abdominal pressure (due to straining), relaxation of pubo-rectalis, the anal sphincters and conjoint longitudinal muscle takes place. All these factors actively participate when the urge for the defecation occurs.

Guda is one of the Karmendriya and its function is to excrete the mala from the body. Guda and Pakvashaya are the main seats of Aapan Vayu, the main driving force for the expulsion of feaces. Any imbalance in the functioning of Aapan Vayu leads to the disease of Guda and Vasti. The description of the process of defecation has not been clearly described in any of the Ayurvedic classics. Based on internal structure of Guda described by various authors, Gananath Sen describes that Pravahani helps in compressing and pushing the feaces downwards, Visarjani relaxes during this process and thus allow the contents to move further and Samvarani controls the final act of evacuation. Thus Aapan Vayu and the three vali are solely responsible for initiating and completing the act of defecation.

D. Anatomical and Physiological Concept of Gudavalis

i. Pravahini: „प्रवाहयतीतत प्रवाहणी' – Dalhana

This is the first Vali in the proximal part of Gudanalika and is about 1½ inch above the Visarjani. Since it initiates the Vega of Purisha Pravartana (sensation of expulsion) and pushes the Purisha downwards (Pravahana), it is called Pravahini.

This is the middle one third part of the rectum or the upper half of the ampullary part of the rectum. Its beginning or the proximal end is indicated by the presence of the second Houston's valve. The distance from the second to the third Houston"s valves is about 3 to 4cm, as similar to the Ayurvedic description. The middle Houston's valve which lies at the upper end of the rectal ampulla is the largest and the most constant fold. In Ayurvedic texts, it has great importance and considered as a landmark. The faecal matter is stored in the Sigmoid colon and at the time of evacuation. It enters the ampulla of the rectum by mass peristaltic movement. Then it give rise to the urge of defecation and Pravahanam, hence is named as "Pravahini."

ii. Visarjani: 'ववसृजतीतत ववसजजनी' –Dalhana

This is the second Vali situated between Pravahini and Samvarni and is about 1 inch. It is in the middle portion of Guda. It helps in moving the fecal matter forward by its expansion and aids in its expulsion.

This is the last one third part of the rectum or the lower half of the ampulla of the rectum. Its beginning or proximal end is indicated by the third Houston's valve and the distal end by the ano-rectal ring. Its length is about 3 to 4 cm. The mucous membrane of this part is pink in colour and the tributaries of the superior and middle rectal vessels are seen through it. It also contains longitudinal mucosal folds similar to Pravahini.

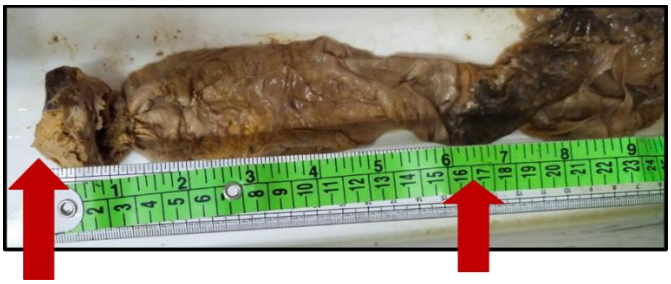
iii. Samvarni: 'संवृणोतीतत संवरणी'-Dalhana

This is the third vali situated below Visarjani and is 1 inch above the Gudaustha. It is the last Vali and its function is to open Guda, when faecal matter comes from above and to close it after faecal expulsion.

This part is the anal canal with internal and external anal sphincters. It is in continuation with the rectum above and is marked by the Ano-rectal ring. The internal anal sphincter is involuntary and the external anal sphincter is under voluntary control. Both of these open for defecation and close after passing out of the faecal matter, hence the name, Samvarni.

2. Discussion based on Cadaveric study

For the cadaveric study the dead body was taken and dissected in Department of Rachana Sharir, Government Ayurvedic College, Patna. According to modern anatomy the total length of the rectum was 12 cm and the length of the anal canal was 3.8 cm. Anatomically the length of rectum and anal canal was 16 cm according to modern view but according to Sushruta and Vagbhata the length of Guda as four and half Angula. The measurement of one Angula is approximately 2 cm and on the basis of this total length of Guda is calculated approximately 9 cm. It is known that average length of anal canal is 3.8 cm. Thus the extent of Guda includes anal canal and lower 6 cm of rectum. Sushrut has described that the interior of the Guda contains three Valis which can be correlated to the modern anatomical parts. They can be related to horizontal folds in the rectum (houstans valve) namely middle and the lower folds. The third Vali seems to be at the level of dentate line. The distance between each fold is about 2.5 cm which is approximately one and half Angula.



A. Length according to Modern Aspect

A. Length according to Ayurvedic Aspect

DISCUSSION

A. Clinical Concept of *Gudavalis*

The lacunae of this hypothesis, that the lower two *Vali* do not look like folds of a conch shell and their corresponding distance in an anatomical specimen does not coincide with the description in *Ayurvedic texts*.

The scholars opinion on the grounds that the nomenclature of Vali indicates some functional aspects also, which cannot be explained assuming Houston's valves only as three Vali and also their location is far away from the anal margin.

This entire description in Ayurveda was based on simple clinical observation with the help of Arsoyantra (similar to practoscope) in a patient rather than on a cadaver. The ancient surgeons used to introduced a four and half finger breadth long Arsoyantra in the anal canal which cannot go beyond lower left Houston's valve as is observed during proctoscopy. They named this fold as Pravahani Vali, this part seems moving, during straining.

The next structure presenting like a fold through proctoscope is the level of ano-rectal ring which suddenly pops-up during withdrawal of the proctoscope because of the pull of pubo-rectalis muscle. This is the level where circular muscles assume considerable thickness and are named as internal sphincter. Any faecal matter arising in this area will be expelled out. Thus they named it Visarjani.

The third Vali seems to be at the level of pectinate line. Although this does not look like crecenteric fold, can fit into the functional aspects of Samvarani Vali. At this level the entire anal canal constricts and collapses at the opening of proctoscope owing to strong muscular pressure exerted by external sphincter from outside.

All these three levels, if marked on the proctoscope would appear one and a half finger breadth, because the proximal portion goes on collapsing, thus reducing the actual distance covered by proctoscope. The middle portion i.e. area corresponding to ano-rectal ring and below dose not collapse, hence proctoscope shows the mark of actual distance, and the lower portion near the level of dentate line suddenly expells the protoscope exaggerating its actual distance during withdrawal.

B. Discussion based on Clinical Study

In this modernized era, there is lot of competition in each and every field. People are very conscious about securing their future. For achieving this, people are having lack of time for themselves and which is a main reason of deterioration of health. Due to lack of time people prefer easy to made and easily available food, junk food, which is very low in nutritive value and contain high amount of calories. Along with this long time sitting work, day and night shift, improper and unsatisfied sleep are the common situation of most of the individuals. All these unhealthy habits cause vitiation of Vata, Pitta, and Kapha Dosha. This causes Mandagni. According to Vagbhat, the root cause of all diseases is Mandagni.

Gudagata Vikara (Anorectal disorders) refers to ailments of the anus and rectum. Gudagata Vikara includes; Arsha (Haemorrhoids), Bhagandara (Fistula-in-Ano), Parikartika (Fissure-in-Ano), Guda Kandu (Pruritus Ani), etc. These are some common disorders in human being.

Common Anorectal disorders are as follows

1. Arsha (Haemorrhoids)-

According to Acharya Sushruta, Arsha is included in Ashtamahagad Vyadhi. Mahagada means deadly and incurable imperative diseases. Arsha occurs in Guda which is a Marma (a vital place). Arsha is deadly disease as enemy. According to modern science Haemorrhoids are dilated plexus of superior Haemorrhoidal veins of anal canal.

2. Bhagandara (Fistula-in-Ano)-

Bhagandara has been included in Ashtamahagada. Bhagandara is a disease which causes tear or discontinuity in the region of Bhaga, Guda and Vasti. It can be well correlated with Fistula-in-Ano as per modern science. Fistula in Ano can be defined as abnormal communication between anal canal and rectum with perianal skin.

3. Parikartika (Fissure-in-Ano)-

Parikartika is derived from root Parikrit which denotes, to cut around. (Pari- all around, Kartanam- the act of cutting). Acharya Dalhan mentioned it as a cutting and tearing pain everywhere Vijayaraksita mentioned its cutting type of pain specially localized in Guda. According to modern science it is defined as longitudinal tear in lower end of anal canal. It is the most painful condition affecting the anal region.

4. Gudabhramsha (rectal prolapse)-

Acharya Sushruta has mentioned Gudabhramsha in Kshudraroga. He explained that straining and diarrhoea in rough and lean person leads to Gudabhramsha.

CONCLUSION

At the end of the study, following conclusion has been drawn and summarized as below:

Conclusion based on the Literary Study -

Literary study of both Ayurvedic and modern classics was done to build up a firm relation between anatomical and physiological aspect of the anorectal region (Guda) and Gudagata Vikara (Anorectal disorders) which includes; Arsha (Haemorrhoids), Bhagandara (Fistula-in-ano), Parikartika

(Fissure-in-ano), Gudabhransha (Rectal prolapsed) which can also be justified on modern medical sciences.

The term Guda is significantly correlating with the anorectal region or anorectum.

Adhar Guda can be correlated with the lower part of the rectum and anal canal, Uttar Guda can be correlated with the distal rectum.

The total length of the Anorectal canal or anorectum from recto- sigmoid junction to anal verge is 16.5 cm.

The length of Guda is considered, whole of the anal canal & distal 5 to 6 cm of the rectum, which extends up to the middle Huston's valve.

Apana Vayu carries sensory and motor function. It carries defecation impulses to the brain, after that defecation urge is produced. So Vata is significantly correlated with neurotransmitters as described in Ayurveda.

Gudavali namely- Pravahani correlates with the Middle Houston's valve, Visarjini correlates with the inferior Houston's valve and Samvarni correlates with the dentate line line. These Gudavalis are associated with the defecation process.

Conclusion over Cadaveric study

It is concluded that Guda as described in Ayurvedic Samhita is significantly correlated with the anorectal region or anorectum.

The term Shankha Nabhi (conch shell) having many spirals in shape, can be correlated with anteroposterior and lateral curvatures of the rectum and anal canal.

Conclusion over Clinical study

The study of Ayurvedic review on Arsha, Bhagandara, Parikartika, Gudabhransha is significantly correlated with Haemorrhoids, Fistula-in-ano, Fissure-in-ano, Rectal prolapse.

Vitiated Apana Vata in Guda is responsible for causation of disease like Arshas etc.

Guda Marma is both Dhamani and Mansa Marma.

Guda is a Sadya Pranhara Marma.

Guda is one among 15 Koshtangas.

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