

**A REVIEW ON PITTAJA MUTRAKRICHHRA W.S.R TO CYSTITIS
AND ITS MANAGEMENT THROUGH SHATAVARI GHRITA UTTAR
BASTI AND SNEHAPANA**

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ABSTRACT

Urinary tract infection is the most common outpatient infection, accounting for 1-3% of consultation in general medical practice. Women are more prone to UTIs. It is estimated that more than 30% of women will experience at least one episode of Cystitis in their lifetime. Of these 30%, 20% women will have recurrent cystitis. In our Ayurvedic textbooks, the urinary disorders are described in the form of 8 types of *Mutrakrichhra*, 13 types of *Mutraghata* & 4 types of *Mutraashmari*. Amongst them, *Pittaja Mutrakrichhra* is a commonly occurring condition that resembles with the symptoms of *Cystitis*. According to Ayurveda, Uttar Basti is described as chief treatment for Bastigata rogas and it can also be used in *Mutrakrichhra* and

Mutraghata. Also in *Mutrakrichhra* Chikitsa adhyaya, Chakradutta has mentioned use of Shatavari Ghrita for treatment of Pittaja Mutrakrichhra. Hence, use of Shatavari Ghrita Uttar basti and snehapana in management of Pittaja Mutrakrichhra will be discussed in this article.

KEYWORDS: Urinary tract infection, Pittaja Mutrakrichhra, Uttar Basti, Snehapana.

INTRODUCTION

According to *Ayurveda*, a man is *Swastha* whose *doshas*, *agni*, *dhatus* and *malas* are in the states of normalcy or equilibrium (*samadosha*, *samagni*, *samadhatumalakriya*) and who is mentally and spiritually in state of calmness i.e. bliss and happiness.^[1]

As for a healthy body, one should have equilibrium of Doshas & Dhātu. In the same way proper excretion of mala is of equal importance. Among, Trimala- MUTRA is responsible for Bastipoorna and Kledavhanam^[2] i.e. Elimination of waste product out of the body. When this physiology is hampered, it leads to Mutravaha Sroto Dushti Vikaras.

In our classical textbooks, the urinary disorders are described mainly in the form of *Mutrakrichhra*, *Mutraghata* & *Mutra-ashmari*.

Amongst them, ***Pittaja Mutrakrichhra*** is a commonly occurring condition. Patients of Pittaja Mutrakrichhra complaint- Raktayukta, Shulayukta, Dahayukta, Krichh-Muhurmuhur Mutrapravartti^[3] etc. In Modern, these symptoms resembles with the symptoms of CYSTITIS such as, Abnormal colour of Urine, Haematuria, Pain while micturition, Burning sensation, Frequency & Urgency and Supra-pubic pain^[4] etc.

As mentioned earlier, UTI is the most common outpatient infection so it creates a significant societal and personal burden in terms of social and psychological effects which have a negative impact on quality of life. Thus, urinary tract infection is potentially a serious condition and failure to realize that this may lead to development of serious chronic pyelonephritis and chronic renal failure. With the introduction of effective antibiotics problem has been solved to some extent but the use of, antibiotics have limitations like side effects, chances of reinfection and relapse even after the long term therapy. Simultaneously increasing incidence of resistance and high cost of therapy are common problems.

Hence, it is the need of the hour to find out more effective treatment with less burden of cost for the disease so Shatavari Ghrita Uttar basti and Snehapana is used for the treatment of Pittaja Mutrakrichhra. The manifestation of any disease is described in five steps in *Ayurveda*, these are Nidana, Purvarupa, Rupa, Upashaya and Samprapti. These help in proper diagnosis of disease.^[5]

NIDANA

The specific nidana for Pittaja Mutrakrichhra are not available in classics. So etiological factors which have mentioned for Mutrakrichhra roga can be taken as nidana of Pittaja Mutrakrichhra. The nidanas which are responsible for Mutravaha Srotodusti can also be taken as Samanya nidana for Pittaja Mutrakrichhra.

Indulgence in sex, eating and drinking during the urge of micturition, suppression of urge for micturition results in Vitiating of Mutravaha Srotas. In addition to that, injury to Mutravaha srotas and individuals who are having Dhatukshaya also suffer from Mutrakrichhra Roga are the Samanya Nidana^[6], and Ativyayama (Excessive exertion i.e. in excess of one's own capacity), Tikshana Aushadha Sevana (Use of strong medications), Ruksha Madhya (Habitual intake of alcohol made of dry Dravyas), Vyavaya (excessive indulge in intercourse), *Durtprishthaaynaat* (riding on fast moving animals), Anupa Matsya and Mamsa Sevana (ingestion of flesh of creatures residing on land and under water), Adhyasana (intake of food before the digestion of previous meal), Ajirna (indigestion) are considered as Vishishta Nidana^[7] of Mutrakrichhra.

Sushruta and Vagbhata have not mentioned nidana while Madhava, Yogaratnakara have mentioned similar Nidanas as that of Charak. "Katiskandhatidharanat"^[8], one of the etiological factor of Mutrakrichhra is mentioned in Kashayapa Samhita, that is –Lifting heavy weight on Kati and Skandha.

SAMPRAPTI

From Nidana sevana until the appearance of Vyadhi, there is a sequence of pathological changes taking place in the body which is collectively called Samprapti. Acharya Charak has described the pathogenesis of Mutrakrichhra. In Mutrakrichhra, Specific etiological factors either individually or jointly results in vitiating of Tridosha. Then these Vitiating Dosha get aggravated in the Basti and hamper the Mutravaha srotas that cause Mutravikara namely Mutrakrichhra.^[9]

SAMPRAPTI GHATAK

Dosha	: Pitta Pradhan Tridoshaj
Dushya	: Mutra
Srotas	: Mutravaha
Sroto dushti	: Sang

Agni	: Mandagni
Adhistan	: Basti, Mutramarg
Sanchar Sthan	: Mutramarg
Rog marg	: Mutramarg

PURVAROOPA

These are the characteristics that appear before the actual manifestation of Vyadhi and are expressed in milder or incomplete form. There is no textual reference regarding the Purvaroopa of Pittaja Mutrakrichhra but Chakrapani says that Lakshnas of Vyadhi which are expressed in the milder form is to be considered as Purvarupa. The different Lakshanas of Pittaja Mutrakrichhra when expressed in the milder form are to be considered as Purvaroopa of Pittaja Mutrakrichhra.

ROOPA^[10]

All Acharyas explained Pittaja Mutrakrichhra as a Pitta Pradhan Vyadhi characterized by Peetayukta- Raktayukta (Abnormal colour of urine), Shulayukta (Pain while micturition), Dahayukta (Burning sensation while micturition), Krichh-Muhurmuhur mutrapravartti (Frequency and urgency).

UPDRAVAS^[11]

Updravas are those which develop after the manifestation of the main disease or during the disease process itself. Acharya *Kashyapa* has only explained the Upadrava of Mutrakrichhra as Karshyata (Emaciation), Arti (Uneasiness), Aruchi (Anorexia), Annavasthiti (Mind instability), Trishna (Thirst), Shoola (Pain) and Vishada (Nervousness).

SADHYA-ASADHYATA

Kashyapa has stated that all the Mutrakrichhra are Daruna, which literally means difficult to cure.^[12]

CHIKITSA

According to Ayurveda, *Chikitsa* is defined as Procedures by which the vitiated doshas, dhatus, etc are brought to normal state or in equilibrium.^[13] Chikitsa is nothing but Samprapti Vighatana. Ayurveda therapeutics is divided as Sodhana chikitsa (Purification treatment) and Shamana chikitsa (alleviating treatment). Urinary tract infection is a disease affecting the

Basti Marma So, an early restoration of the Vitiated Dosha is necessary to maintain the state of equilibrium.

PITTAJA MUTRAKRICHHRA CHIKITSA^[14,15,16,17]

➤ **Bahirparimarjana Chikitsa**

- Sheeta Parisheka (Cold affusion), Avagahana in cold water, Pralepana with Chandan and Karpur are advised for Pittaja Mutrakrichhra.

➤ **Antahparimarjana Chikitsa / Shodhana**

- Virechana (Purgation therapy) with prepared juice of Tikta, Madhur and Kashaya Dravyas is advised.
- Anuvasana Basti, Niruha Basti, Uttara Basti (Medicated enema).

➤ **Shamana Chikitsa**

- Pittanashaka Dravyas can be used.
- Follow Grishma Ritucharya.
- Draksha, Vidarikand Swarasa, Ikshu Rasa Siddha Ghrita will be used for Mutrakrichhra.
- Use of cold decoction prepared from Satavari, Kusha, Kasha, Savadamstra, Vidari, Sali, Ikshu and Kaseruka, mixed with honey and sugar is advised for the patient suffering from Pittaja Mutrakrichhra.
- Shatavaryadi Kwatha (Ch.), Haritakyadi Kwatha, Trinpanchamula Kwatha(Y.R.), Trinpanchamula Churna (Su.), Ervaru Beeja, Yashtimadhu, Devdaru with Tandul Dhavan.
- Cold sponging, lepa and Avagahana is mentioned in Vagbhata Samhita, to get relief from Pittaja Mutrakrichhra.
- Acharya Sushruta mentioned drugs of Trinpanchamula group, Utopladi group, Kakolyadi and Nyogrodhadhi group in the form of Ghrita and Taila for oral and Basti purpose in the management of Pittaja Mutrakrichhra.
- Acharya Chakradutta mentioned use of Ghrit siddha from Shatavari, Kasa, Kush, Gokshuru, Vidari, Ikshu, Amlaki in Pittaja Mutrakrichhra. (Shatavari Ghrit)

UTTAR BASTI

Uttar basti is a procedure, in which drug is administered through Uttar Marga i.e. marga above the guda (Apatyamarg and Mutramarga) and it imparts Srestha guna to the body.^[18]

Acharya Vagbhata defines it as the one which is administered after the niruha basti and is given in uttar marga.^[19]

Uttar Basti is described as chief treatment for Bastigata rogas and can also be use in Mutrakrichhra and Mutraghata.

UTTAR BASTI PROCEDURE

Like every procedure of panchakarma, Uttar Basti is also carried out in 3 steps –

- Poorvakarma,
- Pradhana karma
- Paschat Karma.

➤ POORVAKARMA

1. Sambhar Sangraha (Preparation of material- Instruments and Drug).
2. Matra-Kala Nirdharan.
3. Atur Siddhata (Preparation of Patient).

Preparation of Patient

In Classics

- Acharya Vagbhata has mentioned administration of Niruha Basti prior to uttar basti for shodhan effect as to purify the Mala Marg.^[20]
- Acharya Charak advised the patient to take bath then having food mixed with Mamsa ras and Ksheer and voided her mala marga before uttar basti.^[21]
- Acharya mentioned Sthanik Abhyanga and Swedana over abdomen, thighs, groin area and having Yavagu with ghrita and dugdha before administration of uttar basti.^[22]

In Current Practice

Advise the patient first to empty his/her bladder and bowel.



B.P and pulse should be recorded.



All instruments should be autoclaved to avoid any type of infection.



Patient should be made to lie down in supine position with well flexed thighs (Lithotomy position).



Yoni Prakshalana with Panchvalkala Kwatha, Triphala kwatha, Nimba kasaya, etc should be done for local aseptic precautions.



Followed by Sthanik Abhyanga and Swedana over abdomen, thighs, groin region.

➤ PRADHANA KARMA (METHOD OF ADMINISTRATION)

In Classics

1. In Lithotomy position, Bastiputaka containing the prescribed dravya (either kwath or sneha) is taken and Bastinetra lubricated with sneha is carefully introduced into the Apatyamarg and Mutramarga.
2. Bastiputaka is compressed uniformly, so that the dravya enters the marga easily.
3. Such uttar basti can be repeated 2/ 3/ 4 times in a day and also has to be given consecutively for 3 days. Then the patient is advised rest for 3 days before giving another course of 3 uttar basti.^[23]

In Current Practice – (URETHRAL UTTAR BASTI)

In Lithotomy position, after cleansing of the part expose the Urethral Opening and catheterize it.



Then slowly insert the Bastinetra (Rubber catheter) and wait for the residual urine from the other end of catheter.



After collecting the residual urine, attach the Bastiputaka (Syringe) to bastinetra and slowly push the drug.



Then remove the netra and ask the patient to lie down until she feels urination.

➤ PASCHATKARMA

In Classics

- The Uttarbasti Dravya Pratyagamana Kala is 100 Matra (~31.66 sec).^[24]
- Acharya Sushruta says, after the medicine has returned, in the evening considering the Dosha, Ksheera, Yusha or Mamsa Rasa has to be taken.^[25]
- Acharya Charak and Acharya Vagbhata mentioned the same Paschatkarma for uttar basti as of Anuvashana basti.
- Acharya Charak says if the Sneha does not return, then observation should be done for one night. If it fails to return, then Teekshna Shodhanavarti should be inserted.^[26]

- Acharya Sushruta says, if Sneha does not return then Shodhana basti can be given.^[27]
- He also mentioned the use of Probe in Mutramarga and abdomen is pressed forcefully below the umbilicus.^[28] Then, Varti of size of Mudga, Ela and Sarshapa prepared from Aaragwadha Patra with Nirgundi Patra Swarasa, Gomutra and Saindhava smeared with Ghee is inserted into Mutramarga with the help of Shalaka.^[29]

In Current Practice

Blood pressure, pulse to be recorded.



Patient is advised to relax for 30 min in ward in head low position.



Fomentation over supra-pubic area should be done with hot water bag to relieve pain. Patient is advised to take light diet in evening.



All the instruments including syringe, catheter, and oil should be properly autoclaved.

DRUG REVIEW OF SHATAVARI GHRITA^[30]

Textual Reference: **Chakradutta**

Rogadhikar: **Mutrakrichhra**

Composition

Name & B. Name	Rasa	Guna	Veerya/Vipak	Karma	Proportion
SHATAVARI <i>Asparagus racemosus</i>	Madhura Tikta	Guru, Snighdha	Sheeta / Madhura	Vata Pitta Shamaka, Mutrala	1 Part
KASH <i>Saccharum spontaneum</i>	Madhura Kasaya	Laghu, Snighdha	Sheeta / Madhura	Vata Pitta Shamaka, Mutra virechaniye	1 Part
KUSH <i>Desmostachya bipinnata</i>	Madhura Kasaya	Laghu, Snighdha	Sheeta / Madhura	Tridoshaghana, Mutrala	1 Part
GOKHSHURU <i>Tribulus terrestris</i>	Madhura	Guru, Snighdha	Sheeta / Madhura	Vata Pitta Shamaka, Mutrala	1 Part
VIDARI <i>Pueraria tuberosa</i>	Madhura	Guru, Snighdha	Sheeta / Madhura	Vata Pitta Shamaka, Mutrala	1 Part
IKSHU <i>Saccharum</i>	Madhura	Guru, Snighdha	Sheeta / Madhura	Vata Pitta Shamaka Kapha vardhak	1 Part

<i>officinarum</i>				Mutrala	
AMALAKI <i>Emblica officinalis</i>	Panchras (Lavana rahit and Amla Pradhan)	Guru, Ruksha, Sheeta	Sheeta / Madhura	Tridoshahar, Especially Pitta Shamaka, Mutrala	1 Part

DISCUSSION

Probable Mode of Action of Shatavari Ghrita

The line of treatment in Ayurveda is mainly based on Dosha Chikitsa (treatment). The action of every drug is determined by the dominant pharmacodynamic factors. The disease Mutrakrichhra (urinary tract infection) has involvement of vitiation of Pitta Dosha along with vitiation of Vata Dosha. Shatavari Ghrit is classically indicated medicine for Pittaja Mutrakrichhra (urinary tract infection) by Chakradutta. All the drugs of Shatavari Ghrita are Vata Pitta Shamaka, Mutrala, Sheet virya, Madhura vipaka, Mutravirechaniye^[31] which helps in Samprapti vightana of Mutrakrichhra. By Mutravirechaniya (diuretic) action, urine volume is increased, pH becomes alkaline and inflammation is reduced with the Daha Shamaka (pacifying burning sensation) properties medicine soothes the epithelium of urinary tract.

Probable Mode Of Action Of Mutramargagata (Urethral) Uttarbasti^[32]

Drug administered through phallus or female urethra is called Urethral Uttarbasti. A small fraction of orally administered drugs only acts on the desired site either due to poor absorption or due to metabolic loss for which systemic therapy in bladder diseases most often is not fruitful. This loss can be avoided from first pass metabolism, thus the therapeutic effect of a drug at the target site with very minimal side effects can be achieved by administering Intra-vesical Drug Delivery (IDD). The need of a prolonged regimen by oral administration for achieving efficacy can be lowered by IDD.

The main problem of IDD is low residence time of a drug in the bladder that necessitates frequent instillation. Usually, the drug inside the bladder rarely lasts beyond the first voiding of urine after instillation. Another important obstacle of this therapy is low permeability of transitional epithelium of the bladder also known as Urothelium.^[42] However, in diseased state, this tough barrier against IDD is somewhat compromised and even then, only mode of membrane transport across urothelium is passive diffusion. Since passive diffusion is the only driving force for intra-vesical drug absorption, the drug transport across the urothelium (trans-vesical) may be improved if the concentration gradient is high. Increasing retention

time of bladder is possible by repeating the therapy for prolonged time. The medicine of Uttarbasti (usually medicated oil or ghee; sometimes decoction) are introduced into bladder for 3 to 4 times in a day and should be repeated in every fourth day. Use of Ghee or oil in Uttarbasti is beneficial as it remains on the urothelium layer for several hours. It fulfils three main criteria: quick adhesion to the urothelium after instillation, should not bottleneck voiding of urine and retained over urothelium for at least several hours.

In Ayurvedic classics, the drugs used in Uttarbasti have been advised to release at the level of mid portion of penile part of the urethra in male and in urethra of the female. So, there is also a chance of absorption of drug in urethral part. Moreover in male, it is said to administer Uttarbasti in Hrishta Medhra (i.e. Erected Phallus). In erect condition, there is huge accumulation of blood in spongy area, which may drain the drugs to the circulation.

CONCLUSION

The increasing prevalence of UTIs is a global issue of concern due to associated social and psychological effects which compromise the quality of life. UTI is potentially a serious condition and failure to realize that this may lead to the development of serious chronic pyelonephritis and Chronic renal failure. With the introduction of effective antibiotics, the problem has been solved to some extent but the use of, antibiotics has limitations like side effects, chances of reinfection, and relapse even after long-term therapy. Simultaneously increasing incidence of resistance and high cost of therapy are common problems. Though UTI is difficult to manage, but significant improvement in the case of UTIs has been recorded through Ayurveda. So it can be a good option for better management of UTI or Mutrakrichhra. *Ayurveda* can treat and avoid recurrence of *Pittaja Mutrakrichhra* with medications, *Panchakarma* therapies, diet and lifestyle modifications.

REFERENCES

1. Sushruta, Sushruta Samhita, Hindi commentary by Ambikadatta Shastri, Sutra Sthana, Chapter 15/48, Varanasi, Chaukambha Sanskrit Sansthan.
2. Editor Yadavji Trikamji, Sushruta Samhita with Nibandhasangraha Commentary of shri Dalhanacharya, Sutrasthana, chapter 15/4, Chaukambha Surbharati Prakashan Varanasi, reprint: 2014.
3. Charak, Charak Samhita, Hindi commentary by Kashinath Shastri, Chikitsa Sthana Chapter 26/34, Varanasi, Chaukambha Bharti Academy.

4. Davidson's principles & practice of medicine 23rd edition by Stuart H Ralston & Ian D Penmana.
5. Editor Dr. Brahmananda Tripathi, Madava Nidanam of Sri Madavakara with Madhukosa Commentary by Vijayaraksita & Srikantadatta, chapter 1/4, Chaukambha Surbharati Prakashan.
6. Charak, Charak Samhita, Hindi commentary by Kashinath Shastri, Vimana Sthana Chapter 5/20, Varanasi, Chaukambha Bharti Academy.
7. Charak, Charak Samhita, Hindi commentary by Kashinath Shastri, Chikitsa Sthana Chapter 26/32, Varanasi, Chaukambha Bharti Academy.
8. Kashyapa, Kashyapa Samhita, Hindi Commentary by Hemraj Sharma, Sutra Sthana Chapter 25/21, Varanasi, Chaukambha Sanskrita series office.
9. Charak, Charak Samhita, Hindi commentary by Kashinath Shastri, Chikitsa Sthana Chapter 26/32, Varanasi, Chaukambha Bharti Academy.
10. Charak, Charak Samhita, Hindi commentary by Kashinath Shastri, Chikitsa Sthana Chapter 26/34, Varanasi, Chaukambha Bharti Academy.
11. Kashyapa samhita, Hindi Commentary by Satypala Bhisagacharya, Chikitsa Sthana, chapter 7/23, Chaukambha Sanskrit Sanstana, Varanasi.
12. Kashyapa, Kashyapa Samhita, Hindi Commentary by Hemraj Sharma, Chikitsa Sthana Mutrakrichhra, Varanasi, Chaukambha Sanskrita series office.
13. Charak, Charak Samhita, Hindi commentary by Kashinath Shastri, Sutra Sthana Chapter 16/34, Varanasi, Chaukambha Bharti Academy.
14. Charak, Charak Samhita, Hindi commentary by Kashinath Shastri, Chikitsa Sthana Chapter 26/49, Varanasi, Chaukambha Bharti Academy.
15. Sushruta, Sushruta Samhita, Hindi commentary by Ambikadatta Shastri, Uttara Tantra Chapter 59/20- 21, Varanasi, Chaukambha Sanskrit Sansthana.
16. Vagbhata, Ashtanga Hridaya, Hindi commentary by Brahmanand Tripathi, Chikitsa Sthana 11/35, Varanasi, Chaukambha Surbharti Prakshana.
17. Chakradutta Svimarsha 'Vaidhprabha' hindi commentary by Dr Indradev Tripathi, Chaukambha Sanskrit Bhawan, Reprint 2019.
18. Chakrapani, Commentator. Charak, Drudhbala, Charak Samhita, Siddhi Sthana, Trimarmiya Siddhi adhyay, 9/50, Vaidya Yadavji Trikamji Acharya, editor. New Delhi: Chaukambha Publications; Reprint 2014.
19. Vagbhata. Ashtanga Samgraha. Sutrasthana, Bastividhi adhyay, 28/9. Ravi Dutt Tripathi, editor. Delhi: Chaukambha Sanskrit Pratishthan.

20. Vagbhata. Ashtanga Hridayam. Sutrasthana, Bastividhiadhyay, 19/70, Vd. Yadunandan Upadhyay, editor. Varanasi: Chaukhambha Prakashan.
21. Charak, Charak Samhita, Hindi commentary by Kashinath Shastri, Siddhi Sthana Chapter 9/53, Varanasi, Chaukhambha Bharti Academy.
22. Sushruta, Sushruta Samhita, Hindi commentary by Ambikadatta Shastri, Chikitsa Sthana, Chapter 37/109, Varanasi, Chaukhambha Sanskrit Sansthan.
23. Vagbhata. Ashtanga Hridayam. Sutra Sthana, Bastividhiadhyay, 19/81-82, Vd. Yadunandan Upadhyay, editor. Varanasi: Chaukhambha Prakashan.
24. Bhaluki Commentator. Sushruta. Sushruta Samhita. Chikitsa Sthana, Anuvasanottarbasti Chikitsa Adhyay 37/117, Vaidya Yadavji Trikamji Acharya, editor. Varanasi: Chaukhambha Sanskrit Sansthan; Reprint 2013.
25. Sushruta, Sushruta Samhita, Hindi commentary by Ambikadatta Shastri, Chikitsa Sthana, Chapter 37/113, Varanasi, Chaukhambha Sanskrit Sansthan.
26. Charak, Charak Samhita, Hindi commentary by Kashinath Shastri, Siddhi Sthana Chapter 9/57, Varanasi, Chaukhambha Bharti Academy.
27. Sushruta, Sushruta Samhita, Hindi commentary by Ambikadatta Shastri, Chikitsa Sthana, Chapter 37/118, Varanasi, Chaukhambha Sanskrit Sansthan.
28. Sushruta, Sushruta Samhita, Hindi commentary by Ambikadatta Shastri, Chikitsa Sthana, Chapter 37/119, Varanasi, Chaukhambha Sanskrit Sansthan.
29. Sushruta, Sushruta Samhita, Hindi commentary by Ambikadatta Shastri, Chikitsa Sthana, Chapter 37/120, Varanasi, Chaukhambha Sanskrit Sansthan.
30. Chakradutta Svimarsha 'Vaidhprabha' hindi commentary by Dr Indradev Tripathi, Chaukhambha Sanskrit Bhawan, Reprint 2019.
31. Dravyaguna Vijnana Vol.2, Prof. P. V. Sharma, Varanasi, Chaukhambha Bharti Academy.
32. Pulak Kanti Kar. Mechanism of Panchakarma and its Module of Investigation. Varanasi: Chaukhambha Sanskrit Pratishthan. 2013.