



A REVIEW STUDY ON MUTRAKRICHRA AND ITS MANAGEMENT WITH SPECIAL REFERENCE TO URINARY TRACT INFECTION.

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Mutrakrichra is one of the most prevalent health concerns in community practise, and it is a wide word that encompasses almost all urinary tract infection (UTI) diseases reported in modern medicine. Mutrakrichra's pratyatma lakshana is "Dukhena mutra pravritti," which means "discomfort during micturition." A urinary tract infection (UTI) is a disorder in which bacteria enter the urinary tract, stay there, and multiply. Other diseases with Mutrakrichra as a lakshana include Ashmari, Mutraghata, Mutraja vriddhri, Arsha, and Gulma. This sickness is described in practically all key sources that discuss its prevalence in the ancient world. In Uttar-tantra, Acharya Sushruta described Mutraghata and Mutrakrichra separately. In Mutrakrichra, the prakupit pitta dosha, combined with vata (mostly Apana vayu), enters the Vasti (urinary bladder) and affects the Mutravaha Srotas, causing symptoms such as Daha, Ruja, Basti-gurutva, Shotha, Muhurmutrata, Peet mutrata, and Sarakta mutrata. The aforementioned symptomatology is more similar to LUTI symptoms (i.e. Urethritis and Cystitis). The purpose of this study was to evaluate the Mutrakrichra literature review according to various texts and to determine the inter-relationship between Mutrakrichra and UTI. As a result, in this article, an attempt has been made to define Mutrakrichra in terms of urinary tract infection based on scientific evidence.

KEYWORDS: *Mutrakrichha, Shool, Mutraghata, Peeta Mutrata, Urinary Tract Infection.*

INTRODUCTION

Urinary illnesses are classified into 8 categories of Mutrakrichra, 13 types of Mutraghatas, 4 types of Ashmaris, and 20 varieties of Prameha in our classical book. In Vedna adhyaya, Acharya kashyapa describes the signs and symptoms of Mutrakriccha. [2] In general, a healthy urinary system is resistant to infections. Female lower urinary tracts, on the other hand, are more susceptible due to anatomical factors. Female sex, age under 6 months, obstructive uropathy, severe vesicoureteric reflux, constipation, and frequent catheterization are all risk factors for recurrent urinary tract infection. Urinary tract infections are becoming more common due to poor hygienic conditions and the environment, as well as poverty and illiteracy. Infections of the urinary tract affect 1% of boys and 1-3 percent of girls. [3] These infections are prevalent problems among pregnant women, diabetics,

polycystic kidney disease patients, and other immune-compromised individuals. In hospitalised patients, urinary tract infections are the most common cause of gram-negative sepsis. They are a significant cause of morbidity and can lead to kidney impairment, especially when combined with vesicoureteric reflux (VUR). Urinary tract infections are the second most common type of infection, following upper respiratory tract infections. [4] Infections in the urinary tract have a higher rate of occurrence, morbidity, and mortality than infections of the upper respiratory tract. As a result, urinary tract infection can be a major problem, and failing to recognise it can lead to chronic pyelonephritis and chronic renal failure. The problem has been remedied to some extent with the introduction of effective antibiotics, but their use has drawbacks such as side effects, the risk of reinfection, and recurrence even after long-term treatment. Resistance is on the rise at the same time that the cost of treatment rises, which is a common issue.

The term Mutrakrichchhra is self-explanatory and is derived from two words: Mutra and Krichchhra. The word mutra comes from the Sanskrit word prasrava, which meaning "to ooze." The word 'krichchhra' comes from the word 'kashte,' which signifies trouble or agony. Mutrakrichchhra refers to difficult or painful micturition.

"Dukhen mutra pravritti," according to all classical sources, is its silent feature. Mutrakrichchhra⁹ includes any form of 'Dukha' (discomfort) during micturition. Mutrakrichchhra is a broad term that refers to a variety of illnesses that are classified as urinary tract infections in modern medicine. The infection affects portions of the urinary system in urinary tract infection (UTI). Simple cystitis is the name given to an infection that affects the lower urinary tract (i.e. Urinary bladder infection).

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Ayurvedic perspective: Mutra is a byproduct of food digestion and metabolism in the body that is passed by the urethra. Krichhrata (dysuria) and Mutra-vibandhta are both present in Mutraghata and Mutrakrichchhra at the same time, but krichhrata (dysuria) predominates in Mutrakrichchhra.

Definition of mutrakrich: Mutrakrichchhra is known as "The painful voiding of urine". In this disease patient has urge to micturate, but he passes urine with pain.

Nidana (Etiology):

It can be concluded that *Vyayama, adhyashan, ruksha sevana, yana gamana* are causative factors for *vata prakopa*²³. *Tikshna aushadha, amla sevana* causes *pitta prakopa*²⁴, and *Anupa mamsa sevana, vyayama, adhyashan* causes *kapha prakopa*²⁵. So these *Nidanas* cause vitiation of *Doshas* along with *Stroto-dushti* of *Mutrvaha strotas*. *Stroto-dusti* will cause *kha-vaigunya* in *Mutravaha strotas*. These factor leads to *Mutrakrichchhra*.

These etiological factors can be summarized as:

Aharaja Nidana	Viharaja Nidana	Partantra Nidana
1. Adhyashana	1. Yana gamana	1. Kaphaja arsha ²⁶
2. Ajirna	2. Ativyayama	2. Ajirna ²⁷
3. Ruksha anna sevana	3. Aghata	3. Vasti vidradhi ²⁸
4. Tikshna aushadha sevana		4. Gulma ²⁹
5. Ruksha madya sevana		5. Udavarta ³⁰

Types of Mutrakrichhra:

All the Acharyas except Acharya Vagbhatta have described eight types of Mutrakrichhra. Acharya Vagbhatta has mentioned only Doshaja Mutrakrichhra

2.2 Nidana (Etiology)

It can be concluded that Vyayama, adhyashan, ruksha sevana, yana gamana are causative factors for vata prakopa.[6] Tikshna aushadha, amla sevana causes pitta prakopa[7] and Anupa mamsa sevana, vyayama, adhyashan causes kapha prakopa[8] So these Nidanas cause vitiation of Doshas along with Stroto-dushti of Mutrvaha strotas. Stroto-dushti will cause kha-vaigunya in Mutravaha strotas. These factor leads to Mutrakriccha.

Aharaja Nidana	Viharaja Nidana	Partantra Nidana
Adhyashana,	Yana gamana	Kaphaja arsha[9]
Ajirna	Ativyayama	Ajirna[10]
Ruksha anna sevana	Aghata	Vasti vidradhi[11]
Tikshna aushadha sevana		Gulma[12]
Ruksha madya sevana		Udavarta[13]

Rupa (Symptomatology):

Pratyatma lakshana

मूत्रकृच्छ्रमिति मूत्रस्य कृच्छ्रेण महता दुःखेन प्रवृत्तिः ।³¹

रोमहर्षो अंगहर्षश्चमूत्रकाले च वेदना ।

मूत्रकृच्छ्रेदशत्योष्टौवस्तिस्पृशितपाणिना ।।³²

1. Vataja Mutrakrichra Lakshana

The Nidanas like Ruksha Aahara Sevana, Vegadharana, Atistresevana leads to Vataprakopa leading to Vatadosha Pradhana Mutrakrichra. Because of the Vataprakopa laghu, Ruksha and Sheetaguna aggravates leading Shula as the Pradhana Lakshana along with Kruchra Mutravahana in Vataja Mutrakrichra.

The Visistha Lakshanas of Vataja Mutrakrichra are

<i>Vankshanashula</i>	pain in the inguinal region
<i>Bastishula</i>	pain in the lower abdomen
<i>Medhrashula</i>	pain in the penis or urethral region
<i>Muhurmuhur Mutra Pravartana</i>	increased frequency of urination
<i>Alpamutrata</i>	scanty urination
<i>Kruchramutrata</i>	difficulty in urination
<i>Phenamutrata</i>	frothy urine
<i>Arunamutrata</i>	Arunavarna of urine
<i>Avarchastvam</i>	difficulty in defecation

2. Pittaja Mutrakrichra Lakshana

The *Nidanas* like *Madhya*, *Aanupamatsya Sevana*, *Amla Lavana Aahara Sevana* and *Teekshna Aaushadha Sevana* leads to increase in *Ushna* and *Teekshna Guna* of *Pitta Dosha* leading to *Pittaja Mutrakrichra*.

The ***Pradhana Lakshana*** of *Pittaja Mutrakrichra* is ***Sadahamutrata***.

Other *Lakshanas* of *Pittaja Mutrakrichra* are

<i>Sarujamutrata</i>	pain during urination
<i>Kruchramutrata</i>	difficulty in micturition
<i>Muhurmutrata</i>	increased frequency of urination
<i>Peeta</i> or <i>Haridramutrata</i>	yellow discoloration of urine
<i>Ushnabashpasamhitham</i>	feeling of <i>Ushnata</i> along with perspiration.
<i>Saraktamutrata</i>	presence of blood in the urine

3. Kaphaja Mutrakrichra Lakshana

The *Nidanas* like *Ajeerna* and *Aanupamatsya Sevana* leads to increase in *Guru Guna* of *Kaphadosha* causing *Kaphaja Mutrakrichra*. *Shotha* and *Gurutwa* of *Basti*, *Linga* and *Mushka* and *Picchilamutra* are the predominant symptoms of *Kaphaja Mutrakrichra*.

Apart from the above said *Shukla Mutrata*, *Anushnamutra*, *Samhrushtaroma* - horripilations, *Vibandha*, and *Alpamutrata* are mentioned.

4. Sannipataja Mutrakrichra Lakshana

When an individual indulges in multiple *Nidanas* like *Katu*, *Amla*, *Lavana Aahara Sevana*, *Ativyayama*, *Vegadharana* and *Ajeerna* all the three *Dosha* gets aggravate & leading to *Sannipataja Mutrakrichra*.

The ***Lakshanas*** of *Sannipataja Mutrakrichra* are *Sarvanirupa* - *Lakshanas* of all the *Tridoshas* will be manifested. *Daha* - burning micturition, *Ruja* – pain while micturition, *Nanavarnamutra* - multi-coloured urine, *Muhurmutrata* - increased frequency of urination, *Murcha*, *Bhrama* and *Vilepa* are also seen.[14] *Acharya Kashyapa* has mentioned *Dwandwaja Mutrakrichra*, where in the *Lakshanas* will be based on the combination of respective type of *Doshas*. [15]

5. **Abhighataja Mutrakrichra Lakshana**

Abhighataja Mutrakrichra manifests when there is Kshatha or Abhigata by a Shalya causing Mutrakrichra. Acharyas mention Abhighataja Mutrakrichra Lakshana similar to that of Vataja Mutrakrichra. As Abhigata leads to Vatadosha Prakopa, the Pradhana Lakshana of Abhigataja Mutrakrichra is **Basti Kukshi Peeda** along with Kruchramutrata.[15]

6. **Shakrutaja Mutrakrichra**

When Pureesha gets to Pratighataavastha leading to Vayuvigunata it leads to Shakrutaja Mutrakrichra. Vegadharana might be considered as Nidana of Shakrutaja Mutrakrichra leading to Vatadosha Prakopa leading to symptoms such as, Aadhmana, Shula and Mutrasanga.[15]

7. **Ashmarija Mutrakrichra Lakshana**

Its Mutrakrichra due to the presence of Ashmari. According to Acharya Charaka, Ashmari will be Kadamba Pushpaakruti and Triputa. Ashmari when reaches the Mutra Marga causes Avarodha and leads to Lakshanas such as Vedana in Basti, Sevani, Mehana, Visheernadharamutra and Dourbalya.[16] Acharya Susruta has said the Lakshanas of Ashmarija Mutrakrichra are similar to that of the Ashmari.[17]

8. **Shukraja Mutrakrichra Lakshana**

Vitiated Sukra when passes through the urinary tract, individual urinates with difficulty with semen and experiences pain in the bladder and penis. Other symptoms include Vrushanaativrutte – testicles become enlarged, painful with stiffness. Vibandha of Mutra and Shukra - obstruction to the voiding of urine and semen, and Vedanashcha Tudyathe - pricking kind of pain.[18]

9. **Raktaja Mutrakrichra Lakshana**

Due to Kshata when there is blood in urinary tract it causes obstruction to urinary flow and pain in the lower abdomen. The Lakshanas are Teevraarti - excruciating pain, if this condition is associated with Ashmari it will lead to symptoms like Aadhmana and Gourava in Basti. When the Ashmari passes out, the patient feels Laghutwa in Basti Pradesha.[9] Acharya Kashyapa highlights the involvement of Pitta Dosha in causing Raktaja Mutrakrichra.[19]

10. **Vatakundali Mutrakrichra Lakshana**

In Basavarajeeyam, this type of Mutrakrichra is mentioned and Lakshanas are Mutraalpatwam, Vedana, Aadhamana, Guruta and Kandu.[20]

Chikitsa (Management):

1. **Shamana chikitsa:** It includes Mutra-vishodhaniya, mutra-virechaniya, mutra-viranjaniya and ashmarihara dravyas.
2. **Shodhana chikitsa:** It contains diuretic medications as well as utara vasti, which dilutes and flushes numerous infective agents with urine.
3. **Bahirparimarjana chikitsa:** It includes medicines that can be used externally in the form of douches, fomentation, showers, poultices and ointment etc.

Specific Management

1. Vataja Mutrakrichra chikitsa

Bahirparimarjana chikitsa	Antahparimarjana chikitsa
Abhyanga, Svedana, upanaha	Shodhana- Niruha vasti, Uttara vasti with vata shamak kwath like dashmoola kwath.
Vatashamaka dravyas like dashmool, Eranda, Nirgundi, Parisheka on Kati Pradesh with Vatashamak Taila and Kwatha	Shamana- Amritadi kwatha, Sthiradi aushadha, Shwadanshtra taila, traivritta taila(Su.), Mishraka sneha

2.Pittaja Mutrakrichra chikitsa

Bahirparimarjana chikitsa	Antahparimarjana chikitsa
Sheeta Parisheka, Avagahana in cold water,pralepana with chandan and karpur	Shodhana- Virechana with tikta evam Madhur kashaya, Uttara vasti.
	Shamana- Shatavaryadi kwatha (Ch.), Haritakyadi kwatha, Trinapanchmula kwatha (Y.R.), Trinapanchamula churna (Su.),ervaru beeja,yashtimadhu,devdaru with tandul dhavan.

3.Kaphaja Mutrakrichha chikitsa

Bahirparimarjana chikitsa	Antahparimarjana chikitsa
Svedana, Abhyanga with taila containing tikta ushna dravya.	Shodhana- Vamana, Niruha vasti with kshara,tikshna,and katu dravya.
	Shamana- Vyoshadi churna praval bhasma(Ch.),shwadanshtradi kwatha,trikankantakadi ghrita,yava bhaksh,takra.

4.Sannipattaja Mutrakrichha chikitsa

In Sannipataja Mutrakrichra the treatment should be done according to vata sthana. Gudadugdha yoga, dhatryadi yoga	Antahparimarjana chikitsa
“The dosha which is more dominant is treated first”	Shodhana- If kapha is predominant then vamana, if pitta is predominant then virechana and if vata is predominant then vasti karma should be perormed.
	Shamana- Pashanbhedadi yoga, Brihatyadi kwatha

5.Raktaj Mutrakrichha chikitsa

It should be managed as sadyovrana.

6.Shakritajanya Mutrakrichha chikitsa

Vatahara kriya is done in shakritjanya Mutrakrichra.

Bahirparimarjana chikitsa	Antahparimarjana chikitsa
Abhyanga, Svedana, Avagahana	Shodhana: vasti
	Shamana: Churna kriya

Pathya:	Apathya:
Ahara: Purana shali, yava, kshara,takra, dugdha,dadhi, jangal mamsa, mudga yusha, trapusha,nadeya jala, sharkara, kushmanda, patola patra,ardraka, gokshura, puga, narikela, laghu ela,karpura.	Ahara: Tambula, matsaya, lavana, pinyaka,hingu, tila, sarshapa, masha, karira, tikshna, vidahi,ruksha, amla dravya, virudhashana, vishamashana,
Vihara: Abhyanga,Swedana,Avagahana	Vihara: Yana gamana, vega dharana, Ativyayama, Ativyavaya, Riding on elephant and horse.

Modern perspective:

Urinary tract infections have been a problem for humans long before bacteria were recognised as disease-causing agents and urology became a recognised medical specialty. The Ebers papyrus from ancient Egypt suggested herbal treatment for urinary symptoms but did not explain the underlying cause. Hippocrates thought that sickness was caused by an imbalance of the four humours, and he diagnosed urinary ailments as a result of this belief. 37 Infection of the urinary tract refers to both microbial colonisation of the urine and tissue invasion of any urinary tract structure. Bacteria are the most prevalent cause of urinary infection, however yeast, fungus, and viruses can all cause illness. UTI in infants and young children can cause a variety of symptoms. Symptoms and findings associated with a urinary tract infection are more common in older paediatric patients. 38 It is not always feasible to distinguish cystitis from pyelonephritis in children, but children who appear ill or have a fever should be assumed to have pyelonephritis if they have indications of UTI. "Urinary tract infection" is defined as "the multiplication of organisms in the urinary tract."

Urinary tract infection is an infection that affects a section of the urinary tract. Lower tract infections (urethritis and cystitis) and upper tract infections (acute pyelonephritis, prostatitis, and internal and perinephric abscesses) can be separated into two main anatomic types. Painful micturition, frequent urination, and a feeling of incomplete voiding despite an empty bladder are all signs of a lower urinary tract infection. Infections of the urethra and urinary bladder are examples of superficial or mucosal infections, whereas pyelonephritis and renal suppuration are examples of tissue invasion. There are three types of urinary tract infections: pyelonephritis, cystitis, and silent bacteriuria. Focal pyelonephritis and renal abscess are less prevalent conditions. The presence of pathogenic bacteria in the urine, urethra, bladder, and kidney indicates the presence of a urinary tract infection from a microbiological standpoint. Acute urethral syndrome occurs when symptoms such as dysuria, urgency, and frequency occur without substantial bacteriuria. The phrase acute urethral syndrome is widely used, however it lacks anatomic accuracy because the majority of cases are actually urinary bladder infections. Furthermore, the causative factor in these patients can typically be identified, thus the term syndrome, which implies uncertain origin, is incorrect.

Aetiology:

Urinary tract infection is a prevalent medical issue in modern society (UTI). Up to 40% of women are believed to experience a UTI at some point in their life. Colonic bacteria are the most common cause of urinary tract infections. Escherichia coli causes 75-90 percent of all infections in women, followed by Klebsiella and Proteus⁴³. Other bacterial origins of UTI include Enterococcus species, Staphylococcus saprophyticus, particularly in female adolescent and sexually active females, and Streptococcus group B, particularly in neonates. Fungi (Candida species) can cause UTIs, especially following urinary tract instrumentation. Adenovirus is an uncommon cause of UTI that can lead to haemorrhagic cystitis.

Treatment:

Acute cystitis should be treated as soon as possible to avoid the development of pyelonephritis. If the symptoms are severe, a urine sample from the bladder is taken for culture, and therapy is started right away. Treatment can be postponed until the findings of the culture are known if the symptoms are minor or the diagnosis is questionable, and the culture can be repeated if the results are ambiguous. If a gram-negative organism grows between 10⁴ and 10⁵ colonies in a midstream culture, a second culture can be collected via catheterization before therapy begins. A 3- to 5-day course of trimethoprim-sulfamethoxazole therapy is effective against most strains of *E. coli* if started before the findings of a culture and sensitivities are available. Nitrofurantoin (5–7 mg/kg/24 hr in 3–4 split doses) is also effective and has the added benefit of killing *Klebsiella-Enterobacter* germs. Amoxicillin (50 mg/kg/24 hr) shows no evident advantages over sulfonamides or nitrofurantoin as an initial treatment.

A 10 to 14 day course of broad-spectrum antibiotics capable of reaching considerable tissue levels is recommended in acute febrile infections indicative of pyelonephritis. Children under the age of one month who are dehydrated, vomiting, or unable to ingest fluids, or who have a risk of urosepsis, should be admitted to the hospital for intravenous rehydration and antibiotic medication. It is recommended to use ceftriaxone (50–75 mg/kg/24 hr, not to exceed 2 g) or ampicillin (100 mg/kg/24 hr) in combination with an aminoglycoside such as gentamicin (3–5 mg/kg/24 hr in 1–3 separate doses). Aminoglycosides' potential ototoxicity and nephrotoxicity should be recognised, and serum creatinine and trough gentamicin levels should be measured prior to starting treatment, as well as regularly thereafter for as long as treatment is continued. Aminoglycoside treatment is very efficient against *Pseudomonas* spp., and urine alkalinization with sodium bicarbonate improves their effectiveness in the urinary tract. Other than *Pseudomonas*, oral 3rd-generation cephalosporins like cefixime are equally effective as parenteral ceftriaxone against a number of gram-negative pathogens, and some authorities consider these drugs to be the treatment of choice for oral therapy. Because it does not reach considerable renal tissue levels, nitrofurantoin should not be administered routinely in children with a febrile UTI. In individuals above the age of 17, the fluoroquinolone ciprofloxacin is an alternate antibiotic for resistant bacteria, particularly *Pseudomonas*. It has also been utilised in younger children with cystic fibrosis and lung infection caused by *Pseudomonas*, as well as in children with *Pseudomonas* UTI on occasion.

The main implications of pyelonephritis-induced chronic renal damage are arterial hypertension and renal insufficiency, which should be treated correctly if they are discovered.

Conclusion:

- The "growing prevalence of UTI" is currently a global topic of concern due to the related long-term degradation in quality of life.
- Mutrakrichchra has a resemblance to Urinary Tract Infections, as described in Modern Medicine.
- Mutrakrichchra is a major source of kidney impairment, school absences, and frequent visits to paediatricians, clinics, and hospitals.
- Mutrakrichchra is a Vata-dominant Tridoshaj illness involving the Mutravaha Srotas and the Mutra and Ambu dushti.
- In both Ayurveda and modern medicine, the Nidanprivarjanam (i.e. primary prevention) strategy has been prioritised.
- Uncircumcised male infants were shown to have a higher risk of UTI in the first three months of life.
- A girl with voiding dysfunction is at a higher risk of recurring UTI due to the reflux of bacteria-laden urine from the distal urethra into the bladder.

- Boys with real phimosis and aberrant voiding, especially in the form of pyelonephritis, were found to have a high rate of urinary tract infection. Because microorganisms cause urinary tract infections, patients should maintain adequate hygiene to reduce the risk of UTI. Parents and caregivers can aid in the prevention of UTI in children by teaching them about proper cleanliness, hydration, and being mindful of their child's regular bathroom habits.

References:

- Narayana sharma (editor), commentary: nibhandasanghra vyakya of dalhana on nidhanasthana and nyayachandrika sammulikktha of gayadasa on sutra sthana by prof. privath sharma, of Sushrutha, sutrasthana, chapter 15, verse no 3, Varanasi: Chowkhambha Sanskrit Series 2014;153
- Prof. K.R Srikantha Murthy: Astanga Hridayam of Vagbhata, sutrasthana, chapter 1, verse no 13, Varanasi:KrishnadasAyurveda Series; 2001;
- Prof. K.R Srikantha Murthy: Astanga Hridayam of Vagbhata, sutrasthana, chapter 4, verse no 1, Varanasi: KrishnadasAyurveda Series; 2001
- Yadavaji Trikamaji (editor). Commentary: Ayurveda Deepika of Chakrapani on Charaka Samhita of Charaka, chikitsasthana, chapter 26, verse no.3, Varanasi: Chowkhambha Sanskrit Series; 2006;
- Nitin Ashok John, CC Chatterjee's Human Physiology, Functional Anatomy of Excretory System, CBS Publishers and Distributors Pvt. Ltd; Benagloru, Edition 12th, 2017:450
- Davidson's (Sir Stanly Davidson), The principles and practices of medicine, edited by Stuart H. Ralston, Ian D. Penman, Mark W. J. Strachan and Richard P. Hobson, Elsevier publication; London, Edition 23rd, 2018; p. 429
- Yadavaji Trikamaji (editor). Commentary: Ayurveda Deepika of Chakrapani on Charaka Samhita of Charaka, chikitsasthana, chapter 26, verse no.32, Varanasi: Chowkhambha Sanskrit Series; 2006
- Yadavaji Trikamaji (editor). Commentary: Ayurveda Deepika of Chakrapani on Charaka Samhita of Charaka, chikitsasthana, chapter 5, verse no.20, Varanasi: Chowkhambha Sanskrit Series; 2006
- Y. P. Munjal, API Textbook of Medicine, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, Edition 10th, 2015; p. 1791-1792
- Yadavaji Trikamaji (editor). Commentary: Ayurveda Deepika of Chakrapani on Charaka Samhita of Charaka, chikitsasthana, chapter 26, verse no.33, Varanasi: Chowkhambha Sanskrit Series; 2006
- Harita Samhita 'Hari' Hindi commentary by pandit, Harihara Prasad Tripathi, chapter 30, verse no. 6, 1st edition, Chaukhambha Krushnadas Academy, Varansi, 2005
- Kashyapa Samhita or Vrudhajivakiya Tantra, edited by Prof.(Km.) P. V. Tewari, chikitsasthana, chapter 10, verse no 2, Published by Chaukhamba Vishvabharati edition 2002.
- Harita Samhita 'Hari' Hindi commentary by pandit, Harihara Prasad Tripathi, chapter 30, verse no. 7, 1st edition, Chaukhambha Krushnadas Acedemy, Varansi, 2005
- Ch.Su.19/1 Caraka Samhita, with Ayurveda Dipika commentary by Cakrapanidatta, Chowkhamba Krishnadas Academy, 2nd edition, Varanasi.
- Ka.Su.25/21 Bhisgacharya, Shri Satyapala. Kashyapa Samhita "Vidyotini" Hindi commentary, Chaukhambha Sanskrit Sansthan Varanasi, 2004.
- IAP Textbook of Pediatrics - IVth edition.
- www.ncbi.nlm.nih.gov.

18. Su.Sa.9/7 Shastri, Kaviraj Ambikadutta Sushruta Samhita commentary "Ayurveda Tattva Sandipika" part 1, Chaukhambha Sanskrit Sansthan, Varanasi, 1995.
19. Su.Su.21/19 shastri, Kaviraj Ambikadutta Sushruta Samhita commentary "Ayurveda Tattva Sandipika" part 1, Chaukhambha Sanskrit Sansthan, Varanasi, 1995.
20. Su.su.21/20 Shastri, Kaviraj Ambikadutta Sushruta Samhita commentary "Ayurveda Tattva Sandipika" part 1, Chaukhambha Sanskrit Sansthan, Varanasi, 1995.
21. Su.su.21/21 Shastri, Kaviraj Ambikadutta Sushruta Samhita commentary "Ayurveda Tattva Sandipika" part 1, Chaukhambha Sanskrit Sansthan, Varanasi, 1995.
22. Ch.Ch.14 Caraka Samhita, with Ayurveda Dipika commentary by Cakrapanidatta, Chowkhamba Krishnadas Academy, 2nd edition, Varanasi.
23. Ch.Ch.15/49 Caraka Samhita, with Ayurveda Dipika commentary by Cakrapanidatta, Chowkhamba Krishnadas Academy, 2nd edition, Varanasi.
24. Ch. Su. 17/101 Caraka Samhita, with Ayurveda Dipika commentary by Cakrapanidatta, Chowkhamba Krishnadas Academy, 2nd edition, Varanasi.
25. Ch.Ch.5 Caraka Samhita, with Ayurveda Dipika commentary by Cakrapanidatta, Chowkhamba Krishnadas Academy, 2nd edition, Varanasi.
26. Ch.Ch.26/8 Caraka Samhita, with Ayurveda Dipika commentary by Cakrapanidatta, Chowkhamba Krishnadas Academy, 2nd edition, Varanasi.
27. Ma.Ni.30/2 (Madhukosha) Madhavakar, Madhava Nidana, revised by Vijayarakshita and Kanthadatta „Madhukosha“ commentary and Vidyotini Hindi commentary by Ayurvedacharya Shri Sudarshana Shastri, Edited by Ayurvedacharya Shri Yadunandana Upadhyaya, Published by Chaukhambha Publications, New Delhi, Edition 32, Year of reprint 2002.
28. Ka.Su.25/21 Bhishgacharya, Shri Satyapala. Kashyapa Samhita "Vidyotini" Hindi commentary, Chaukhambha Sanskrit Sansthan Varanasi, 2004.
29. Ch.Chi.26/45 Caraka Samhita, with Ayurveda Dipika commentary by Cakrapanidatta, Chowkhamba Krishnadas Academy, 2nd edition, Varanasi.
30. I.A.P. Textbook of Pediatrics - IVth edition, 2009, p. 751.
31. Harrison's principles of internal medicine by Fauci, Braunwald, Kasper, Hauser Longo, Jameson, Loscalzo, 17th edition p. 5665.
32. Harrison's principles of internal medicine by Fauci, Braunwald, Kasper, Hauser Longo, Jameson, volume-2, 16th edition, part-11(Disorders of the kidney and Urinary Tract) p. 1715.
33. Harrison's principles of internal medicine by Fauci, Braunwald, Kasper, Hauser Longo, Jameson, volume-2, 16th edition, part-11(Disorders of the kidney and Urinary Tract) p. 1715.
34. Nelson Textbook of Pediatrics by Behrman, Kliegman, Jenson, 16th Edition, Volume-2, Chapter-546, p. 1621.
35. Nelson Textbook of Pediatrics by Behrman, Kliegman, Jenson, 16th Edition, Volume-2, Chapter-546, p. 1621.
36. Nelson Textbook of Pediatrics by Behrman, Kliegman, Jenson, 16th Edition, Volume-2, Chapter-546, p. 1623.