



Review Article

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ETIOPATHOLOGICAL STUDY OF MUTRAKRICCHRA WITH SPECIAL REFERENCE TO URINARY TRACT INFECTION: A REVIEW

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ABSTRACT

Mutrakricchra is a broad term which covers the conditions described in modern medical science as Urinary tract infection (UTI). The pratyatma lakshana of Mutrakricchra is “dukhen mutra pravritti” means discomfort during micturition. Mutrakricchra is also found as a lakshana in many diseases such as ashmari, Mutraghata, Mutraja vridhi, arsha and Gulma etc. The present study was done to assess the etiopathology of mutrakricchra according to various classical texts and to find out interrelation between mutrakricchra and Urinary tract infection. In this review etiopathogenesis of the mutrakricchra has been illustrated in accordance with ayurvedic classics, and research papers collected from indexed journals accessed physically and through the internet. Nidanans of mutrakricchra are divided in to two types i.e. samanya and vishishta nidana. It can be classified according to the doshas i.e. vataja, pittaja and kaphaja nidana. Various scholarly articles have suggested that Excessive exercise, Medications, Alcohol, Regular intercourse, Regular riding, Sea foods, Heavy food intake & Indigestion, Salt & astringent materials, Urge suppression and Fecalith are the main etiological factors of mutrakricchra w.s.r. to Urinary tract infection. Apana vata is responsible for normal evacuation of urine. Sushruta has mentioned that the pratiloma gati of vata is responsible for the mutra rogas. So it is concluded that any abnormalities in vyana vayu, samana vayu, pachaka pitta, ranjaka pitta and apana vayu due to dietary, habitual, deficiency, injury and bacterial factors resulting in mutrakricchra.

Keywords: Urine, Mutrakricchra, Urinary tract infection, Apana vata

INTRODUCTION

Trimarmas (Vital parts) described by ayurveda classics, Basti (Bladder) is one of them¹. Basti is seat of urine and feces, known as the best prana ayatana (Where life resides)². Hridaya (Heart), shira (Head) and basti are the live essence of person, so we should try to save them by treating the diseases and by following the rules of swastha vritta (Daily healthy routines)³. Many diseases such as mutraghata, prameha, shukra doshas and mutra doshas occurred in basti⁴. Mutrakricchra is a disease of affecting basti and mutra marga (Urinary passage). Diseases of mutravaha srotas (channels carrying the urine) included Mutrakricchra, mutraghata, prameha and ashmari. When a mutravaha srotas is injured, the treatment is explained as a Mutrakricchra chikitsa⁵.

Urine is the liquid refuse portion of the food and drink. It is separated from the sara portion by the maladhara kala with the help of pachaka pitta and samana vayu. Thus formed urine is taken to the basti by the mutravahi siras. The mechanism of formation of urine is clearly described in sushruta samhita. Sushruta has said that basti is the seat of urine (mutrashaya) the product meant for excretion (maladhara). In the state of active life, mutravaha nadis (ureter) carry the urine originating inside the kidney to the bladder and keep it filled with this essential fluid, just as new earthen pot immersed in water up to its neck for some time gets filled by the process of percolation⁶. Normal volume of mutra is about four anjali and quantity of urine seems to depend upon that of food ingested⁷. Acharya Kashyapa

described normal urine as anaviddhama (not turbid), atanukama (not very thin consistancy), analpama and rujuvegam (passing without interruption)⁸.

The term mutrakricchra comprises of two words – mutra and kricchra. The word mutra is derived from ‘prasrava’ means to ooze⁹. The word kricchra is derived from ‘kashte’ means causing trouble or painful. Difficulty or painful micturition is called as Mutrakricchra. There will be a pain while passing urine and also obstruction. Here difficulty in micturition, retention and suppression of urine are accepted for the term Mutrakricchra. Obstruction is more dominant in mutraghata than mutrakricchra while pain in urination is more dominant in mutrakricchra¹⁰.

All the classical texts have explained its silent feature is “dukhen mutra pravritti”. Any type of ‘Dukha’ (Discomfort) during micturition is included under Mutrakricchra¹¹. Mutrakricchra is a broad term which covers the conditions described in modern medical science as urinary tract infection. Urinary tract infection (UTI) is an infection that affects part of the urinary tract. When it affects the lower urinary tract it is known as a simple cystitis or bladder infection and when it affects the upper urinary tract it is known as pyelonephritis or kidney infection. So urinary tract infection (UTI) is also known as acute cystitis or bladder infection¹².

Urinary tract infection (UTI) is a common medical complaint. It is estimated that up to forty percent of women will have a UTI at some time in their lives¹³. Urinary tract infection is defined as

multiplication of organisms in the urinary tract. It is usually associated with the presence of neutrophils and $>10^5$ organisms/ml in a midstream sample of urine (MSU). When the infection is restricted to the lower urinary tract i.e. urethra, bladder and prostate then it is called as lower urinary tract infection (LUTI)¹⁴.

Mutrakricchra can occur as an independent disease as well as purvarupa and rupa. It can also occur as a result of Mutrakshaya. Mutrakricchra is found as a lakshana in following diseases i.e. Pakvasayastha vata¹⁵, Mutranirodhajanya udavarta¹⁶, Sukrashmari¹⁷, Ashmari purvarupa¹⁸, Mutraja vridhi¹⁹, Vataja ashmari²⁰, Mutra kshaya²¹, Ushnavata²², Mutrasada²³, Kaphaja arsha²⁴, Gulma²⁵.

Etiology

Etiological factors which affect the mutravaha srotas can also be taken in to consideration as the nidana of Mutrakricchra. Acharya Chakrapani has described in the context of jwara nidana chapter that all the diseases having two types of etiology samanya and vishishta nidana²⁶. So nidana can be classified in to two types i.e. Samanya nidana (General Etiology) and Vishishta nidana (Specific Etiology). Vitiating of mutravaha srotas by the food, drinks intake and sexual intercourse while having the urge for micturition especially by those suffering from wasting and consumption are included in samanya nidana²⁷. Excessive physical exertion, strong medications, continual use of dry wine, intercourse, mounting fast horses, ingestion of the flesh of wetland creatures & fishes, taking pre-digestion meals and owing to indigestion are included in vishishta nidana²⁸. Uropathogenic *E. coli* is responsible for approximately 85% of urinary tract infections²⁹. *Enterococcus*, *Klebsiella*, *Enterobacter*, and *Proteus* species are less common causes³⁰.

Acharya Kashyapa has described mutrakricchra as pitta pradhana tridoshaja vyadhi³¹, while Acharya Hareeta as a pitta pradhana vyadhi³². Hence pitta prakopa leads to Mutrakricchra Acharya Charaka has recommended Vata sthananupurvi chikitsa in the treatment of Mutrakricchra³³. So the nidanas can be classified according to the doshas. Vata prakopaka nidana i.e. Vyayama, vyavaya, vegadharana, ruksha Madhya, shakrita, abhigata, vyadhikshamatva, Pitta prakopaka nidana i.e. Pitta prakopaka dravya (krodha, shoka, sarshapa etc.), Katu, amla, lavana rasa ati sevana, anupa matsya mamsa, madya, ruksha ahara, tikshana aushadha, katiskandha dharana and Kapha prakopaka nidana i.e. Anupa mamsa, adhayasana, ajirna. Mutrakricchra is also occurred due to Nidanarthakara roga i.e. Ajirna³⁴ and due to Abhigataja nidana i.e. Indriyapratighata, Rakta pravritti in mutrendriya and uttana ratibhanga³⁵.

Types

All the acharya except Vagbhata have described eight types of Mutrakricchra. Acharya Charaka described eight types of mutrakricchra i.e. Vataja, Pittaja, Kaphaja, Sannipataja, Raktaja, Ashmarija, Shukraja, Sharkarajanya. Acharya Sushruta also described eight types of mutrakricchra i.e. Vataja, Pittaja, Kaphaja, Sannipataja, Abhigataja, Ashmarija, Sharkarajanya, Purishaja. Acharya Vagbhata described four types of mutrakricchra i.e. Vataja, Pittaja, Kaphaja, Sannipataja.

Symptoms

Many symptoms are mentioned in the classics for various types of Mutrakricchra. The symptoms like krichchra (hesitancy), muhurmuhur mutra pravritti (increased frequency of

micturition) and shula (dysuria) are present in almost all types of Mutrakricchra as explained in the classics. Hence these symptoms can be considered as important clinical features of Mutrakricchra.

The most presenting features Shula and muhurmuhur mutrata are due to aggravation of vata dosha, peeta mutrata and daha are due to aggravated pitta dosha and picchila mutra (turbid urine), shweta mutra (presence of leukocytes in urine) are due to aggravated kapha dosha. Among all these symptoms most agonizing and predominant symptom of Mutrakricchra (LUTI) is burning micturition which suggests pitta dusti in manifestation of this disease.

Pathogenesis

Ayurvedic concept of pathogenesis lies in understanding the dosha and dushya involved in the manifestation of the disease. Causative factors like atimaitihuna, ativyayama, mutravegadharana, and nityadrutaprustayana leads to aggravation of vata dosha specially apana vata. Excessive intake of madya, matsya and katu amla lavana rasa causes aggravation of pitta dosha i.e. pachaka pitta. Intake of anupamamsa, adhyashana and ajirna bhojana aggravates kapha dosha which in turn leads to reduced state of agni (digestive power). Hence all the tridoshas get vitiated.

The vitiated tridoshas along with the state of agnimandhya (reduced digestive capacity) invariably produce ama. Ama mixes with the doshas forming sama doshas. These sama dosha produces symptoms such as peeta mutra (yellowish urine), sadaha mutra pravritti (burning micturition), basti and mutrendriya gurutwa (inflammation of bladder), shweta, snigdha and picchila mutra (turbid urine with the presence of leucocytes).

It is an important factor to understand the process of manifestation of the disease. In the context of Mutrakricchra, only Acharya Charaka has described the pathogenesis. When the doshas have been vitiated by the specific etiological factors, then three doshas either individually or jointly get aggravated in the basti or afflict the urinary passage, then give rise to Mutrakricchra³⁶.

Application of Shata kriyakala in samprapti of Mutrakricchra

The development of the disease according to Shata kriya kala is following³⁷

In first kriyakala Sanchaya, in the context of mutra vikara, the organ which is responsible for formation of Toya (former part of mutra) is a pakvashaya and for formation of ama is amashaya. Pakvashaya is the vishesha sthana of vata and Amashaya of pitta. Stabdhapurna koshttha, Pitavabhasata and Alasya are the symptoms of vata, pitta and kapha chaya respectively arises due to disturbance of agni.

In second kriyakala Prakopa, when etiological factors are not controlled and continue to act for long, the doshas continue to increase further and accumulate in excess till they reach the prakopa stage. In third kriyakala prasara, vitiated pitta spreads to other regions of the body in to general circulation with the help of vyana vayu or rasa. The prakupita doshas are propelled from koshttha to basti and to other parts of the body. Pittaja and vataja factors help doshas to move out from the koshttha. It leads to dhatvagnimandhya. As a result, kleda (mala of all dhatus) is

formed in excess. Excess kleda affects the quantity of mutra and disturbs the concentration of urine. Natural colour of urine is due to ranjaka pitta but here vitiated pitta results in haridra mutra (Yellow urine).

In fourth kriyakala Sthana samshraya, due to kha vaigunya in mutravaha srotas, the excited dosha having extended to other parts of body becomes localized to basti and mutra marga³⁸. As a basti is the seat of apana vayu, vitiated pitta with the influence of apana vayu obstruct the urinary pathway due to pratiloma gati of vayu. Vitiated pitta with its ushna and tikshna guna causes irritation of urinary pathway. As a result, mild symptoms are produced. Acharya Susruta has clearly mentioned that when there is localization of the doshas in the basti, the resultant effect is any disease which affects the mutra such as mutra dosha, mutraghata or prameha³⁹. This is the purvarupa stage of the disease and the clinical features that are manifested in the stage are not attributable to any particular dosha but to the disease.

In fifth kriyakala Vyakti, the pathogenesis of the disease is completed fully in this stage. In this stage micturition process is affected due to obstruction of mutra marga. Further differentiation according to the doshas will take place and the respective type of Mutrakricchra will manifest. In sixth kriyakala Bheda, if the disease is not checked by proper measures then the condition will deteriorate and complications like karshya (Weakness), arti (Discomfort), trishna (Thirst), shula (Pain) will be developed⁴⁰ (Table 1).

Differential diagnosis

Each disease is different from the other disease with respect to its etiopathology. The diseases which show similarity with mutrakricchra are to be identified. In this regard following diseases are considered as mutraghata⁴¹, ashmari⁴² and prameha (Table 2).

Table 1: Samprapti ghataka of mutrakricchra

1	Dosha	Pitta, vata
2	Dushya	Mutra, Rakta ⁷² , Kleda
3	Agni	Jatharagnimandya, rasagni and raktagnimandya
4	Srotas	Mutravaha
5	Srotodushti	Sanga
6	Udbhava sthana	Pakvashaya
7	Adhishthana	Basti, mutra marga
8	Vyadhi prakara	Nija
9	Roga marga	Madhyama
10	Swabhava	Ashukari

Table 2: Differential diagnosis of mutrakricchra with mutraghata, ashmari and prameha

S.N.	Features	Mutrakricchra	Mutraghata	Ashmari	Prameha
1	Presentation of urination	Urination with burning sensation and pain	burning sensation and pain	mutadhara sanga and vishiradhara	No burning sensation
2	Nature of urination	White, yellow or red colour urine	Anuria	Haematuria	Depends upon urine
3	Prominent feature	Difficulty in urination is more prominent	Obstruction is more prominent	Mutradhara sanga and vishiradhara	No obstruction

DISCUSSION

Mutrakricchra is compared with LUTI. Acute infections of the urinary tract can be subdivided into two general anatomic categories i.e. lower urinary tract infection (urethritis and cystitis) and upper urinary tract infection (acute pyelonephritis, prostatitis, intrarenal and perinephric abscesses). Infections of the urethra and bladder are often considered superficial or mucosal infections, while prostatitis, pyelonephritis, and renal suppuration signify tissue invasion⁴³. Infections confined to lower urinary tract commonly cause dysuria, frequency and urgency. Pyelonephritis is a clinical syndrome characterized by chills, fever, flank pain and constitutional symptoms caused by bacterial invasion of the kidney⁴⁴.

If a person complains frequency, urgency, hesitancy, burning micturition, painful micturition and red-yellow-orange urine etc is diagnosed as a Mutrakricchra. These are the symptoms which are similar to lower urinary tract problem. In lower urinary tract infection, patient suffers from urgency, frequency, suprapubic pain, discomfort etc. associated with the presence of microorganisms in the urinary tract. Some patients can also have symptoms of infection with very low or none of the bacterial count in urine. It is included under acute urethral syndrome.

Intestinal cystitis is a condition that results in recurring discomfort or pain in the bladder and surrounding pelvic region.

Some of the symptoms of intestinal cystitis resemble those of bacterial infection, but medical tests reveal no organism in the urine of patients with intestinal cystitis. Furthermore, patient with intestinal cystitis do not respond to antibiotic therapy. So we can compare the Mutrakricchra with LUTI (Lower urinary tract infection).

Aharaja nidana (Ati ushna, lavana, katu, amla rasa, Anupa mamsa, madya, Tikshana aushadha) acts like irritants (Urinary metabolites), then Mutravaha srotas dushti resulting in Mutrakricchra (Vataja, Pittaja, kaphaja, ashmarija), and due to Viharaja nidana (Ativyavaya, ativyayama, Vegadharana, bharadharana, Nityadrutaprushthayana, abhighata) trauma (mutravaha srotobheda) occurred resulting in Mutrakricchra (Abhighataja, Shukraja, Shakritaja, Ashmarija, Pittaja). Analysis of textual references regarding etiology of mutrakricchra discloses the fact that pittakara nidana and vatakara nidana play a significant role in manifestation of mutrakricchra.

Consideration of the eight types of Mutrakricchra has also shown up interesting facts. UTI is common in patient with calculi and other obstructions. Ashmari (Lithiasis) and sharkara (Lithiasis) has been implicated as a cause of Mutrakricchra even in ayurvedic texts. Burning micturition is one of the common complaints of an infected patient. Daha (Burning sensation) is also the common finding explained in texts when pitta dosha is aggravated. This feeling of burning is one of the lakshana of

pittaja mutrakricchra. Sannipataja mutrakricchra have daha when pitta is predominant in all three types. Another, ashmaraja and sharkaraja mutrakricchra have similar features like vataja, pittaja, kaphaja and sannipataja but they are diagnosed by the patient's clinical history. Abhigataja mutrakricchra occurs when a person suffered from trauma in urethra, vagina, bladder and during coitus or surgical instrumentation. Its main feature is bloody micturition with severe pain. Purishaja mutrakricchra have complaints of flatulence, distention of abdomen with pain and retention of urine.

The pratyatma lakshana of Mutrakricchra is "dukhen mutra pravritti" means discomfort during micturition. This dukha is also a synonym for Roga. So difficulty may also be due to various diseases other than Mutrakricchra as a disease. This point is validated as we find that Mutrakricchra occurs as a clinical symptom in pakvashayastha vata. It also occurs as a purvarupa in ashmari.

From an ayurvedic point of view, even in agantuja nidana, dosha prakopa is the main cause for the vyadhi though pain occurs first. Kha vaigunya in the srotas decides whether there will be sthana samshraya of the doshas or not. Apana vayu is responsible for normal evacuation of urine. Acharya Sushruta has said that the pratiloma gati of vata is responsible for mutra rogas. Vesico ureteral reflux and neurogenic bladder dysfunction are two major causes for UTI. Vesico ureteric reflux is more common in patients with urinary tract infection. It causes infection of peripheral papillae and consequent scars at the poles of kidney⁴⁵. So we can say that the normal gati of apana vata is reversed in these two conditions.

The modern theories of pathogenesis suggest that the bacteria gain access to the bladder via the urethra. There is first an increase in the intestinal flora and the bacteria colonize the vaginal introits in females and distal urethra in both males and females. Cystitis like UTI is more common in females than in males because of shortens of urethra which is liable to fecal contamination and due to mechanical trauma during sexual intercourse. Local immunity factors are said to decide whether infection occurs or not.

Detailed analysis of the pathogenesis of the disease suggests that there is increase in ruksha and chala guna of vata giving rise to impairment in the flow of urine through its channels. The ushna and tikshna gunas of pitta increase and thereby produce burning micturition. The guru and picchila guna of kapha gets vitiated, giving rise to shotha i.e. colonization of bacteria leading to inflammation of the urinary tract.

Excessive exercise, medications, alcohol, regular intercourse, regular riding, meat (Sea foods), heavy food intake & Indigestion, Salt & astringent materials, Urge suppression and Fecalith are the main etiological factors of mutrakricchra w.s.r. to urinary tract infection. These etiological factors are followed:

Vyayama [Excessive exercise]: Researchers were proved that strenuous physical exercise or any act which causes excessive sweating may concentrate the urine and alter urinary pH. Altered pH is further responsible for various disease in KUB (Kidney, ureter, bladder) i.e. calculi, cystitis etc⁴⁶.

Anupa mamsa [Sea foods]: Excessive intake of meat of marshy places increases kapha dosha and fish acts as maha abhishyandi (obstruction to channels) especially mutravaha srotas. The vitiated kapha / kleda affect the innate immunity of the individual. The reduced local immunity i.e. of the urinary tract makes it vulnerable for infection⁴⁷.

Tikshna aushadha [Medication]: Intake of drugs with strong potency aggravates pitta dosha. This increases the urine concentration, thereby urine volume decreases and results in change of pH value. This creates an environment susceptible for infections. Studies have revealed that certain medications, particularly the chemotherapy drugs like Cyclophosphamide and Ifosfamide can cause inflammation of bladder which is termed as drug induced cystitis⁴⁸. People who have compromised immune systems due to illness or medication use may be more prone to urinary tract infections than others⁴⁹.

Madya [Alcohol]: Ushna (hot), teekshna (sharp), ruksha (dry) and ashukari (fast acting) qualities of alcohol will cause vitiation of vata and pitta dosha. Hence intake of alcoholic beverage changes the urine pH and in turn makes the bladder susceptible for the infection. Studies have revealed that there is considerable amount of increase in the risk of development of UTI with the intake of alcoholic beverages⁵⁰. Alcohol addiction aggravates to the urinary tract infection⁵¹. Liver is the site of bhutagni and dhatvagni, when in liver effect of both the agni is also hampered, further formation of dhatu is interrupted which leads to dhatu kshaya. Then dhatu kshaya is responsible for bala kshaya or oja kshaya, resulting in the loss of immune power locally or systemically which gives the site for foot holding the infections.

Katu amla lavana rasa [Salt & astringent materials]: It produces inflammation (Shotha) due to their irritant property⁵². Excess intake of these rasas act as an irritant to bladder mucosa. High sodium intake can increase urinary calcium and lower urinary citrate levels, which leads to stone formation causing urinary tract problems i.e. pain, hematuria, obstruction, burning micturition⁵³. Increased pitta dosha is responsible for the increase in urine concentration thereby altering the pH and decreases the volume of urine. Thus it creates an environment favorable for the growth of bacteria. Studies have suggested that spicy food articles tend to irritate bladder and thus facilitates cystitis⁵⁴.

Vyavaya [Regular intercourse]: The increased vata dosha causes deterioration of dhatus which in turn leads to reduced immunity. This reduced immune component of body makes the individual prone for infections. It is noted that sexual intercourse causes the introduction of bacteria into the bladder and is associated with the onset of cystitis and thus it appears to be important in the pathogenesis of UTI in young women⁵⁵. In young sexually active women, sexual activity is the cause of 75–90% of bladder infections, with the risk of infection related to the frequency of sex⁵⁶. During sex, the urethra comes into contact with the bacteria from the genital area and anus, allowing them to enter the urethra, the bladder, and possibly eventually the kidneys, and result in an infection. Frequent sex increases the risk of developing a UTI, too, as does having more sex partners⁵⁷. In non-institutionalized post-menopausal women, prior UTI, incontinence, and diabetes increase the risk of UTI⁵⁸, while in young women, sexual intercourse, exposure to spermicidal and prior UTI are important risk factors. Although sexual intercourse is a strong predictor of UTI among younger women⁵⁹.

Vegadharana [Urge suppression]: When a person indulges in eating or drinks water under the urge of micturition, the apana vayu gets vitiated causing Mutrakricchra⁶⁰. One of the most common causes of urinary tract infections is the prolonged retention of urine in the bladder. Because urine is sterile, it serves an important role in flushing out the urinary tract. Urination acts to clear the urinary tract and wash away bacteria

that are attempting to make their way up the urethra. By preventing the passage of urine, such as by suppressing the urge to urinate when the patient has a full bladder, can prevent this flushing from taking place. Additionally, a full bladder can create an environment where bacteria can dwell and thrive. If kept inside the bladder for too long, the sterile urine may begin to harbor bacteria. This in turn will cause the infection to multiply and spread⁶¹.

Nitya druta prushtha yana [Excessive travelling]: Nitya druta prushtha yana refers to riding the back of fast moving animals. It can be considered as excessive travelling on uneven surface. This cause khavaigunya in mutravaha srotas and also aggravate apana vata whereas excessive exercise or physical activity causes aggravation of apana vata. Aggravated vata dosha increases ruksha guna of body. Because of this, urine volume decreases and thereby causing increase in the urine concentration. This produces an environment favorable for bacterial growth⁶².

Shakrita [Fecalith]: It is thought that the bulk of the fecalith reduces the volume of urine that the bladder can comfortably retain and in female patients the association of perineal fecal soiling and short urethra predisposes to UTI.

Adhyashana & Ajirna [Heavy diet intake & indigestion]: Adhyashana and ajirna are the causes of mutrakricchra. Due to indigestion, heavy materials mix up with urine, and decrease the density, liquidity and specific gravity of urine.

Epidemiological studies point to five risk factors for the development of acute uncomplicated UTI in young women. Sexual intercourse is a strong risk factor for UTI. It probably introduces bacteria into the introitus, and further from the introitus through the urethra into the bladder, and is thus a risk factor⁶³. Delayed postcoital voiding is a possible second factor, because bacteria are allowed to remain and proliferate in the bladder⁶⁴. A third factor is a recent UTI, because approximately 27% of women with an initial episode of cystitis have recurrent infection. Some UTIs tend to cluster in time in the same individual from a persistent focus, but 90% of recurrent UTIs appear to be a newly reintroduced infection with new bacteria, occurring months apart⁶⁵. Diaphragm and spermicidal use, which constitute the fourth risk factor, increase the risk of UTIs by killing H₂O₂-producing *Lactobacillus* while having no effect on *Escherichia coli*. This allows the persistence and overgrowth of *E. coli* in the vagina. Diaphragm use may also increase the risk by mechanically compressing the urethra. The last risk factor is use of selected antimicrobial agents, which also appears to alter the vaginal micro flora and facilitate the survival of uropathogenic *E. coli* and other urinary tract pathogens in the vagina⁶⁶.

Some of the high prevalence of UTIs in postmenopausal women can be attributed to risk factors such as women with diabetes requiring treatment, poor health, vaginal itching, vaginal dryness, and urge incontinence⁶⁷. Two more recently identified risk factors are age at first UTI and UTI history in the mother⁶⁸. Postmenopausal women not receiving hormone replacement therapy can develop vaginal pH and micro flora changes that lead to recurrent UTIs. Lastly, women of any age are at increased risk for UTI after antibiotic use⁶⁹.

These associations have been established between UTI and age, pregnancy, sexual intercourse, use of diaphragm and a spermicide, delayed post-coital micturition, menopause and a history of recent UTI. Factors that do not seem to increase the

risk of UTI include diet, use of tampons, clothing and personal hygiene including methods of wiping after defecation and bathing practices⁷⁰.

All the etiological factors of mutrakricchra i.e. vyayama, tikshna aushadha, ruksha madya, nitya prasanga, druta prushtha yana, anupa matsaya, adhyashana, ajirna and vega dharana disturb to vayu namely prana vayu, vyana vayu, samana vayu and apana vayu. Most of the causes affect apana vayu and vyana vayu⁷¹.

Most of the nidana of mutrakricchra causes vitiation of vata pitta dosha. Pitta spreads to other regions of the body in to general circulation with the help of vyana vayu or rasa. Vitiated pachaka pitta and samana vayu leads to dhatvagnimandhya. As a result, kleda (mala of all dhatus) is formed in excess. Excessive kleda are propelled from koshttha to basti, it affects the quantity of mutra and disturbs the concentration of urine. Vitiated ranjaka pitta results in haridra mutra (Yellow urine). Vitiated pitta with the influence of apana vayu obstructs the urinary pathway due to pratiloma gati of vayu, resulting in pain during micturition.

CONCLUSION

Mutrakricchra can occur as a result of mutra kshaya. It also manifests as a purvarupa, rupa and vyadhi. The symptoms of mutrakricchra resemble with lower urinary tract infection. Etiopathogenesis of this disease suggests that pitta dosha plays a major role. It is concluded that any abnormalities in vyana vayu, samana vayu, pachaka pitta, ranjaka pitta and apana vayu due to dietary, habitual, deficiency, injury and bacterial factors resulting in mutrakricchra.

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