

Review Article

Postoperative Urinary Retention and Nursing Approaches

Yaban Zuleyha Simsek, RN, PhD

Research Assistant in Surgical Nursing, Kocaeli University School of Health Department of Nursing, Kocaeli, Turkey

Karaoz Sureyya, RN, PhD

Professor in Surgical Nursing, Istanbul Bilgi University School of Health Sciences Department of Nursing, İstanbul, Turkey

Correspondence: Zuleyha Simsek Yaban, Research Assistant in Surgical Nursing, Kocaeli University School of Health Department of Nursing, Umuttepe Campus, 41380 Kocaeli, Turkey
E- mail: zuleyha_simsek@hotmail.com

Abstract

Urinary retention is a problem, which is seen prevalently after an anesthesia or a surgical intervention. Defining PUR (Postoperative Urinary Retention) becomes a challenging problem due to the lacking of a universal urinary retention definition and the differences between diagnostic criteria. The common point among PUR definitions is being not able to urinate while having a full urinary bladder.

Nurses have important responsibilities in sustaining the functions of the patients including the excretion. These responsibilities might be expressed as; determining risky groups, preventing postoperative urinary retention development, early realization and when developed, managing the urinary retention by using appropriate nursing attempts. It is expected from the nurses to do these responsibilities with a systematic approach and providing a care in cooperation with the doctor. This kind of approach is very important in shortening the time the patient spent in the hospital, increasing the comfort/satisfaction of the patients, preventing complications, avoiding unnecessary usage of analgesics and increasing the quality of life.

Keywords: Postoperative urinary retention, nursing approaches, postoperative complication

Introduction

The urinary retention is one of the predicted complications of the postoperative period. American Medical Association defines urinary retention as; “the most frequent complication that is seen between the 2nd and 4th hour after the operation” (2004 alinti Palese et al., 2010, p. 2971).

Postoperative Urinary Retention (PUR) is defined in various ways in literature; however the common point in these definitions is being not able to urinate while having a full urinary bladder (Changchien et al., 2007; Gonullu et al., 1994; Smith & Albazzaz 1996).

There is not a consensus on how to define urinary retention and this led to various definitions on the subject. While many general definitions treat urinary retention as a detention in urination, more specific definitions focused on

the necessity of catheterization and measuring the amount of urine left in the bladder after urination. In some definitions however, PUR is treated based on the decrease in bladder sensitivity and therefore the increase in the bladder capacity.

However, the cut-off values show significant differences in the definitions which focused on measuring the bladder volume (Geller 2014). Olsen & Nilsen (2007) defined 300 ml and above, Hansen et al. (2011) and Mcleod, Southerland & Bond (2013) defined 400 ml and above, Joelsson-Alm et al. (2011) defined 500 ml and above, and Dreijer, Moller & Bartholdy (2011) defined 600 ml and above as PUR.

The prevalence of PUR differs between 2.1% and 44.1%, because there is not a consensus on the definitions; there are a lot of factors in its etiology; and there are differences between the cut-off points in the measurement of bladder

volume (Alsaïdi et al., 2014; Feliciano et al., 2008; Johansson & Christensson 2010; Warner et al., 2000; Wu, Auerbach & Aaronson 2012; Zaheer et al., 1996).

The frequency of PUR incidence differs, due to many factors such as the location, type and duration of the surgical intervention, the amount of given liquid, having factors such as the age and the sexuality of the patient in the PUR etiology, and the lack of general defining criteria (Dreijer, Moller & Bartholdy 2011; Gonullu et al., 1994; Lee et al., 2011).

The PUR development ratio is expressed as 38% after hip fracture operation (Johansson & Christensson 2010), 10% after THP (total hip prosthesis) and TKP (total knee prosthesis) (Dutta 2008), 14% after general surgery operations, 25% after otolaryngology operations (Warner 2000), 32.8 after hemorrhoidectomy operations (Lin, Liu & Chen 2010) and 26.7 % after anorectal surgery (Lau & Lam 2004).

Symptoms of Postoperative Urinary Retention

The most important finding in physical examination; is the presence of a palpated, aching, sensual and shapely bulk (glob vesicale) on the suprapubic area under the umbilicus, in other words a full bladder (Anafarta, Bedük & Arikan 2007). Besides these symptoms, tachycardia, indisposition, anxiousness, need for urination, demand for urination, an increase in the blood pressure and weakness may be observed in patients (Cayir, Beji & Yalcin, 2007; Dreijer, Moller & Bartholdy 2011; Olsen & Nielsen 2007).

In addition to increasing the discomfort of the patient, urinary retention may harm bladder with extreme expansion and it may cause chronic nephropathy, sepsis, atony in the bladder walls. It may cause an increase in duration of hospital stay due to urinary system infection, may lead to repeated lying in hospital and may negatively affect the quality of life (Baldini et al., 2009; Burger et al., 1997; Changchien et al., 2007; Dreijer, Moller & Bartholdy 2011; Palese et al., 2010; Ringdal, Borg & Hellström, 2003).

Pathophysiology of Postoperative Urinary Retention

It is being thought that various factors have a role in the etiology of postoperative urinary retention. The main factors may be expressed as the filling of urinary bladder with a high amount of

medicine applied in order to prevent hypotension, during the intraoperative and postoperative period without the patient being able to metabolize them, prevention of perineal relaxation because of the pain, a lack of fullness sense of the urinary bladder in the postoperative period because of the medicine that are given during the operation, sedation, the medicine used during and after the anesthesia, patient being reliant on the bed because of the applications such as nasogastric style, vascular access and trying to urinate in a position, which the patient is not used to (Anderson and Grant 1991; O' Reilly 1991).

The Effecting Factors in the Development of PUR

Patient, operation and anesthesia related various factors and the medicines utilized in the perioperative period are effective in the development of PUR. The nurses may intervene with some of the risks; however they do not have an effect in the majority of events. The prevention and management of PUR is more probable with the collaboration of team members.

When a nurse detects the risk factors of a PUR development, it may be possible to detect potential patients early and to prevent PUR development by tracking the necessary factors and by making necessary interventions. In addition to this, it may be possible to solve the problem with less discomfort when PUR is developed in a patient. Due to this reason it is very important for nurses to know the effective factors in the development of PUR and to take the necessary precautions (Table 1).

Complications of Postoperative Urinary Retention

Autonomic Response

Kamphuis et al. emphasizes that the painful stimulation which is developed by the excessive stimulation of bladder might cause bradycardia, hypotension, cardiac dysrhythmia and even asystole (1998 alinti Baldini et al., 2009, p. 1151).

Urinary Tract Infection

As urinary infection might be a direct complication of a long acting PUR, it might develop after permanent bladder catheterization. The development of nosocomial urinary system infection increases the mortality of the

hospitalized patients. In a study where a wound infection after an hip fracture operation and the relation of this infection with urinary catheterization, it has been demonstrated that a long acting catheterization might play an important role in the development of a wound infection (Cumming & Parker 2007).

Thus, the importance of the avoidance of urinary catheterization as much as possible, or the removal of catheter after a short amount of time and the catheterization with aseptic technique is emphasized.

Excessive Contraction of Bladder and Adverse Effects on Urodynamics

Urinary retention might bladder to excessively contract in the postoperative period. The extension of the contraction period in the bladder might increase the pain, uneasiness, urination will, nausea and blood pressure. Bladder distension might disturb the function of the bladder by causing permanent changes in the bladder contractibility.

Moreover, it might cause detrusor damage and ischemia by causing smooth muscle fibers to contract and stretch and later, it might disturb the excreting capacity chronically by causing bladder wall atony. PUR might do damage to bladder because of extreme relaxation and might decrease the life quality of the patients by increasing the time spent in the hospital because of chronic nephropathy, sepsis and urinary system infection and by repeated hospitalization (Alsaïdi, et al., 2013; Balderi & Carl 2010; Baldini et al., 2009; Changchien et al., 2007; Dreijer, Moller & Bartholdy 2011; Khori et al., 2013; Olsen & Nielsen 2007; Palese et al., 2010; Ringdal, Borg & Hellström, 2003).

The standard treatment with continuous catheterization might delay the patients discharge from the hospital by causing urethral stricture, trauma, infection and confusion and delirium especially in older patients (Alsaïdi, et al., 2013; Lamonerie et al., 2004).

Although extreme distension of the bladder cause deformation in the bladder functions, it is stated that there are no changes in the bladder functions after the operation even with over 900 ml urine volume before the catheterization. It is emphasized that if the contraction of bladder, because of a volume of 500 ml to 1000 ml for a temporal time period, is detected early and get

treated in an hour or so, the situation won't be harmful (Pavlin et. al. 1999).

Detection Methods of Postoperative Urinary Retention

Physical inspection, bladder ultrasound whose usage increases in the recent years, patient statements, urinary catheterization and measurement of the urine volume left in the bladder after urination plays an important role in the diagnosis of PUR.

Taking different criteria in the diagnosis of PUR into account necessitates the usage of only one method in some situations, or a few in some other situations.

Prevention and Management of Postoperative Urinary Retention

Various kinds of methods might be used in the prevention of PUR. Although one of the methods might prove to be sufficient in some cases, it might be required to use more than one methods at the same time in some cases.

The PUR management and prevention, which requires a multidisciplinary approach, may be explained with two groups as medical approach and nursing attempts.

Medical Approach

Medication

Many medicines such as physostigmine, neostigmine and anticholinesterases are successfully utilized in the medication of urinary retention (Yip et al., 2003).

PUR treatment intended pharmacologic trials mostly focused on increasing the detrusor muscle activity or decreasing the opening pressure of the inner sphincter in the cervix vesicae.

Cholinergic agents such as bethanechol and carbachol promote the miction by theoretically increasing the detrusor muscle strength (Gonullu et al., 1999). It is known that phenoxybenzamine, which is an alpha adrenergic blocker, is clinically effective in the prevention and treatment of PUR.

Phenoxybenzamine decreases the flow resistance by providing the generation of reflex spasm or the relaxation of the spasm by blocking the alpha adrenergic receptors in the cervix vesicae and proximal urethra (Gonullu et al., 1992b).

Table 1: The risk factors for postoperative urinary retention

Patient related factors	Operation and Anesthesia related factors	Utilized Medicines in the Perioperative Period
-Age	-Type and Duration of Operation	-Anticholinergics (oxybutynin, tolterodine, atropine)
-Sexuality	-Given Liquid Amount in the Postoperative Period	-Antiarrhythmics
-Medical Record of the Patient *Diabetes Mellitus *Existence of a Urinary Problem	-Type and Duration of Anesthesia	-Opioids
-Usage of Cigarettes and Alcohol		-Antipsychotics
-Body Mass Index (BMI)		-Antiparkinsons
-PUR Experience		-Sympathomimetics
-Anxiety		-Beta blockers
-Constipation		-Antihistaminics

Liquid Amount

Limiting the amount of given liquid in the postoperative period and making the patients urinate before surgical intervention helps in decreasing the PUR incidence, when urinary retention that can be developed due to the excessive amount of liquid given during the operation is considered (Edmond 2006; Erbil & Degerli 2008; Koch , Grinberg & Farley 2006; Lepor 2005; Toyonaga et al., 2006).

It is emphasized that by not limiting the liquid amount after the operation, the urinary retention risk increases nine times (Koch , Grinberg & Farley 2006). Due to this reason, it is suggested to limit the liquid amount to 5-7 ml/kg (Cataldo & Senagore 1991), during the intraoperative period and to 1-2 ml/kg (Gonullu et al., 1993) in the postoperative period.

The orally taken liquid amount during the postoperative period should be under 300 cc until the patient urinate; however if the patient cannot urinate within eight hours, a distension and discomfort is developed, they should be catheterized. A real urination is defined as urinating at least 150 cc urine in one go (Cataldo & Senagore 1991).

Ultrasound Screening

Since it necessitates less catheterization, increases the satisfaction and comfort of the patients, ultrasound is taking the place of urinary catheterization, which is considered to be the golden standard, in measuring the residual urine amount after the urination and diagnosis of the PUR. By this way, it is possible to decrease the urinary system infection risk originated from catheter and the cost decreases since the patient leaves the hospital early (Rigby & Housami 2009).

Urinary Catheterization

Although urinary catheterization is accepted as the standard treatment of the PUR, there is no consensus on which situations it should be utilized. In the studies where PUR is defined on the urine volume, it is suggested to put catheter when the bladder volume is measured above 400 ml (Joelsson-Alm et al., 2011), 500 ml (Balderi et al., 2011; Luger et al. 2008), or 600 ml (Dreijer, Moller & Bartholdy 2011; Pavlin et al., 1999).

Catheterization should be the last applied method, because of the complications it causes.

Therefore, it is believed that catheterization based only on the volume of bladder is not a suitable method. It is stated in a study that the excessive contraction of the bladder with a volume between 500 ml and 1000 ml will not be harmful, under the early detection and treatment (in 1-2 hours) conditions (Pavlin et al., 1999).

Acupuncture

There are recent studies which are related with acupuncture usage in the treatment of PUR. Acupuncture is developed in Japan, China and other far east countries as a traditional treatment method (Yip et al., 2003).

Pelvic Floor Exercises

Although it is a frequently applied method in the treatment of urine incontinence, there are a limited number of studies on its usage for the treatment of urinary retention (Yip et al., 2003).

Early Mobilization

By suppressing the detrusor muscle contraction during the postoperative period, the constituted pressure in the bladder cannot go towards the exit. Urination may be simplified by making the patients stand up and directing the pressure inside the bladder to urethra. In this context, enabling early mobilization of patients is a useful application in decreasing the PUR incidence (Alsaïdi, et al., 2013; Gonullu et al., 1992c).

Analgesia after the operation

The requirement for analgesia after the operation is an independent risk factor for urinary retention. Urinary retention cannot be seen as a complication of the analgesics but is related with the level of pain. Therefore, it is stated that the prophylactic analgesics usage in the postoperative pain control is effective against preventing PUR and decreasing the incidence of PUR (Toyonaga et al., 2006).

Nursing Initiatives

Nowadays, besides the traditional caring methods based on observation, the nurses observe their patients with new technological devices and this situation reshapes the nursing practices in an increasing fashion (Aygün & Yaman 2011). While in a urinary retention situation, the portable ultrasound device is being used as a noninvasive method since 1980 with a short education, for the identification of the problem and for evaluating the volume of the bladder (Palese et al., 2010). Since bladder

screening with an ultrasound device helps to evaluate the bladder volume, it enables for a catheter to be utilized just in the required situations. The usage of an ultrasound device simplifies the management of urinary retention and decreases the incidence of the urinary infections (Balderi et al., 2011). Since the patient will stay for a shorter time in the hospital, it also decreases the cost. The usage of the ultrasound device becomes more popular in the measurement of urine amount in the bladder since; it is a noninvasive method, it gives accurate and dependable results, it enables quick results, it requires less preparation, its usage being easy and its accuracy (Palese 2010; Rigby & Housami 2009).

Urinary catheterization is frequently used in the diagnosis and treatment of urinary retention. However, this initiative too increases the risk of urinary system infection. The care for a patient, who has urinary retention, appears in the Nursing regulations under “initiatives to be taken with nurse’s decision”, published in 2011. The nurse may decide for urinary catheterization with a doctor or alone, provided that nurse could not have prevented urinary retention with the already taken initiatives (Resmi Gazete 2011). Our observations indicate cases where urinary catheterization is applied without taking appropriate nursing initiatives.

Legal regulations give a nurse the authority to put catheter on and this increases the catheterization incidence. A nurse should encourage patient, provide the appropriate environment, establish a reassuring relation and apply nursing initiatives for a normal urination. If no urination takes place within 8-10 hours after the operation despite all of nurses initiatives, catheterization should be applied as a final resort.

Nurses have important responsibilities in the sustaining the excretory function in a healthy way after the operation. These responsibilities might be expressed as; determining risky groups, preventing postoperative urinary retention development, early realization and when developed, managing the urinary retention by using appropriate nursing interventions. It is expected from the nurses to do these responsibilities with a systematic approach and providing a care in cooperation with the doctor. This kind of approach is very important in shortening the time the patient spent in the

hospital, increasing the comfort/satisfaction of the patients, preventing complications, avoiding unnecessary usage of analgesics and increasing the quality of life.

The interventions for preventing PUR and when developed, the miction to be realized are itemized below:

- Making the patient urinate before the operation in order for them to enter the operation room with an empty bladder (Gonullu et al., 1992c).
- In order to make the patient start to urinate, a close enough tap to be heard might be opened for the patient to hear it. This practice might not only provide the patient to urinate by helping the perineal muscles of the patient to be relaxed, but also the patients which feels uncomfortable of their urination to be heard may feel themselves more comfortable (Ay 2011; Carpenito- Moyet 2012).
- Hands of the patients may be kept in warm water in a wide pot (Ay 2011; Dewit 1998; Ulrich, Canale & Wendell, 1998).
- Instead of urinating while lying down, letting men to urinate by sitting at the edge of the bed or while standing; letting women in seated position by using a commode (Aksoy, Kanan, Akyolcu 2012; Carpenito- Moyet 2012; Dal et al., 2013; Gonullu et al., 1993; Johannson et al., 2012; Karadakovan & Aslan 2010; Ulrich, Canale & Wendell, 1998; Yip et al., 2005).
- Applying hot water bag to the pelvic area of the patient (Ay 2011; Dal et al., 2013; Gonullu et al., 1992a; Gonullu et al., 1993; Ulrich, Canale & Wendell, 1998).
- While urinating, the nurse may respect to individuals privacy by considering their cultural, social and sexual practice (Aksoy, Kanan, Akyolcu 2012; Dewit 1998; Karadakovan & Aslan, 2010).
- Since a cold slide may cause the muscles to contract, the slide may be heated (Aksoy, Kanan, Akyolcu 2012; Aslan 2010; Carpenito- Moyet 2012; Dewit 1998; Johannson et al., 2012; Karadakovan & Aslan 2010; Yip et al., 2005).
- The muscle relaxation may be increased and urination might be evoked by pouring warm water on the perineum of the patient (Aksoy,

Kanan, Akyolcu 2012; Ay 2011; Carpenito- Moyet 2012; Dewit 1998; Karadakovan & Aslan 2010; Ulrich, Canale & Wendell, 1998).

- Liquid limitation in the perioperative period might help to prevent the development of urinary retention, which arises due to the applied high amount of liquid during the operation (Gonullu et al., 1993; Lepor 2005; Toyonaga 2006). However on the contrary, some researchers claim that increasing the amount of liquid would be more appropriate. In this context, diuretic liquids such as water, tea/coffee might be recommended (Aksoy, Kanan, Akyolcu 2012; Dal et al., 2013).
- If the patient requests, analgesics might be given (Karadakovan & Aslan 2010; Toyonaga 2006; Ulrich, Canale & Wendell, 1998; Yip et al., 2005).
- Patients might be encouraged for sitting, standing and mobilization as early as possible (Gonullu et al., 1992a; Gonullu et al., 1993; Johannson et al., 2012.; Yip et al., 2005).
- The bladder might be pressured in order to help excretion, if the patient has a weak, soft and loose bladder (Ay 2011; Dal et al., 2013; Ulrich, Canale & Wendell, 1998).
- If the patient could not urinate despite these attempts, urethral catheter might be used as last resort (Cayir, Beji & Yalcin, 2007; Erdil & Elbaş 1999; Gonullu et al., 1992a; Karadakovan & Aslan 2010; Yip et al., 2005).

The continuation of the patients excretion function is one of the important responsibilities of the nurses. Nurses might be effective in the prevention and management of PUR with the interventions they will take. The nursing interventions is effective in decreasing the PUR incidence and due to this the urinary catheterization incidence.

References

- Aksoy G, Kanan N & Akyolcu N. (2012) Postoperative Nursing Care. Surgical Nursing I. Nobel Medical Bookstores. Istanbul, 355-356.
- Alsaidi M, Guanio J, Basheer A, Schultz L, Abdulhak M, Nerenz D, Chedid M, Seyfried D. (2013) The Incidence and Risk Factors for Postoperative Urinary Retention in Neurosurgical Patients. Surg Neurol Int, 4 (61).

- Anafarta K, Beduk Y & Arikan N. (2007) Basic Urology. 3rd Edition Solar Medicine Bookstores. Ankara.
- Anderson JB & Grant JBF. (1991) Postoperative Retention of Urine: A Prospective Urodynamic Study. *BMJ*, 302: 894-896.
- Ay FA. (2011) Basic Concepts and Skills in Health Care. Nobel Medicine Bookstores. Istanbul, 609-610.
- Aygun M & Yaman HE. (2011) A New Approach to Nursing Practice: Application of Peripheral Intravenous Catheter with Ultrasonography. *Journal of Research and Development in Nursing*, 1: 61-70.
- Balderi T & Carli F. (2010) Urinary Retention After Total Hip and Knee Arthroplasty. *Minerva Anestesiologica*, 76: 120-130.
- Balderi T, Mistraletti G, D'angelo E, Carli F. (2011) Incidence of Postoperative Urinary Retention (POUR) After Joint Arthroplasty and Management Using Ultrasound –Guided Bladder Catheterization. *Minerva Anestesiologica*, 77: 1050-1057.
- Baldini G, Bagry H, Aprikian A & Carli F. (2009) Postoperative Urinary Retention. *Anesthesiology*, 110: 1139-57.
- Burger DHC, Kappetein AP, Boutkan H, Breslau PJ. (1997) Prevention of Urinary Retention After General Surgery: A Controlled Trial of Carbachol/Diazepam Versus Alfuzozine, *J Am Coll Surg*, 185: 234-236.
- Carpenito-Moyet LJ. (2012) Nursing Diagnosis Handbook. Translated by: Firdevs Erdemir. Nobel Medical Bookstores, Istanbul, 606-607.
- Cataldo PA & Senagore AJ. (1991) Does Alpha Sympathetic Blockade Prevent Urinary Retention Following Anorectal Surgery? *Dis Colon Rectum*, 34:1113-1116.
- Changchien CR, Yeh CY, Huang ST, Hsieh ML, Chen JS, Tang R. (2007) Postoperative Urinary Retention After Primary Colorectal Cancer Resection Via Laparotomy: A Prospective Study of 2355 Consecutive Patients. *Diseases of The Colon & Rectum*, 50: 1688- 1696.
- Cumming D & Parker MJ. (2007) Urinary Catheterisation and Deep Wound Infection After Hip Fracture Surgery. *International Orthopaedics*, 31:483–485.
- Cayir G, Beji NK & Yalcin O. (2007) Effectiveness of Nursing Care After Surgery for Stres Urinary Incontinence. *Urologic Nursing*, 27 (1): 25-33.
- Dal U, Erkorucu A, Eroglu K, Karatas B, Yalcin A. (2013) Sacral Region Massage as an Alternative to The Urinary Catheter Used to Prevent Urinary Retention After Caesarean Delivery. *Balkan Medical Journal*, 30(1): 58–63.
- Dewit SC. (1998) Essentials of Medical-Surgical Nursing. Fourth Edition. WB Saunders Company New York, p:93.
- Dreijer B, Moller MH & Bartholdy J. (2011) Post Operative Urinary Retention in A General Surgical Population. *European Journal of Anaesthesiology*, 28 (3): 190-194.
- Dutta S. (2008) Postoperative Urinary Retention in Elective Total Hip and Knee Replacement Surgery. *British Journal of Medical Practitioners*, 1(2): 28-32.
- Edmond L. (2006) A Brief Literature Search and Clinical Audit of Postoperative Urinary Retention Following Total Joint Replacement. *Journal of Orthopaedic Nursing*, 10: 67-72.
- Erbil Y & Degerli U. (2008) Cerrahide Complications. Gunes Bookstore, Ankara.
- Erdil F & Elbaş NO. (2001) Surgical Diseases Nursing, 4th Edition, Ankara.
- Feliciano T, Montero J, McCarthy M, Priester M. (2008) A Retrospective, Descriptive, Exploratory Study Evaluating Incidence of Postoperative Urinary Retention After Spinal Anesthesia and Its Effect on PACU Discharge. *Journal of Perianesthesia Nursing*, 23 (6) (December): 394-400.
- Geller EJ. (2014) Prevention and Management of Postoperative Urinary Retention After Urogynecologic Surgery. *International Journal of Women's Health*, 6: 829-838.
- Gonullu NN, Utkan NZ, Gokgoz MŞ, Duger M. (1992a) Postoperative urinary retention. *Syndrome*, 38-40.
- Gonullu NN, Ersoy G, Utkan NZ, Dulger M. (1992b) Sympathomimetics and Alpha Adrenergic Blockers in the Treatment of Postoperative Urinary Retention. *Surgical Medicine Bulletin*, 1 (1): 26-29.
- Gonullu NN, Utkan NZ, Gonullu M, Dulger M, Gokgoz MŞ. (1992c) The Effect of Mobilizing and Phenoxybenzamine Prevention of Urinary Retention after Operations Performed Due to Benign Anorectal Diseases. *Colon Rektum Hast Derg*, 2(3): 114-117.
- Gonullu NN, Gonullu M, Utkan NZ, Dulger M, Gokgoz MS, Karsli B. (1993) Postoperative Retention of Urine in General Surgical Patients. *Eur J Surg*, 159:145-147.
- Gonullu NN, Dulger M, Utkan NZ, Gokgoz MŞ, Canturk NZ. (1994) The Impact of Prazosin on the Recovery of Urinary Retention after Anorectal Surgery Interventions. *Colon Rectum Journal*, 4: 118-122.
- Gonullu NN, Dulger M, Utkan NZ, Canturk NZ, Alponat A. (1999) Prevention of Postherniorrhaphy Urinary Retention With Prazosin. *The American Surgeon*, 65: 55-58.
- Hansen BS, Soreide E, Warland AM, Nilsen OB. (2011) Risk Factors of Postoperative Urinary Retention in Hospitalised Patients. *Acta Anesthesiol Scand*, 55: 545-548.
- Joelsson-Alm E, Ulfvarson J, Nyman CR, Divander MB & Svensén C. (2011) Preoperative Ultrasound

- Monitoring Can Reduce Postoperative Bladder Distension: A Randomized Study. *Scandinavian Journal of Urology and Nephrology*, early online, 1-7.
- Johansson RM & Christensson L. (2010) Urinary Retention in Older Patients in Connection with Hip Fracture Surgery. *Journal of Clinical Nursing*, 19: 2110- 2116.
- Karakokovan A & Aslan FE. (2010) Internal and Surgical Care. Nobel Medical Bookstore. Istanbul, 363-364.
- Khori F, Mayyas E, Haddad F, Sbaih A, Haddad R, Ajlouni M. (2013) Evaluation of Post-Operative Urinary Bladder Distention at Prince Rashid Military Hospital. *Journal of the Royal Medical Services*, 20(2) 16–19.
- Koch CA, Grinberg GG & Farley DR. (2006) Incidence and Risk Factors for Urinary Retention After Endoscopic Hernia Repair. *Am J Surg*, 191: 381–385.
- Lamonerie L, Marret E, Deleuze A, Nembert N, Dupont M, Bonnet F. (2004) Prevalence of Postoperative Bladder Distension and Urinary Retention Detected by Ultrasound Measurement, 92(4): 544–546.
- Lau H & Lam B. (2004) Management of Postoperative Urinary Retention: A Randomized Trial of In-Out Versus Overnight Catheterization. *Australian and New Zealand Journal Surgery*, 74: 658-661.
- Lee KS, Lim KH, Kim SJ, Choi HJ, Noh DH, Lee HW, Cho MC. (2011) Predictors of Successful Trial Without Catheter for Postoperative Urinary Retention Following Non- Urological Surgery. *Int Neurourol J*, 15: 158-165.
- Lepor H. (2005) Managing and Preventing Acute Urinary Retention. *Rev Urol*, 7 (8): 26-33.
- Lin YH, Liu KW & Chen HP. (2010) Haemorrhoidectomy: Prevalence and Risk Factors of Urine Retention Among Post Recipients. *Journal of Clinical Nursing*, 19: 2771- 2776.
- Luger JT, Garosio I, Rehder P, Oberladstatter J, Voelckel W. (2008) Management of Temporary Urinary Retention After Arthroscopic Knee Surgery in Low-Dose Spinal Anesthesia: Development of A Simple Algorithm. *Arch Orthop Trauma Surg*, 128:607-612.
- McLeod L, Southerland K & Bond J. (2013) A Clinical Audit of Postoperative Urinary Retention in The Postanesthesia Care Unit. *Journal of Perianesthesia Nursing*, 28 (4): 210-216.
- Olsen SW & Nielsen J. (2007) A Study into Postoperative Urine Retention in The Recovery Ward. *British Journal of Anesthetic & Recovery Nursing*, 8 (4): 91-95.
- O'Reilly PH. (1991) Postoperative Urinary Retention in Men. *BMJ*, 302: p. 864.
- Palese A, Buchini S, Deroma L, Barbone F. (2010) The Effectiveness of the Ultrasound Bladder Scanner in Reducing Urinary Tract Infections: A Meta-Analysis. *Journal of Clinical Nursing*, 19: 2970-2979.
- Pavlin DJ, Pavlin EG, Gunn HC, Gunn HC, Taraday JK, Koerschgen ME. (1999) Voiding in Patients Managed With or Without Ultrasound Monitoring of Bladder Volume After Outpatient Surgery. *Anesthesia and Analgesia*, 89: 90–7.
- Official newspaper. *Nursing Regulation: of Modification of existing regulations*. 19 April 2011, Issue: 27910.
- Rigby D & Housami FA. (2009) Using Bladder Ultrasound to Detect Urinary Retention in Patients. *Nursing Times*, 105: 21
- Ringdal M, Borg B & Hellstrom AL. (2003) A Survey on Incidence and Factors That May Influence First Postoperative Urination. *Urologic Nursing*, 23 (5): 341-354.
- Smith NKG & Albazzaz MK. (1996) A Prospective Study of Urinary Retention and Risk of Death After Proximal Femoral Fracture. *Age and Ageing*, 25: 150-154.
- Toyonaga T, Matsushima M, Sogawa N, Jiang SF, Matsumuna N, Shimojima Y, Tanaka Y, Suzuki K, Masuda J, Tanaka M. (2006) Postoperative Urinary Retention After Surgery For Benign Anorectal Disease: Potential Risk Factors and Strategy For Prevention. *International Journal of Colorectal Disease*, 21(7): 676–82.
- Ulrich SP, Canale SW & Wendell SA. (1998) *Medical-Surgical Nursing Care Planning Guides*. Fourth Edition. WB Saunders Company, p: 62-64.
- Warner AJ, Philips S, Riske K, Haubert MK, Lash N (2000) Postoperative Bladder Distension: Measurement With Bladder Ultrasonography. *Journal of Perianesthesia Nursing*, 15 (1): 20-25.
- Wu AK, Auerbach AD & Aaronson DS. (2012) National Incidence and Outcomes of Postoperative Urinary Retention in The Surgical Care Improvement Project. *The American Journal of Surgery*, 204: 167-171
- Yip SK, Sahota D, Pang, MW, Chang A. (2003) Postpartum Urinary Retention. *Acta Obstetrica & Gynecologica Scandinavica*, 83: 881–891.
- Zaheer S, Reilly WT, Pemberton JH, Ilstrup D. (1998) Urinary Retention After Operations for Benign Anorectal Diseases. *Dis Colon Rectum*, June, 41 (6): 696-704.