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Research Article

A Clinical Study of Factors Affecting Post Operative Urinary Retention

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Abstract: Postoperative urinary retention is a common and potentially major complication faced during early post-operative period but is poorly understood. Postoperative urinary retention is condition in which the patient after a surgical procedure difficulty in micturition in spite of normal renal function, a full bladder with absence of any lower urinary tract obstruction. Postoperative urinary retention related to different patient characters, the absence of uniform defined criteria and the multifactorial causes including age, gender, Excessive perioperative fluids, type of anesthesia and type of surgery. Urological, some orthopedic procedures and benign anorectal procedures are known to carry a higher risk. Several contributing mechanisms of Postoperative urinary retention include traumatic instrumentation, bladder overdistention and decreased awareness of bladder sensation, reduced bladder contractility, raised outlet resistance, decreased micturition reflex activity and nociceptive inhibitory reflex with preexistent outlet pathology.Hence this study is performed to find out the incidence of postoperative urinary retention in patients, to correlate the effect of age, sex, site & duration of surgery, type of anesthesia used, amount of perioperative fluid given, postoperative analgesia and any other factor associated with postoperative urinary retention and to detect the effectiveness & complication rates of overnight Catheterization & in/out catheterization requiring recatheterisation in next 24 hours.
Keywords: Postoperative urinary retention, anaesthesia, anorectal surgery, micturition

INTRODUCTION

Postoperative urinary retention may be considered to be an acute unobstructive urinary retention precipitated by surgery and/or anesthesia in which spontaneous remission may be expected when the precipitating stimuli are abolished, which raises the question of risk factors for postoperative urinary retention.

Postoperative micturition difficulties although taken as minor complication, have a very high incidence. Postoperative urinary retention can occur after all types of anaesthetics or surgeries. General anesthesia, during which patient is unconscious, affects brain function and inhibits the autonomic (involuntary) nervous system that controls bladder emptying. The brain centers in charge of urination are inhibited. The end result is that the detrusor (bladder muscle) contractions are suppressed or decreased. This is an effect of both the IV anesthetic agents and the anesthesia gases used during general anesthesia.Surgical trauma to pelvic nerves or to urinary bladder, postoperative edema of bladder neck with pain induced reflex spasm of the external and internal urethral sphincters have significant role in the development of post-operativeurinary retention.

Postoperative urinary retention is most common complication of surgery performed for benign anorectal disease. The incidence of urinary retention is higher in old male patients. Preoperative lower urinary tract urinary symptoms are not a prerequisite for development of postoperative urinary retention, but these are considered to be an important risk factor. Even a single incidence of bladder overdistention can cause significant morbidity. Excess filling of the bladder can stretch and cause damage to detrusor muscle, leading to atony of the urinary bladder wall, so that recovery of urination may not occur when the urinary bladder is emptied. Besides this excess use of an indwelling catheter can cause urinary tract infection, urethral stricture and increased hospital stay.

AIMS AND OBJECTIVES

- To find out the incidence of postoperative urinary retention in patients.
- To correlate the effect of age, sex, site & duration of surgery, type of anaesthesia used, amount of perioperative fluid given, postoperative analgesia and any other factor associated with postoperative urinary retention.

- To detect the effectiveness & complication rates of overnight Catheterization & in/out catheterization requiring recatheterisation in next 24 hours.

MATERIAL AND METHODS

A prospective study will be conducted on patients of age group 14-70 years age group admitted in general surgical wards of S.P.Medical College & A.G. of hospitals Bikaner (Rajasthan)

Inclusion Criteria

1. Patients in age group of 14-70 yrs.
2. Male and female both.
3. Surgeries including elective inguinal, incisional & umbilical hernia repair, Appendicectomy, Perineal Surgeries and lower limb surgeries.
4. Surgery done under local, spinal or general anaesthesia.

Exclusion Criteria

1. Previous episode of post-operative urinary retention.
2. Previous history of any urological complaints or surgeries.
3. Any history of renal failure or serum creatinine>1.2.
4. Benign prostatic hyperplasia or malignant disease of prostate diagnosed by clinical history and per rectal examination
5. Prophylactic therapy with alpha adrenergic blocker.

Definition of Urinary Retention

Urinary retention was defined as inability of patient to void with > 400 ml of urine obtained on catheterization. Retention was classified as painful or painless. Urinary retention was noted by patients in case of painful retention and by medical or nursing staff in case of painless retention by observing the fluid balance chart or palpating the lower abdomen for a full bladder.

All those who had difficulty in initiating voiding were subjected to helping measures by the nursing staff or house surgeon. The methods used to encourage the patient to void included.

a) Providing privacy to patient. (A curtain is placed around patient bed)
b) Making the patient to sit.
c) Making the patient to ambulate.
d) Sound of running water.

Only those patients who failed to void following helping measures were included in retention group.These patients were catheterized either by using a retention catheter (Foley`s) Or K-90 depending on the choice of house surgeon. Catheterisation was also done if the patient voided small amount of urine frequently but feeling of fullness persisted. The common principle was to try to make the patient void spontaneously.

In all cases of retention the duration of retention (from the induction of anaesthesia to the catheterization of the patient) was noted. Catheterization was carried out under strict aseptic precautions and a careful recording of the initial collected urinary volume and duration of catheterization was made in all cases of retention.

OBSERVATION

A prospective study was performed with 94 patients who underwent infraumblical surgeries and developed postoperative urinary retention in our unit during January 2014 to January 2015. Following were the observations made in our study.

Table-1

	No.
Total no. of Infraumblical surgeries performed during study period in general surgical patients.	312
Total no. of patients who developed postoperative urinary retention involved in study.	94

As with above mentioned table it can be seen that total no. of Infraumblical surgeries performed during study period is312.Based on exclusion criteria total no. of patients who developed postoperative urinary retention were 94. Incidence of postoperative urinary retention in infraumblical surgeries is found 30.12%.

Table-2

Age Group	No.	%
14-30 yrs.	17	18.08 %
30-50 yrs.	35	37.23 %
50-70 yrs.	42	44.68 %

Table-2 shows age wise distribution of incidence of postoperative urinary retention. It was found higher incidence of retention in age group 50-70 yrs. It was found that 42 patients with incidence of 44.68 %.

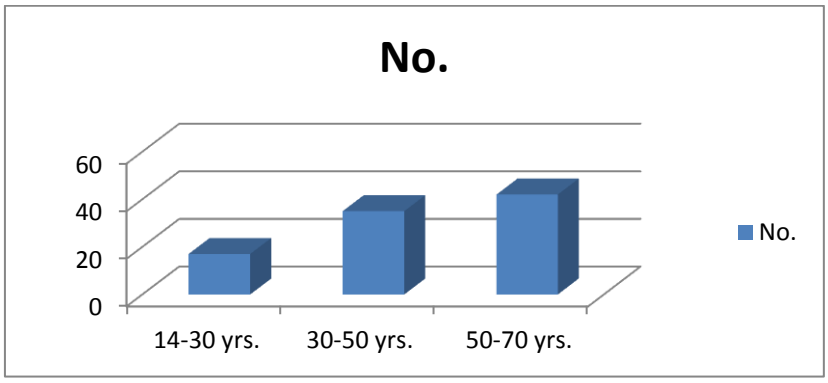

Fig-1

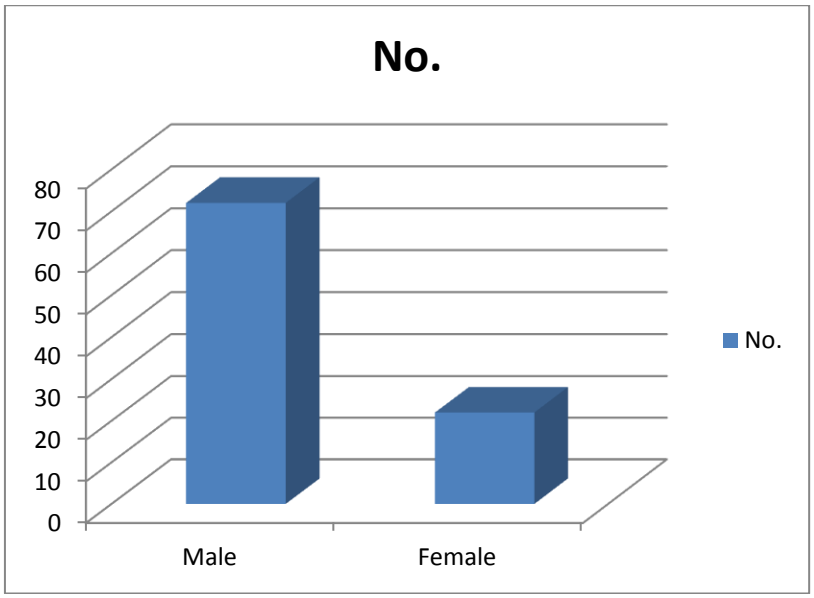

Fig-2

Figure 2 shows that 72 male and 22 female patients developed postoperative urinary retention. Incidence was found to be 76.59 % and 23.40 % for male and female patients respectively.

Table-3

		No	%
A)	Rural	61	64.89
	Urban	33	35.10
B)	Literate	59	62.76
	Illiterate	35	37.23

Table 3 divides the patients into rural and urban categories. Table also shows satisfactory % of literacy (patient being able to read and write).It was found that urban and literate group generally reported early with their symptoms.

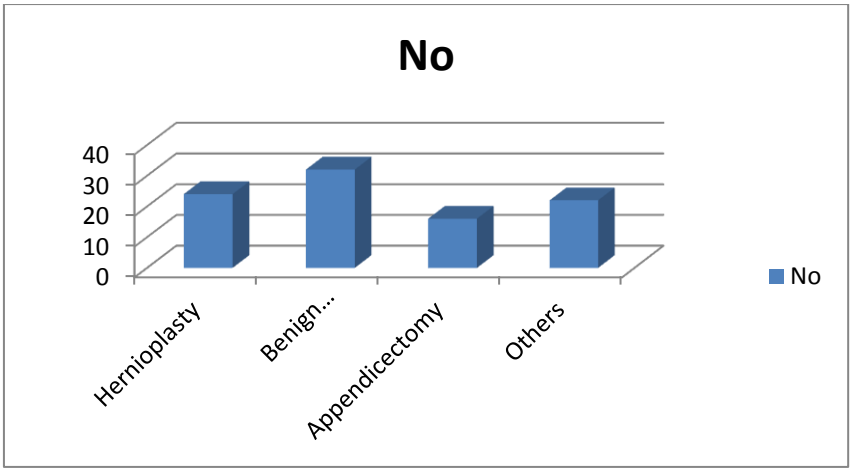

Fig-3

Figure 3 shows % of different infraumblical procedures in which patients developed retention. It was found that highest incidence is found in benign anorectal surgeries. 32 patients operated for benign anorectal surgeries developedpostoperative urinary retention.

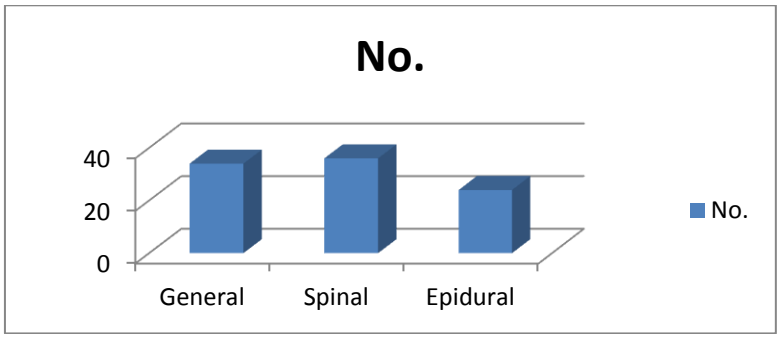

Fig-4

Figure 4 shows type of anaesthesia given to patients included in study. 36.17% patients received GA & 38.29 % patients received SA & 25.53 % received epidural anaesthesia in our study. The choice of anaesthesia was purely decided by anesthetist and surgical team had no influence on his decision.

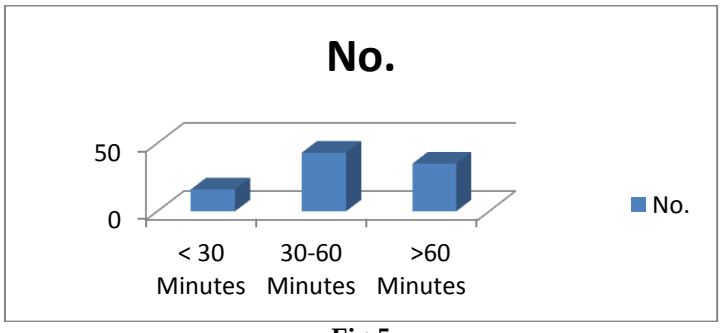

Fig-5

Figure 5shows the amount of time required for induction of anaesthesia, duration of surgery and patient coming out of anaesthesia. As it is found that in 45.74 % patients procedure was completed within 60 minutes.

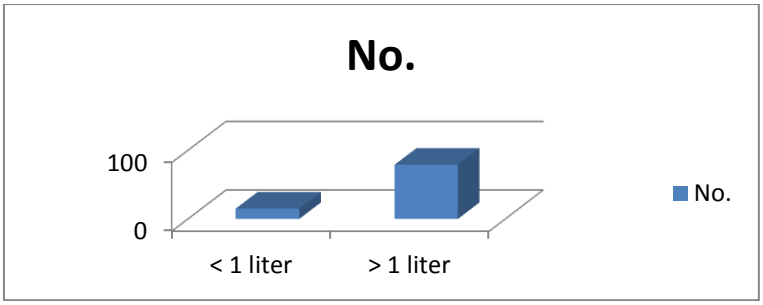

Fig-6

Figure 6 shows the amount of perioperative fluid given to the patient. The amount of fluid given is solely decided by anesthetist. In general it was found that patient receiving SA received more amount of fluid as compared to GA for same duration of surgery because preloading is required to prevent subsequent development of hypotension.

Table-4

Type of analgesic used	No.	%
Diclofenac	19	20.21
Tramadol	75	79.78

Table 4 shows division of patients based on analgesic used. InjDiclofenac was given intramuscularly on returning to ward and then repeated 8 hourly. Similarly Tramadol 100 mg is given intravenous in drip and then repeated 8 hourly. The choice of analgesic was entirely rested upon house surgeon. It was found that 9.58 % patients developed painless retention and all the patients were having DM.

Table -5

Type of catheter used	No.	%
Foleys	50	53.19
K-90	44	46.80

The choice of catheter used was decided by house surgeon. All the patients who were catheterized by foley's catheter, It was removed after 24-48 hrs. Following subsequent removal of Foleys patients voided without any difficulty.

Table- 6 shows that 7 patients were recatheterised after use of K-90.

Table-6

	No.	%
No. of patients required recatheterization after use of K-90 .	7	15.90

DISCUSSION

A prospective clinical study is performed for all infraumblical surgeries performed in General Surgery during January 2014 to January 2015 with 94 patients who developed postoperative urinary retention. Postoperative urinary retention is condition in which the patient after a surgical procedure difficulty in micturition in spite of normal renal function, a full bladder with absence of any lower urinary tract obstruction.

Gabriele Baldini reported[6] incidence between 5% and 70%. The widely varying reported incidence of Postoperative urinary retention is related to different patient characters, the absence of uniform defined criteria and the multifactorial causes including age, gender, Excessive perioperative fluids, type of anaesthesia and type of surgery. Our study shows incidence of postoperative urinary retention is 30.12 %, operated in infraumblical region for various conditions.

In similar kind of study conducted by James G. Petros[1], retention defined as inability to void with >400 ml urine on catheterization) the incidence recorded was 14 %, Gideon and Goldman in their study of 102 patients found 25.5 % incidence of postoperative urinary retention after henioplasty. Robert A. Kozol, retention defined as catheterization of patient if spontaneous voiding does not occur in 8 hrs.) quoted an incidence of 15 % in their study of 60 patients undergoing various procedure[5].

In addition to the factors discussed below the background of our patients particularly illiteracy,

overcrowded conditions of wards, constant flow of relatives in wards hampering adequate privacy, relatively less hygienic condition of our hospitals may have an added influence on incidence.

It is evident that a higher % of retention is observed in older age group (50-70 yrs.) It is 44.68 % in 50-70 yrs age group as compared to 18.08 % in 14-30 yrs. group. Stallard& Prescott, 1988 found that mean age of developing retention was 50.2 yrs. in general surgical patients. TeuvoTamella ,1985 found 44.4 % incidence of urinary retention at age 40 or above and this incidence fall to 2.4 % with 16-20 yrs. age group, in their study of 5220 patients of general surgery. James J. Petrose 1991 [2] also found that retention occurred significantly more often in older patients >53 yrs of age. Possible causes for such age and gender influences is related to age-related progressive neuronal degeneration causing bladder dysfunction and gender-specific pathology like benign prostatic hypertrophy. Although we excluded the older patients with known prostatic hypertrophy from the study, many of our older subjects may have had subclinical disease which increased their susceptibility to retention.

The incidence of post operative urinary retention vary according to type of surgery. Although incidence of post-operative urinary retention in general surgical population is around 3.8%, but the incidence of post-operative urinary retention after benign anorectal surgery ranges between 1 and 52%. Trauma to the pelvic nerves and pain evoked reflex result in increased tone of the internal sphincter explains the higher incidence of post-operative urinary retention in patients undergoing anorectal surgeries

In our study we found 34.04 % patients were operated for benign anorectal conditions. Reilly WT and Zaheer et al studied 1026 consecutive cases of benign anorectal surgeries to determine the incidence and risk factors for postoperative urinary retention[4]. They found a 16% incidence of retention with 34% of the incidence being in case of haemorrhoidectomies. They found that it is a common post-operativecomplication that increases hospital stay. They concluded that old age, perioperative fluid administration and anal pain were important risk factors. After hernia repair, the incidence of postoperative urinary retention ranges between 5.9% and 38%. In our study we found 25.53 % patients were operated for hernioplasty.

A definite correlation is found between type of anaesthesia and post-operative retention in our study. The incidence of GA and SA was 36.17 % & 63.83 % respectively. James G. Petros [2] found a 19 % and 8 % incidence of retention respectively. Nehime had retention in 85 cases 27 % of hernia repaired in SA. A probable explanation for retention following spinal is as follows. Prior to initiation of spinal anaesthesia many patients receives bolus of fluid. This practice is often followed to prevent hypotension associated with rapid intense sympathectomy produced by hyperbaric blocks. The bladder overdistension that occurs during regional anaesthesia enhances the alpha adrenergic sympathetic activity thereby increasing the closure pressure of uretheral sphincter, which in turn leads to difficulty in micturition.

A higher incidence of urinary retention was found in patients who had received a long acting anesthetic agent like Bupivacaine. The incidence of urinary retention is 38.29 % and 25.53 % with bupivacaine and ropivacaine with fentanyl respectively. Intrathecal fentanyl increases the duration of sensory block of SA with short and long acting local anesthetic without affecting the ability to micturition. Low-dose (20 mg) spinal lignocaine with small doses (25 μg) of fentanyl reduces the duration of sensory block and time to void when compared with high-dose (50mg) spinal lignocaine without fentanyl (130 *vs.* 162min, respectively). These results suggest that low dose local anesthetic alone or in combination with low dose opiate such as fentanyl could be a better way to decreasepost-operative urinary retention and facilitate the discharge of ambulatory patients without micturition.

The patients receiving GA the preanaesthetic medication given was either atropine or glycopyrrolate (Table-8) and the patients were reversed by neostigmine and same anticholinergic agent which was used for preanaesthetic medication. The smooth muscles of bladder and urethra consist of many anticholinergic receptors sites. Anticholinergics can abolish or delay bladder contractions by antagonizing the parasympathetic control of bladder leading to urinary retention. G. Virten *et al* in their study of 52 patients undergoing various surgical procedures found that age had a significant effect on kinetics of atropine in children under 2 yrs. of age and elderly, a prolonged elimination was found because of higher sensitivity of these groups. This explains the higher incidence of urinary retention with anticholinergics in elder patients. Moreover a study by Rorke found no statistical difference in incidence of urinary retention in patients with atropine or glycopyrrlolate.

We found in our study that prolonged duration of surgery can cause post-operative urinary retention. We observed that 45.74 % of patients were operated for 30 -60 minutes. In patients undergoing ambulatory surgery under central neuraxial technique, time to micturition is shown to be directly proportional to the duration of anesthesia. These findings can also be explained by the difference in the volume of intravenous fluids given during surgeries of different duration. In fact, Pavlin *et al*[3]. found a significant relation between urinary bladder volume and duration of surgery but failed to show relation between the

urinary bladder volume and the total amount of fluids given. In contrast, Peterson didn't find any causal relationship between duration of surgery and risk of post-operative urinary retention.

Operative time depends upon a number of factors namely anaesthesia, experience of the operating surgeon, capability of assistants, ready availability of desired instruments, suture materials, pathology encountered proper light etc. Longer the operative time, more the amount of anesthetic drugs, more the ill effects associated with them and more the the amount of perioperative IV fluids given to the patients. Many times because of overdoses of anesthetic drugs, use of long acting muscle relaxants patient doesn't come out from anaesthesia as soon as the operative procedure is over.

In our study 84 % of patients who developed postoperative urinary retention had received perioperative fluid more than one liter. The amount of intravenous fluids can influence the development of postoperative urinary retention. In patients undergoing herniorrhaphy and benign anorectal surgery, intravenous fluid administration of more than 750 ml of fluids during the perioperative period increases risk of postoperative urinary retention by 2.3 times as compared to other surgeries. Postoperative urinary retention has not been reported in low-risk surgery and in patients without previous history of urinary retention. Excessive infusion of intravenous fluids can lead to overdistension of the bladder, especially in patients under SA whose bladder filling perception is abolished. Overdistension inhibits detrusor function & the normal voiding reflex cannot be restored even after emptying the bladder with catheter. Therefore bladder volume more than 270 ml represents a risk factor for postoperative urinary retention.

In our study 9 patients developed painless urinary retention whereas 85 patients developed painful urinary retention. Possible causes of painful retention can be explained as follows. If the patients experience the urge to void then afferent limb of micturition is functioning. In painful retention impulses from stretch receptors are reaching the higher centers but patient is unable to initiate voiding, perhaps because of immobilization by intravenous lines and majority of patients are unable to void in supine position and in unfamiliar surroundings. Pain in lower part of groin and perineum as a result of surgical procedure may hinder perineal relaxation which is the first step in initiation of micturition.

Possible causes of painless retention in surgical patients is that the sensory cortex is unaware of the impulses reaching it from the stretch receptors of bladder. This is particularly true for the patients receiving opioid analgesics for pain relief, when they may well not feel the discomfort from distended bladder. In vitro studies on the strip of detrusor muscle shown that opiates are potent presynaptic inhibitors of acetylcholine from postganglionic neurons. Opiates could therefore lower the tone in the bladder neck and contribute to passive filling of bladder , in addition to the analgesic effects. The central effect of opiates may make patient inattentive to sensation of bladder filling and hence contribute to painless retention.

In our study 50 patients Foleys catheter is used to catheterize the patient whereas in 44 patients K-90 is used. Recatheterisation is required in 7 patients after use of K-90 which indicates that in 90 % of we can avoid unnecessary Foleys catheterization.

SUMMARY AND CONCLUSION

Postoperative urinary retention is not a rare occurrence in surgical patients. It may happen after any surgical procedure without presence of any preexisting urinary symptoms.

In our prospective study of 94 patients undergoing Infraumblical surgical procedures for various diseases developed postoperative urinary retention.We found higher incidence in male patients of age > 50 yrs. (44.68 %). In addition to their aging factor, probably a subclinical prostatic disease may have contributed to higher incidence of urinary retention in these groups. The type surgical procedure performed has great influence on retention. Postoperative urinary retention is the most common complication of surgery for benign anorectal diseases.

Anaesthesia particularly SA (63.82 %) is found to be an important incriminating factor in causing urinary retention. Bladder distention due to vigorous perioperative fluid administration is found to be another important factor contributing to this condition with an incidence of 84.04 % when the amount of fluid given exceeded 1000 ml. Increased duration of surgery exposed the patient to a longer period of anaesthesia and a greater perioperative fluid administration and hence a greater risk of developing post-operative urinary retention. Analgesia particularly opiates, contributed significantly to urinary retention.

Our summary would not be complete without the mention of strong psychic influence which though difficult to evaluate, contribute significantly to voiding problems. Pain, fear, anxiety, unfamiliar surroundings, lack of adequate privacy all have a profound influence on general psyche of patient, thereby affecting the voluntary component of the physiology of micturition.

It may be concluded that post-operative urinary retention is an underestimated complication. A proper understanding of the physiology and pathophysiology of micturition, factors contributing to this problem, adequate motivation of the patient pre and postoperatively and with prompt and early

catheterization may protect the bladder from overdistention and its consequences.

REFERENCES

1. Petros JG, Bradley TM. Factors affecting postoperative urinary retention in patients undergone surgery for benign anorectal disease. Am J Surg 1990;159:374–6.
2. Petros JG, Rimm EB, Robillard RJ, Argy O. Factors affecting postoperative urinary retention in patients undergoing inguinal herniorrhaphy. Am J Surg 1991;161:431.
3. Pavlin DJ, Pavlin EG, Gunn HC, Taraday JK, Koerschgen ME; Voiding in patients managed with or without ultrasound monitoring of bladder volume after outpatient surgery. Anesth Analg 1999; 89:90–7
4. Zaheer S, Reilly WT, Pemberton JH, Ilstrup D; Urinary retention after operations for benign anorectal diseases. Diseases of the colon & rectum, 1998;41(6):696-704.
5. Kozol RA, Hyman N, Strong S, Whelan RL, Cha C, Longo WE; Minimizing risk in colon and rectal surgery. The American Journal of Surgery, 2007; 194(5):576-587.
6. Baldini G, Bagry H, Aprikian A, Carli F, Phil M; Postoperative urinary retention. Anesthesiology, 2009; 110(5):1139-57.