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A Placebo Controlled Double Blind Study Using Perioperative Prazosin in the Prevention of Urinary Retention Following Inguinal Hernia Repair

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Acute urinary retention is a frequent complication following inguinal hernia repair. The smooth muscle of the bladder neck and the prostate have been demonstrated to be rich in alpha-1 adrenergic receptors. It has been postulated that the aetiology of acute urinary retention postoperatively is at least partially due to adrenergic stimulation; blocking these receptors may reduce the incidence of acute urinary retention. We have used prazosin in a double blind, placebo controlled study to establish its efficacy in the prevention of acute urinary retention in patients undergoing elective inguinal hernia repair. A total of 70 male patients were enrolled; 36 patients had been allocated active drug and 34 patients had been allocated placebo. Only two patients developed acute urinary retention. Both patients had been allocated prazosin and had received a general anaesthetic for their hernia surgery. In either arm of the study, a higher number of patients developing urinary retention would have been expected but this may be explained by the greater vigilance on urinary output by nursing staff aware that the trial was being conducted. On the basis of our findings, we do not recommend the routine use of perioperative prazosin with inguinal hernia repair. Further studies in high risk groups would be necessary to assess more fully the efficacy of prazosin in this situation.

Introduction

Inguinal hernia repair is a common operation, and estimations by epidemiologists suggest that 40% of men over the age of 65 years will have or have had an inguinal hernia [1]. Acute urinary retention is a frequent complication following inguinal hernia repair. Such a complication will prolong hospital stay and add costs for the patient and to the hospital. In an internal audit of 394 patients undergoing elective inguinal hernia repair at the Repatriation General Hospital at Concord during the years 1988 to 1989, we found the incidence of acute urinary retention requiring catheterization to be 6%.

The smooth muscle of the bladder neck and prostate has been demonstrated to be rich in alpha-1 adrenergic receptors [2, 3]. In the presence of bladder outflow obstruction, there is evidence that approximately 50% of the obstruction is neurally mediated [4]. It has been postulated that the aetiology of acute urinary retention postoperatively is at least partially due to adrenergic stimulation [5]. Blocking these receptors may reduce the incidence of acute urinary retention.

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Prazosin, a selective alpha-1 adrenergic receptor blocking drug, is an established anti-hypertensive agent. We have used prazosin in a double blind, placebo controlled study to establish its efficacy in the prevention of acute urinary retention in patients undergoing elective inguinal hernia repair.

Method

Patients for elective inguinal herniorrhaphy were admitted two days preoperatively for the purposes of this study. The study was approved by the Hospital Ethics Committee and written consent was obtained from all patients. The following exclusion criteria were applied: previous lower urinary tract surgery, carcinoma of the prostate, urethral stricture and patients prescribed medications likely to affect lower urinary tract function.

Urological assessment was designed to mirror the limitations of a General Surgical Outpatient Department. A urinary symptom score as previously described by Boyarsky [6] was used to score patients for severity of symptoms from 0 to a maximum score of 27 points (Table 1). Digital rectal examination was performed on all patients by one investigator (HHW) and prostate size was graded as being either flat, slightly enlarged, moderately enlarged or very enlarged.

Table 1
Boyarsky symptom score*

1.	Nocturia
2.	Daytime frequency
3.	Hesitancy
4.	Intermittency
5.	Terminal dribbling
6.	Urgency
7.	Impairment of size and force of urinary stream
8.	Dysuria
9.	Sensation of incomplete voiding

* Subjects are asked to grade their symptoms from 0 to 3. Summation gives a total score up to a maximum of 27 points.

Prazosin or placebo was administered as indicated in Table 2. Patients were given 0.5 mg on the evening of their admission and progressed to a full dose of 2 mg twice daily until the 2nd postoperative day. Both lying and sitting blood pressure measurements were monitored.

Assessment of acute urinary retention and decision to catheterize a patient was made by resident medical officers without consultation with either of the investigators.

Table 2
Oral administration of prazosin

	Morning dose	Evening dose
Two days preoperatively	–	0.5 mg
One day preoperatively	1 mg	2 mg
Day of surgery	2 mg	2 mg
One day postoperatively	2 mg	2 mg
Two days postoperatively	2 mg	2 mg

Results

A total of 70 male patients were enrolled; 36 patients had been allocated active drug and 34 patients had been allocated placebo. The mean age was 68.7±6.2 (SD) years and 70.5±6.8 years for the placebo and prazosin groups, respectively.

Symptom scores are summarized in Fig. 1 and of note is that 70% of all patients had a symptom score of 5 or less. There was no significant difference between the two groups ($p=0.54$, paired Student *t*-test). Prostate size on digital rectal examination (Fig. 2) was also compared between the two groups and again there was no significant difference ($p=0.58$, paired Student *t*-test).

Systolic and diastolic blood pressures in both the supine and sitting positions were recorded and comparison was made between the two groups. The average blood pressure was 130/75 mm Hg for the prazosin group and 129/76 mm Hg for the placebo group. The only statistically significant difference

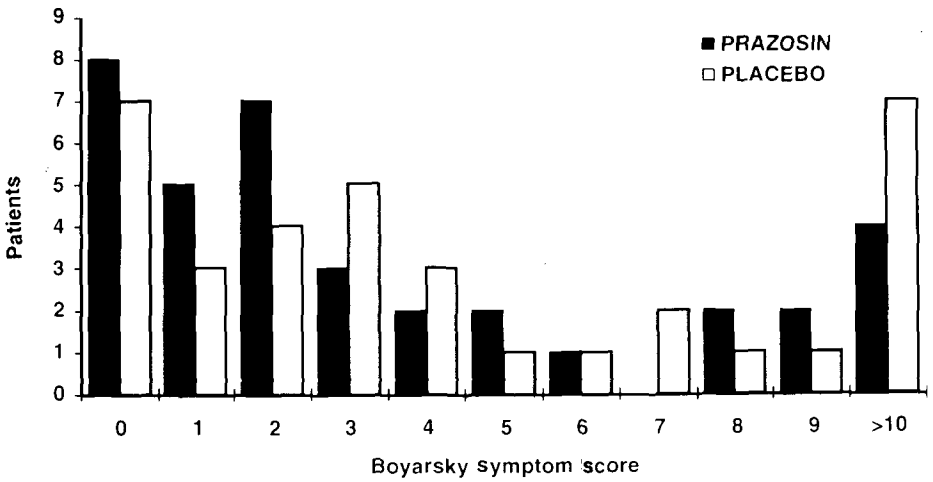

Fig. 1. Urinary symptom scoring as per Boyarsky

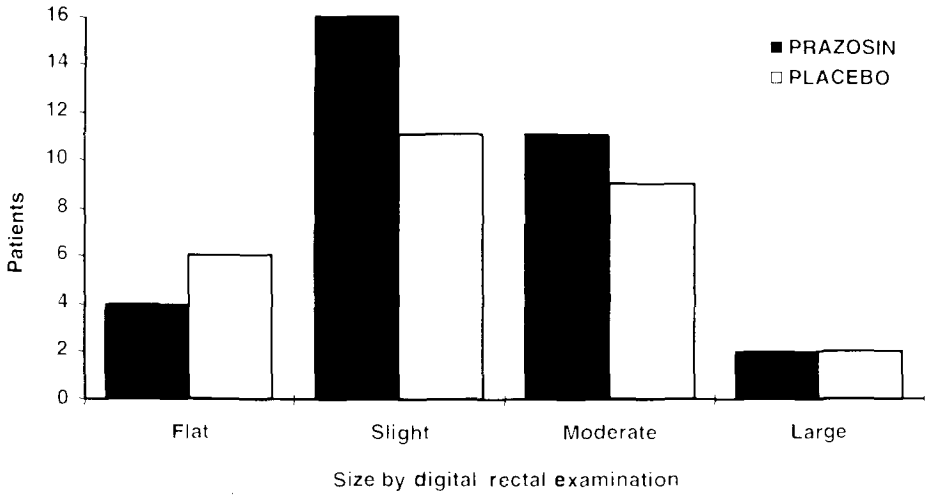

Fig. 2. Prostate size

found was in the lying diastolic blood pressure which measured 7 mm Hg less in the prazosin group.

Only two patients developed acute urinary retention. Both patients had been allocated prazosin and had received a general anaesthetic for their hernia surgery. One of these patients had a low symptom score of 2 and had a moderately enlarged prostate, whereas the other patient had mid-range symptom score of 13 and a slightly enlarged prostate. Neither of them had other complications and were able to void successfully upon removal of their catheter.

Few complications of prazosin were encountered. Only one of the three patients who experienced postural hypotension was taking prazosin. Headache, a recognized complication of prazosin, occurred in two patients; one of these patients received prazosin, the other placebo. Both underwent spinal anaesthesia for their surgery and in each case the headache resolved within 48 hours of the operation. No patient required discontinuation of the trial medication as a result of any adverse reaction.

Discussion

Phenoxybenzamine is a non-specific alpha blocking agent and has been shown to be beneficial in preventing urinary retention following hernia repair. In an unblinded study, Goldman et al. [5] evaluated 102 patients who were randomly allocated either phenoxybenzamine or placebo. Fifty-eight patients received phenoxybenzamine and 44 patients received placebo. No patient in the phenoxybenzamine group developed acute urinary retention, whereas 26

patients in the placebo group required catheterization. Their incidence of acute urinary retention is higher than generally reported [7].

Receptor studies have found that the smooth muscle of the bladder neck and prostate are primarily of the alpha-1 subtype. A specific alpha-1 blocking agent may be as effective as non-specific alpha blockade with the potential advantages of fewer systemic side effects. The incidence of side effects from non-specific alpha blockade with phenoxybenzamine has been reported to be as high as 30% [8]. Attention has therefore been directed towards alternative agents such as prazosin where there is a proven safety profile at doses used to treat bladder outflow obstruction [9, 10]. We are unaware of other studies using perioperative prazosin to prevent postoperative urinary retention. Some benefit, mainly symptomatic, has been demonstrated with the use of prazosin in a double blind, placebo controlled trial for the treatment of benign prostatic hypertrophy [9, 10]. These studies also found few significant side effects with the use of prazosin as has been the case with this study.

Whilst accepting that the number of patients developing urinary retention in this study is small, it is also evident that our ability to predict these patients on the basis of symptomatology or digital rectal examination is poor. None of our patients with higher symptom scores or greater degrees of prostatic enlargement developed urinary retention. Neither the Boyarsky symptom score or any other symptom score have been shown to correlate with bladder outflow obstruction although their use is widely advocated [11]. In either arm a higher number of patients developing urinary retention would have been expected but this may be explained by the greater vigilance on urinary output by nursing staff aware that the trial was being conducted.

The use of urinary flow rates may help identify patients who have significant bladder outflow obstruction. It has previously been shown that 86% of men with a flow rate less than 10 ml/s will have obstruction [12]. Conversely, only 68% of men with bladder outflow obstruction have a flow rate of less than 10 ml/s. From a practical viewpoint, flowmeters are not readily available in all hospitals and particularly not in a General Surgical Outpatient setting. This study has attempted to utilize the tools which a general surgeon would have readily available assessing patients for inguinal hernia surgery.

On the basis of our findings we do not recommend the routine use of perioperative prazosin with inguinal hernia repair. Further studies in high risk groups would be necessary to assess more fully the efficacy of prazosin in this situation.

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