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Research Article

Postoperative urinary retention after general and spinal anesthesia in orthopedic surgical patients

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KEYWORDS

General anesthesia;
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Abstract *Background:* After general, spinal anesthesia and surgery, urinary retention is common. The aim of the study was to compare the effect of general anesthesia versus spinal anesthesia on postoperative urinary retention

Patients and methods: After obtaining local ethics committee approval and written consent, 60 male patients, aged 16–40 years, ASA – physical status I and II were divided into two groups (S) 40 patients and (G) 20 patients undergoing surgery of the lower limb lasting up to 90 min (knee arthroscopy, internal tibial fixation with plate and screws). Group (S) was taken spinal anesthesia, this group was divided into two groups (S_1) 20 patients, who were taken plain bupivacaine and group (S_2) 20 patients who were taken plain bupivacaine plus fentanyl. Group (G) 20 patients were anesthetized by general anesthesia.

Results: There were statistically significant differences among groups S1, S2 and G regarding spontaneous micturition, residual volume and time since spinal or general anesthesia till micturition. The percent numbers of patients with retention were 20% in group S1, 35% in group S2 and 8% in group G.

Conclusion: Urinary retention is more common after spinal than general anesthesia in orthopedic patients. Adding narcotics to the local anesthetics intrathecally causes more incidence of postoperative urinary retention, which may delay patients discharge and transabdominal ultrasonography is a reliable, noninvasive, inexpensive and simple method to measure bladder volume postoperatively.

1. Introduction

Postoperative urinary retention (POUR) is common after anesthesia and surgery. The control of micturition is a complex process involving multiple afferent and efferent neural pathways, reflexes, and central and peripheral neurotransmitters. The perioperative period includes myriad insults that may interrupt this process and promote the development of urinary retention [1]. In a meta-analysis done by Baldini, and his colleagues, reviewing the impact of anesthesia on the incidence of postoperative urinary retention revealed that the overall incidence of POUR after general anesthesia was found to be significantly lower in comparison with conduction blockade [2].

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Spinal anesthetics bupivacaine and tetracaine delay the return of bladder function beyond the resolution of sensory anesthesia, and may lead to distention of the bladder beyond its normal functioning capacity. This may cause urinary retention, or possibly even bladder damage [3].

Ultrasound has been used as a diagnostic tool for postoperative urinary retention as well as an imaging modality to evaluate bladder function [1]. In the postoperative period, urinary retention has two main causes. The first is mechanical obstruction of the urinary outflow tract, and the second is altered neural control of the bladder and detrusor mechanism, most commonly due to analgesic drugs [4].

The present study hypothesized that adding narcotic analgesics to spinal anesthesia would increase the incidence of postoperative urinary retention The aim of the study was to compare the effect of general anesthesia versus spinal anesthesia with and without narcotics on postoperative urinary retention.

2. Patients and methods

After obtaining local ethics committee approval and written consent, 60 male patients, aged 16–40 years, ASA – physical status I and II were divided into two groups (S) 40 patients and (G) 20 patients undergoing surgery of the lower limb lasting up to 90 min (knee arthroscopy, internal tibial fixation with plate and screws). Group (S) was anesthetized by spinal anesthesia, this group was divided into two groups (S_1) 20 patients, who were taken heavy plain bupivacaine and group (S_2) 20 patients who were taken plain bupivacaine plus Fentanyl while group (G) 20 patients were anesthetized by general anesthesia.

Exclusion criteria include prostate hyperplasia or urogenital pathologies (incontinence, cysto-ureteric reflux, known bladder retention and patients with renal impairment), intraoperative blood loss 200 ml or more, alcohol or drug abuse.

Patients were allowed to drink water up to 2 h before induction of anesthesia. All patients voided before transfer to the operating area. After application of routine monitoring equipment (ECG, oscillometric arterial pressure cuff, pulse oximetry), an intravenous infusion with ringer's lactate fixed volume (1000 ml) for all cases was commenced and an initial bladder ultrasonography scan was performed to measure bladder content before and after spinal anesthesia or general anesthesia, scan set was LOGIQ, TM, P_5, IA_5, (version 4).

2.1. Spinal anesthesia method

In the lateral or setting position, the subarachnoid space was punctured with a 25 G Whitacre needle at L3/4 or L4/5 using a median or paramedian approach until there was free backflow of cerebrospinal fluid, and 3 ml of hyperbaric bupivacaine 0.5% in group (S_1) and 3 ml hyperbaric bupivacaine 0.5% plus 20 μm fentanyl in group (S_2) were administered. After 3 min, patients will be returned to the supine position. Perioperatively, ephedrine, midazolam, or both were administered intravenously if required.

2.2. General anesthesia method

Intravenously, induction was done by fentanyl 1 μg/kg, propofol 2 mg/kg and atracurium 0.5 mg/kg to facilitate tracheal intubation. Controlled ventilation was maintained in a closed valvular system using 50% air and 50% oxygen. Anesthesia was achieved by the administration of 2% isoflurane and maintained until the end of surgery. During surgery, one liter ringer lactate was given intravenously. Postoperative pain was measured on a numeric rating scale (0–10). Ketorolac 30 mg i.m. was used as bolus dose if required. Ultrasound scans of the bladder were performed hourly after surgery until spontaneous micturition or catheterization occurs. It should be noted that ultrasound bladder scans were used to diagnose urinary retention. Urinary retention was defined as a bladder volume $\geqslant$ 500 ml together with the inability to micturate or post-residual volume > 500 ml. Patients were catheterized when these criteria were met.

2.3. Statistical methodology

Analysis of data was done by IBM computer using SPSS (statistical program for social science, version 16) as follows:

Description of quantitative variables as mean ± SD.
Description of qualitative variables as number and percentage.
Patients with postoperative urinary retention expressed by percentage.

ANOVA was used to compare between groups regarding urine volume and time. Paired t-test was used to compare between urine volume before spinal anesthesia and before spontaneous micturition, and before spontaneous micturition and posturination residual volume. P value < 0.05 is considered significant.

3. Results

According to demographic data (Table 1), there were no statistical significant differences among groups S1, S2 and G related to age, weight, and duration of surgery.

Regarding urine volume measured before spontaneous micturition (Table 2), there were statistically significant differences between group S1 (575.9 ± 84 ml) and group S2 (691 ± 104 ml) and also significant differences between group G (383.5 ± 78 ml) and both group S1 and group S2. Concerning residual volume, there was statistically significant difference between group S1 (141.4 ± 36 ml) and group S2 (172.9 ± 42 ml), and also significant differences between group G (67 ± 38 ml) and both group S1, and group S2. There were statistically significant differences between urine volume before spinal anesthesia and before spontaneous micturition, and before spontaneous micturition and posturination residual volume. The percentages of patients with retention were 20% in group S1, 35% in group S2 and 8% in group G.

Time since spinal or general anesthesia till micturition was shown in Table 3. There were statistically significant differences between group S1 (344.2 ± 44 min) and group S2 (501.7 ± 59 min), and also significant difference between group G (199 ± 65 min) and both group S1 and group S2.

4. Discussion

The main finding in the present study is that postoperative urinary retention is common complication after general or