

ORIGINAL ARTICLE

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Effects of hyoscine-n-butylbromide on postoperative nausea and vomiting and postoperative pain in ureteroscopic procedures

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Abstract

One of the most common complications of anesthesia is postoperative nausea and vomiting (PONV). It is known that, in addition to the use of inhalational anesthetics and opioids, flank pain due to stones and the procedure also plays a role in the development of PONV in patients who undergo ureteroscopy. The purpose of this study was to retrospectively investigate PONV incidence and postoperative pain in patients who were administered hyoscine-N-butyl bromide (HBB) during ureteroscopy. Data from 40 patients who underwent ureteroscopy and were intravenously administered HBB for analgesia were retrospectively evaluated. Demographic data of the patients, PONV incidence and severity of pain at postoperative 15th and 30th min and postoperative 3rd, 6th, 12th, and 24th h were investigated. Additional analgesic requirements were recorded. Ten females (25%) and 30 males (75%) were included in the study. The mean age of the patients was 47.9 ± 14.9 years. Fourteen patients (35%) had comorbidities. Six patients (15.8%) had PONV at postoperative 15th min, two patients (5.3%) had PONV at postoperative 30th min, and one patient (2.5%) had PONV at postoperative 3, 6, 12, and 24th h. The mean VAS scores during the follow-up period were 0.67 ± 1.03 , 0.41 ± 0.70 , 0.65 ± 1.27 , 0.63 ± 1.51 , 0.60 ± 1.83 , and 0.16 ± 0.60 , respectively. Even though PONV is an important problem after ureteroscopy procedures, HBB that is an anticholinergic drug seems to exhibit effective antiemetic properties in addition to providing postoperative analgesic properties in patients who underwent ureteroscopy.

Keywords: Pain, postoperative nausea and vomiting, ureteroscopy

Introduction

Pain is the most common complication of ureteroscopy [1]. Ahn et al. reported that approximately 14.6% of the patients had moderate to severe pain after ureteroscopic lithotripsy (URS) [2]. Ureteral spasm also contributes to the pain that is frequently caused by endoscopic surgery following ureteroscopy.

Postoperative nausea and vomiting (PONV) are among the most common complications of anesthesia. It is known that the use of inhalational anesthetics and the use of opioids for postoperative pain management are predisposing factors for PONV. In addition, flank pain due to stones and the procedure was also reported to be associated with nausea and vomiting in patients who underwent ureteroscopy [3]. Intraoperative administration of antispasmodics such as hyoscine-N-butyl bromide (HBB) facilitates the procedure by alleviating ureteral spasms and also provides benefit in postoperative pain management. HBB is a scopolamine derivative, and scopolamine is effective in treating PONV [4].

The purpose of this study was to retrospectively investigate the incidence of PONV and the severity of pain in patients who were administered HBB for analgesia during ureteroscopy.

Materials and Methods

Data from 40 patients, who underwent ureteroscopy, collected during their stay at the recovery unit and the ward were retrospectively evaluated. In accordance with our routine clinical practice, a second-generation supraglottic airway device (I-gel or LMA supreme) was inserted following anesthesia induction ($2-3 \text{ mg.kg}^{-1}$ propofol, 2 mcg.kg^{-1} fentanyl, and 0.25 mcg.kg^{-1} rocuronium), and stomach contents were aspirated by an orogastric tube. Anesthesia was maintained with a BIS value of 40–60 by administering $0.1-0.5 \text{ mcg.kg}^{-1}.\text{min}^{-1}$ remifentanyl and 1%–2% sevoflurane infusion in 35%/65% O₂/air mixture. Next, 100 mg of tramadol, 1 g of paracetamol, and 20 mg of HBB were intraoperatively administered through the intravenous route.

Antiemetic prophylaxis was not administered. Patients with different anesthesia management characteristics, those who were postoperatively administered morphine or meperidine, and those who were intraoperatively administered antiemetics were excluded from the study.

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Age, sex, height and weight of the patients, presence of PONV and severity of pain assessed using a 10 cm VAS scale, and additional analgesic requirements were recorded after retrospective file screening. Regarding PONV presence and the severity of pain, the data at postoperative 15th and 30th min was obtained from the follow-up records in the recovery unit, and the data at postoperative 3rd, 6th, 12th, and 24th was obtained from follow-up records in the wards.

Statistical Analysis

Data analysis and management were performed by the software Statistical Package for Social Science, version 17 (SPSS Inc, Chicago, IL). The means and the standard deviation of data and percentages were calculated. Descriptive statistics were presented with the mean $\pm$ standard deviation (SD) and number of patients were expressed as nominal variables and percentages.

Results

Patient demographics are summarized in Table 1. All patients underwent elective surgery. The incidence of PONV throughout the postoperative 24-h period is provided in Table 2; 24-h pain severity assessed based on the VAS scores of the patients is summarized in Table 3. In total, additional analgesics were administered to seven patients (17.5%), five of which were administered diclofenac.

Table 1. Demographic Data

Age (years)	47.9 $\pm$ 14.9
Gender n (%)	
Female	10(25%)
Male	30(75%)
Weight (kg)	77.1 $\pm$ 14.6
Height (cm)	174 $\pm$ 8.1
ASA Score n (%)	
1	24(60%)
2	8(20%)
3	7(17.5%)
4	1(1.8%)
Additional Diseases n (%)	14(35%)*
Hypertension	10
Diabetes Mellitus	5
Coronary Artery Disease	6
Hyperlipidemia	1
Chronic Obstructive Pulmonary Disease	2
Asthma	2
Cerebrovascular Accident	1

ASA: American Society of Anesthesiologists, *Some patients had more than one additional disease

Table 2. Postoperative Nausea and Vomiting Incidence

Evaluation Time	PONV n (%)
Postoperative 15 th minute	6 (15.8%)*
Postoperative 30 th minute	2 (5.3%)*
Postoperative 3 rd hour	1 (2.5%)
Postoperative 6 th hour	1 (2.5%)
Postoperative 12 th hour	1 (2.5%)
Postoperative 24 th hour	0 (2.5%)

PONV: Postoperative nausea and vomiting, * Data of two patients in the relevant time period could not be reached.

Table 3. Postoperative VAS Scores

Evaluation Time	VAS Score (Mean $\pm$ SD)
Postoperative 15 th minute	0.67 $\pm$ 1.03
Postoperative 30 th minute	0.41 $\pm$ 0.70
Postoperative 3 rd hour	0.65 $\pm$ 1.27
Postoperative 6 th hour	0.63 $\pm$ 1.51
Postoperative 12 th hour	0.60 $\pm$ 1.83
Postoperative 24 th hour	0.16 $\pm$ 0.60

VAS: Visual Analogue Scale

Discussion

This study showed that intraoperative administration of HBB might effectively provide PONV and pain management in patients who underwent ureteroscopy.

The incidence of PONV is high after ureteroscopic procedures. In a previous study, it was reported that 21.7% of the patients, who were administered total intravenous anesthesia and tramadol for postoperative pain management but not antiemetic prophylaxis, had nausea and vomiting following URS [5]. There are various causes of nausea and vomiting observed after such procedures. First of all, postoperative colic pain is frequently observed in the abdomen or lower back in patients who undergo ureteral stone removal. This type of pain causes nausea and vomiting via the vagal pathway [5]. Another factor is the side effects of opioids that are administered to treat existing pain. While multimodal analgesia provides effective pain management, tramadol increases the risk of PONV. In a previous study, it was reported that 70.8% of the patients who used tramadol had nausea [6]. Moreover, it was reported that the administration of inhalational anesthetics without the concomitant use of antiemetic prophylaxis was an important risk factor for PONV [7].

The area described as the vomiting center in the central nervous system consists of a neuron network that processes neurotransmitters that trigger nausea and vomiting. While the vomiting center primarily receives signals from the chemoreceptor trigger zone, signals may also be directly transmitted to this area from the inner ear or luminal organs, especially from the gastrointestinal tract [8, 9]. Scopolamine, an anticholinergic agent, acts as an antiemetic through the central pathway and through the peripheral pathway by suppressing intestinal cholinergic signals. Atropine may also act as an antiemetic particularly by alleviating spasm and as a result of its potential central effect [8]. HBB, a quaternary ammonium compound, is an antispasmodic with peripheral anticholinergic effects. It acts on the smooth muscles in the gastrointestinal, biliary, and genitourinary system [10]. It blocks the transmission of signals in parasympathetic ganglia due to its structure which resembles acetylcholine [11]. In a previous study comparing the effects of atropine and HBB on PONV, it was shown that these agents had similar effects. In this study, the incidence of PONV in patients who underwent ureteroscopy was 15.5% at postoperative 15th min. However, the incidence of PONV was considerably low after postoperative 30th min throughout the 24-h follow-up period (5.3% at 30th min; 2.5% in other follow-ups). The incidence of PONV was relatively higher at postoperative 15th min, the first follow-up, but lower in other follow-ups, which may be linked to the inability to objectively assess nausea in the recovery period. In our patient group, the

lack of prophylactic antiemetic use, administration of inhalational anesthetics, and use of tramadol increased the incidence of PONV. This suggests that HBB, a scopolamine derivative, might be effective as an antiemetic in patients undergoing ureteroscopy.

HBB is commonly used as an analgesic during labor and ureteral and renal colic [10]. In a review investigating the effects of analgesics in acute renal colic, it was reported that the analgesic activity of HBB was lower than that of opioids and NSAIDs and lasted shorter than the analgesic activity of NSAIDs [12]. According to another study, 14.6% of the patients who underwent URS had a VAS score of >4 on postoperative day one [2]. Therefore, postoperative pain management is essential in such patients. Another study showed that preemptive administration of tramadol significantly reduced pain at postoperative hour one [13]. As part of the routine practice at our clinic, patients undergoing ureteroscopy are administered 1000 mg of paracetamol and 100 mg of tramadol as analgesics. According to our study, mean VAS scores were <1 within the first 24 h after surgery, and 17.5% of the patients needed additional analgesics in the postoperative period. These results suggest that the combination of paracetamol, tramadol, and HBB is effective in postoperative pain management within the first 24 h in patients who undergo ureteroscopy.

The limitations of our study were as follows: files were reviewed retrospectively and there was no control group. If there had been a control group, the effects of HBB on PONV and pain would be better evaluated. Another limitation of our study is the limited number of the patients. And also, PONV status for the first 30 min was not included in the records of two patients.

Conclusion

Hyoscine-N-butyl bromide seems to show effective antiemetic activity in patients undergoing ureteroscopy. The combination of paracetamol, tramadol, and HBB is effective in postoperative pain management within the first 24 h after ureteroscopy procedures.

Conflict of interests

The authors declare that they have no conflict of interest.

Financial Disclosure

All authors declare no financial support.

Ethical approval

Since ethics committee is not required in retrospective studies, ethics committee approval is not available in our retrospective study.

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