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The efficacy and safety of dezocine combined with propofol used in cystoscopy.

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Abstract

Purpose: To evaluate the clinical efficacy and safety of using dezocine combined with propofol undergoing painless cystoscopy.
Methods: 120 patients who undergoing eystoscopy were randomly divided into three groups: dezocine group (group D), Fentanyl group (group F) and physiological saline (group N), each groups plus propofol through intravenous anesthesia respectively. The MAP (Mean Arterial Pressure), HR (Heart Rate) and SpO_2 (Pulse Oxygen Saturation) were observed after anesthesia, The total amounts of propofol, the period of loss consciousness and arousal time were recorded. The sores of postoperative pain, consciousness-sedation and degree of comfort were registered at 15 min, 30 min, 60 min.
Results: The MAP and HR at T1 time all significant lower than at T0 time (P<0.05), but the comparative differences between groups was no statistically, the HR and BIS of group N are higher at T2 time than group F and D. At T3 time, the MAP and HR of group F and N were higher than group D (P<0.05). The total amounts of propofol of group F and D were significantly reduced than group N (P<0.05), but the period of loss consciousness between groups were no statistically. The arousal time of group F were significantly shorter than group D and N. The pain of urethra of group D was obviously alleviation compare to group F and N.
Conclusion: Dezocine combined with propofol for cystoseopy has big worth on clinical application because it small dosage, Palinesthesia perfect, safety, comfortable and so on.

Keywords: Dezoceine, Fentanyl, Propofol, Cystoscopy.

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Introduction

Cystoscopy is an inspection means commonly used in the Department of Urology clinically and a gold standard for definite diagnosis of bladder tumor [1]. Conventional cystoscopy uses urethral mucosal surface anesthesia, but many patients are difficult to tolerate the fear and the stimulation brought by procedures.

To improve tolerance and comfort for patients, anesthetists are required to provide sedatives and analgesics for them to release their anxiety and fear and erase their intraoperative memories [2]. Propofol plus fentanyl may have satisfactory anesthetic effects [3], but there are more adverse reactions, such as respiratory depression, nausea and vomiting [3,4]. Dezocine is a mixed-opioid agonist/antagonist.

This study is to investigate the feasibility and rationality of dezocine plus propofol in painless cystoscopy through observation of propofol plus dezocine or fentanyl in cystoscopy.

Materials and Methods

This experiment was authorized by the Hospital's Ethics Committee, and the patients were informed consent. All patients volunteered to participate in postoperative scoring of analgesic and sedative effects. A total of 120 patients undergone cystoscopy in our hospital since 2013 were enrolled in this study, with the ranges in age from 42 to 75 years (mean 55years)and in weight from 46 to 83kg (mean 55kg). They were randomized into three groups: dezocine group (Group D), fentanyl group (Group F) and normal saline group (Group N). There were 40 patients in each group, and all the three groups were under intravenous anesthesia in conjunction with propofol. They were all ASA I/II patients. At the same time, the exclusion criteria was as follows: patients with diseases in regard to such vital organs as heart, brain, liver and kidneys. Samples with allergic history of propofol or other relevant drugs were also excluded in this research.

Prior to anesthesia, patients were fasted for 6h and water-fasted for 4h. They were placed in the lithotomy position after entry of the operating room. Vein opening was obtained. Oxygen inhalation was given via the facemask. Blood Pressure (BP),

Heart Rate (HR), Saturation of Pulse Oximetry (SpO_2) and Bispectral Index (BIS) were monitored. Groups F, D and N were given 1 μg/kg fentanyl, 0.1 mg/kg dezocine and 2 ml of normal saline intravenously, respectively. After 5 min, all the three groups were then slowly given 2 mg/kg propofol intravenously. The procedure began until the BIS value was 45 [5]. Intraoperatively, additional 0.5-1.0 mg/kg propofol was given if a patient twisted their bodies and did not tolerate the procedure. Postoperatively, patients were transferred to the postoperative observation ward. They were discharged until they were alert for 2h.

MAP, HR, SpO_2 and BIS were monitored prior to administration (T0), at the time of falling asleep (T1), at the time of cystoscopy procedure (T2) and at the time of analepsia (T3). Pain, sedation and comfort scales were recorded for patients at 15, 30 and 60 min, respectively. Time of unconsciousness and time of arousal were recorded, which were defined as time with BIS lower than 45 and time with BIS returning to 90. Verbal Rating Scale (VRS) [6] was used for pain scaling, Ramsay Sedation Scale (RSS) [7] was used for sedation scaling, and Bruggrmann Comfort Scale (BCS) [8] was used for comfort scaling.

Statistical analysis

All data were analyzed statistically using SPSS17.00 software. Measurement data were presented as mean ± standard deviation ($\overline{x} \pm s$) and t test was used. $P<0.05$ was considered as statistically significant.

Results

MAP and HR in each group were markedly lower at T1 than at T0, and no significant difference was noted between groups ($P<0.05$); there was no marked decrease in SpO_2 during oxygen inhalation via the facemask. No significant difference was noted in MAP, HR, SpO_2 and BIS between Groups F and D at each time point ($P>0.05$). MAP, HR and BIS increased in both Groups N and F at T2 compared with those in Group D. MAP and HR were higher in Groups N and F than in Group D at T3 ($P<0.05$) (Table 1).

Table 1. *Comparisons of MAP, HR, SpO_2 and BIS among three groups (n=40).*

Index	Group	T0	T1	T2	T3
MAP (mmHg)	Group F	84.3 ± 8.2	70.5 ± 9.5	74.3 ± 6.2*	82.1 ± 9.5
	Group D	81.5 ± 12.1	69.4 ± 7.9	75.0 ± 7.1*	80.7 ± 8.6
	Group N	83.6 ± 9.6	71.4 ± 8.7	81.7 ± 10.3	82.8 ± 6.7
HR (bpm)	Group F	85.0 ± 9.7	68.4 ± 9.4	72.0 ± 5.3*	81.3 ± 7.8
	Group D	86.4 ± 8.9	66.8 ± 7.2	73.5 ± 6.1*	84.8 ± 11.2
	Group N	83.9 ± 10.2	67.5 ± 8.6	80.2 ± 9.7	81.5 ± 8.4
SpO_2 (%)	Group F	99.1 ± 0.6	99.0 ± 1.0	99.0 ± 0.9	98.5 ± 1.2
	Group D	99.3 ± 0.4	98.9 ± 0.9	99.3 ± 0.8	99.4 ± 0.5
	Group N	99.0 ± 0.7	99.2 ± 0.8	99.0 ± 0.6	99.1 ± 0.7
BIS	Group F	97 ± 1.6	45 ± 5.1	47 ± 6.3*	93 ± 3.2
	Group D	98 ± 1.9	46 ± 4.9	47 ± 7.8*	93 ± 2.5
	Group N	98 ± 1.7	45 ± 5.3	51 ± 10.1	93 ± 2.8

Note: Compared with Group D, *P<0.05; compared with Group N, *P<0.05

Intraoperatively, total dose of propofol was markedly lower in Groups F and D than in Group N ($P<0.01$), and no significant difference was noted between Groups F and D. No significant difference was noted in time of unconsciousness among three groups. The time of arousal in Group F markedly decreased as compared with that in Groups D and N ($P<0.05$), with a statistically significant difference (Table 2).

Table 2. *Comparisons of total dose of propofol, time of unconsciousness and time of arousal among three groups (n=40).*

Group	Total dose of propofol (mg)	Time of unconsciousness (s)	Time of arousal (min)
Group F	171.32 ± 21.45*	57.7 ± 5.9	5.5 ± 1.4
Group D	174.58 ± 19.24*	58.0 ± 6.4	7.6 ± 1.6**
Group N	207.89 ± 23.46	58.6 ± 7.1	7.8 ± 1.9*

Note: Compared with Group F, **P<0.05; compared with Group N, *P<0.05. Compared with Group F, Group D has no significant change.

After analepsia, VRS scores of urethral pain at each time point was markedly lower in Groups F and D than in Group N ($P<0.05$), with a statistically significant difference; however, at 60min, urethral pain markedly relieved in Group D as compared with Group F, with a statistically significant difference. For RSS scores, patients in the three groups were cooperative at each time point without dysphoria, and no significant difference was noted in sedation scale at each time point. For BCS scores, no significant difference was noted among three groups at each time point (Table 3).

Table 3. *Comparisons of pain, sedation and comfort scales at different time points postoperatively (n=40).*

	Group	15min	30 min	60 min
VRS	Group F	0.32 ± 0.05*	0.36 ± 0.06*	1.12 ± 0.18*
	Group D	0.31 ± 0.06*	0.39 ± 0.06*	0.35 ± 0.05#*
Ramsay	Group N	1.39 ± 0.10	1.38 ± 0.09	1.40 ± 0.11
	Group F	2.46 ± 0.45	2.20 ± 0.25	2.0 ± 0
	Group D	2.56 ± 0.31	2.33 ± 0.26	2.0 ± 0
BCS	Group N	2.52 ± 0.39	2.19 ± 0.22	2.0 ± 0
	Group F	3.42 ± 0.30	3.30 ± 0.52	3.33 ± 0.36
	Group D	3.47 ± 0.52	3.35 ± 0.45	3.34 ± 0.41
-	Group N	3.45 ± 0.44	3.39 ± 0.47	3.43 ± 0.38

Note: Compared with Group F, #P<0.05; compared with Group N, *P<0.05

No distinct body movement and groan was noted in Groups and F and D, without additional administration of propofol. However, four patients with mild body movement were noted in Group N at T2. No distinct adverse reaction, including nausea, vomiting, pallor, tinnitus, diplopia and dyspnea, was noted in the three groups of patients postoperatively.

Discussion

Cystoscopy is a gold standard for diagnosis of bladder tumor. However, conventional examination methods usually lead to distinct pain and thus perineal muscle contractions in patients, increasing the difficulty of examination, extending the examination time and aggravating the damage. Some patients still had pain and hematuria at 12-48 h following examination, and in severe cases, cardiocerebral events may be induced [9]. With the progress of science and technology and the improvement of people's living standards, requirements for medical technology are also growing increasingly. Thus, painless endoscopy is also essential.

Propofol is a novel intravenous anesthetic characterized by fast onset and rapid and complete analepsia. It is widely used in anesthesia of day surgery. However, due to lack of analgesic effect, such responses as limb activities occurred during the procedure can be inhibited in a case of a need to increase its dosage, but it is easy to result in respiratory depression and circulatory collapse [10]. To reduce the dose of propofol and obtain a satisfactory anesthetic effect, it is usually used in conjunction with fentanyl. However, an overdose of fentanyl has a marked effect on respiratory depression, and single-dose intravenous administration can maintain 30 to 60min only, with short-term analgesic effect [11]. Following drug withdrawal, phenomena including tachyphylaxis and dose and time-dependent hyperalgesia will occur. Dezocine is a novel opioid agonist/antagonist which agonizes at the kappa-opioid receptor but antagonizes at the mu-opioid receptor. Agonizing at the kappa-opioid receptor may result in spinal analgesia, mild sedation and respiratory depression, while antagonizing at the mu-opioid receptor may relax gastrointestinal smooth muscles and reduce nausea and vomiting. Dezocine has a strong analgesic effect, and its titer is comparable to morphine [12], with a mean terminal half-life of 2.4 h and a systematic mean clearance of 3.3 L (h.kg). It has a long duration of analgesia, which can last for 3 to 6 h. Dezocine has small respiratory depression, but has no respiratory depression at therapeutic dose in general [13].

This study showed no statistically significant difference in MAP, HR, SpO_2 and BIS at each time point between Groups F and D, suggesting that dezocine plus propofol in general anesthesia is safe and effective compared with fentanyl group. Relative to the Group N (propofol alone), at the time point T2 of cystoscopy, its MAP, HR and BIS increased and there were four patients with mild body movement, suggesting relatively light anesthesia with propofol alone and also verifying the argument that such responses as limb activities occurred during the procedure can be inhibited in a case of a need to increase the dosage. At the time of analepsia, MAP and HR were higher in Groups N and F than in Group D. This conforms to the short hold time of analgesia with fentanyl intravenously. Also, this is consistent with the study by Singh Bajwa SJ [11].

This study showed a marked decrease in the dose of propofol following co-administration with dezocine and fentanyl and no difference in patient's time of unconsciousness. Despite of longer postoperative time of arousal in the dezocine group than in the fentanyl group, all patients were alert and cooperative without dysphoria at 15 min postoperatively. From patients' postoperative pain and comfort scales, pain scales increased in patients of the fentanyl group at 1h postoperatively and no distinct pain was noted in patients in the dezocine group at each time point. This may likely be related to longer hold time of analepsia of dezocine.

In conclusion, the dezocine plus propofol in anesthesia of cystoscopy is worthy of clinical application because it shows a strong analgesic effect and fewer adverse reactions, with safety and reliability.

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