Dexmedetomidine for Sedation during Total Abdominal Hysterectomy under Spinal Anesthesia

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Abstract

Intravenous Dexmedetomidine is associated with stable cardiovascular profile and less associated with fear, anxiety and agitation. Spinal anesthesia (SA) offers many advantages over general anesthesia, like providing analgesia and muscle relaxation in a conscious and compliant patient and an uneventful postoperative recovery. But retained consciousness during surgery or patient awake causes fear, anxiety in perioperative period. The fear of surgery, the unfamiliar environment of operation room, the sight and sounds of sophisticated instruments, and the masked faces makes the patient panic. The intense sensory and motor block, continuous supine position and the inability to move the body also brings a feeling of discomfort and phobia in many patients. Thus, adequate sedation and control of stress, pain, fear and patient satisfaction are essential components during anesthesia. Sedation has been shown to increase patient satisfaction during regional anesthesia. I conclude that, during spinal anesthesia, IV supplementation of dexmedetomidine is more effective than midazolam infusion, as it provides longer duration of sensory and motor blockade and postoperative analgesia with minimal and similar side effects. It provides satisfactory arousable sedation without respiratory depression. Haemodynamic changes observed in our patients were very small and could be ignored. Patient remained stable haemodynamically throughout the intra-operative period. So dexmedetomidine seems to be a good choice for sedation in spinal anesthesia (SA).

Introduction

Hysterectomy is the most common major gynecological operation. Popular and common anaesthetic technique used for abdominal hysterectomy is spinal anaesthesia which is best to control intraoperative pain, excellent muscle relaxation with uneventful postoperative recovery. But intra-operatively the patients remain awake and anxious, ultimately hemodynamic stability could be changed momentarily. Thus, adequate sedation and control of stress, pain, fear are required for pleasant and smooth surgery. Many drugs are used like Benzodiazepines, Propofol and Narcotics to promote the sedation for their sedative and analgesic properties. But they are associated with cardiorespiratory depression. Intravenous midazolam, which is used most often in this situation, has sedative action, but doesn't have analgesic effect. Dexmedetomidine (DMT), a highly selective α_2-agonist, provides stable haemodynamic conditions, good quality of intra-operative analgesia, sedation and prolonged post-operative analgesia with minimal side effects. this study was to evaluate the effectiveness of Dexmedetomidine for sedation during total abdominal hysterectomy under spinal anesthesia.

Methods and methods

Sample was selected by random sampling in two groups distributed as- group D (dexmedetomidine), group M (midazolam). Sequence of study were pretesting of questionnaire, finalization of

questionnaire, sampling, consent talking, data collection with detailed history, physical examination etc. Sixty patients, classified by American Society of Anesthesiologists (ASA- I, II, listed for operative procedure under spinal anaesthesia were randomized by card method in two groups of 30 patients each. Subarachnoid (spinal) anaesthesia was performed in all patients with 0.5% hyperbaric bupivacaine intrathecally, at L3 - L4 interspinous spaces, with 25G Quinke's spinal needle. The patients in the first group (group D) was administrated with an intravenous loading dose of 0.5 μg.kg^{-1} dexmedetomidine and the second group (group M) administrated 0.04 μg.kg^{-1} midazolam via a syringe infusion. Changes of BP, pulse and any complication was recorded. All the information recorded in data collection sheet. All collected questionnaire checked very carefully to identify the error in the data.

Result

Table 3.1 *Age distribution of the patients (n=60)*

Age (years)	Number of patients		Total & Percentage	P value
	Group D *n(%)*	*Group M* *n(%)*		
<50	7(23.3%)	4(13.3%)	11(18.3%)	
50-60	19(63.3%)	21(70.0%)	40(66.6%)	
61-70	4(13.3%)	5(16.6%)	9(15.0%)	0.471^{ns}
Mean ± S.D.	53.3±11.5			

ns= not significant
P value reached from chi square test.

Table- 3.3: *Distribution of the study patients according to types of heart rate (n=60)*

Heart rate (beat/min)	Group D (n=30) Mean±SD	Group M (n=30) Mean±SD	P value
Baseline	93.1±8.2	90.2±7.3	0.184^{ns}
Range (min-max)	80-110	80-100	
5 minute after	93.7±9.4	92.9±7.1	0.231^{ns}
Range (min-max)	80-110	81-105	
10 minute after	94.2±7.8	96.9±7.4	0.206^{ns}
Range (min-max)	80-110	86-110	
15 minute after	102.2±6.3	105.5±6.0	0.182^{ns}
Range (min-max)	90-100	95-110	
30 minute after	93.5±9.1	100.4±9.1	0.008^{s}
Range (min-max)	80-115	89-120	
45 Minute after	87.7±17.7	103.0±8.9	0.001^{s}
Range (min-max)	45-110	90-120	
60 minute after	92.7±8.2	104.5±7.7	0.001^{s}
Range (min-max)	80-110	92-120	

s= significant, ns= not significant
P value reached from unpaired t-test.

At baseline, mean heart rate was found 90.2±7.3 beat/min in group M and 93.1±8.2 beat/min in group D. At 5 minute after, mean heart rate was 92.9±7.1 beat/min and 93.7±9.4 beat/min in group M and group D respectively. At 10 minute after, mean heart rate was found 96.9±7.4 beat/min in group M and 94.2±7.8 beat/min in group D. At 15 minute after, mean heart rate was found 105.5±6.0 beat/min in group M and 102.2±6.3 beat/min in group D. At 30 minute after mean heart rate was 100.4±9.1 beat/min and 93.5±9.1 beat/min in group M and group D respectively. At 45 minute, mean heart rate was 103.0±8.9 beat/min in group M and 87.7±17.7 beat/min in group D. At 60 minutes, mean heart rate was 104.5±7.7 beat/min and 92.7±8.2 beat/min in group M and group D respectively. At after 30 minute, 45 minute and 60 minute difference was statistically significant (p<0.05) between two groups

Table shows systolic blood pressure during follow up it was observed that at baseline, mean systolic BP was found 89.6±6.3 mmHg in group M and 84.3±5.0 mmHg in group D. At 5 minute after, mean systolic blood pressure was 92.5±6.8 mmHg and 81.4±9.2 mmHg in group M and group D respectively. At 10 minute after, mean systolic blood pressure was 95.3±7.1 mmHg in group M and 85.5±5.1 mmHg in group D. At 15 minute after, mean systolic blood pressure was 95.6±11.2 mmHg and 84.3±4.8 mmHg in group M and group D respectively. At 30 minute after, mean systolic BP was 97.9±4.7 mmHg in group M and 84.3±5.0 mmHg in group D. At 45 minute after, mean systolic blood pressure was 94.6±15.6 mmHg and 84.3±5.0 mmHg in group M and group D respectively. At 60 minutes after, mean systolic blood pressure was 59.6±6.0 mmHg in group M and 61.2±9.4 mmHg in group D. At 10, 15, 30 and 45 minute after difference was statistically significant (p<0.05) between two groups.

Table 3.4 *Distribution of the study patients according to types of systolic blood pressure (SBP) (n=60)*

Systolic BP (mmHg)	Group D (n=30) Mean±SD	Group M (n=30) Mean±SD	*P* value
Baseline	84.3±5.0	89.6±6.3	0.271[ns]
Range (min-max)	80-95	80-100	
5 minute after	81.4±9.2	92.5±6.8	0.083[ns]
Range (min-max)	62-95	80-105	
10 minute after	85.5±5.1	95.3±7.1	0.001[s]
Range (min-max)	80-110	86-110	
15 minute after	84.3±4.8	95.6±11.2	0.001[s]
Range (min-max)	80-95	85-110	
30 minute after	84.3±5.0	97.9±4.7	0.001[s]
Range (min-max)	80-95	45-105	
45 Minute after	84.3±5.0	94.6±15.6	0.002[s]
Range (min-max)	80-95	90-105	
60 minute after	61.2±9.4	59.6±6.0	0.467[ns]
Range (min-max)	80-95	45-110	

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Discussion

This prospective randomized double blind study was conducted in Department of Anaesthesia, Analgesia, Palliative & Intensive Care Medicine, Dhaka Medical College Hospital, Dhaka from 8th June 2017 to 7th December 2017. Total of 60 patients fulfilling inclusion/exclusion criteria were studied to determine the effectiveness between Dexmedetomidine and Midazolam in attenuation of haemodynamic stability and sedation during total abdominal hysterectomy under spinal Anesthesia. While studying the distribution of cases by age it was found that majority of the patients i.e. 66.6% (n=40) were between 50-60 years, mean age was found to 53.3±11.5 years. The difference was not statistically significant (p>0.05) between two groups.

Central neuraxial blockade is a widely used anesthetic procedure. However, may promote some type of discomfort caused by the procedure itself or by a prolonged perioperative period, requiring the simultaneous administration of hypnotic, sedative and amnesic drugs. Benzodiazepines, propofol and opioids have these properties and provide some comfort to patients. However, these agents may cause respiratory depression, with consequent hypercarbia and hypoxemia. A promising alternative to these drugs is the alpha$_2$-adrenergic agonists, which have excellent sedative and analgesic properties without respiratory depression.

Dexmedetomidine (D) is a á2 agonist, has anesthetic and analgesic-sparing property. I.V. dexmedetomidine significantly prolongs the duration of sensory and motor block of bupivacaine in spinal anesthesia. Dexmedetomidine provides an excellent sedation during surgery[10]. Various studies have demonstrated that intravenous infusion of dexmedetomidine prolongs the sensory and motor blockade with intrathecal bupivacaine. Its effects are readily reversible with atipamezole, an á-2 adrenoceptor antagonist. Potential desirable effects include decreased requirements of anesthetics and analgesics, a diminished sympathetic response to stress, and the potential for cardioprotective effects against myocardial ischemia with minimal effects on respiration[6].

In this study at baseline, mean heart rate was found 90.2±7.3 beat/min in group M and 93.1±8.2 beat/min in group D. At 5 minute after, mean heart rate was 92.9±7.1 beat/min and 93.7±9.4 beat/min in group M and group D respectively. At 30 minute after mean heart rate was 100.4±9.1 beat/min and 93.5±9.1 beat/min in group M and group D respectively. At 45 minute, mean heart rate was 103.0±8.9 beat/min in group M and 87.7±17.7 beat/min in group D. At 60 minutes, mean heart rate was 104.5±7.7 beat/min and 92.7±8.2 beat/min in group M and group D respectively. At after 30 minute, 45 minute and 60 minute difference was statistically significant (p<0.05) between two groups.

On evaluation of systolic blood pressure during follow up it was observed that at baseline, mean systolic BP was found 89.6±6.3 mmHg in group M and 84.3±5.0 mmHg in group D. At 10 minute after, mean systolic blood pressure was 95.3±7.1 mmHg in group M and 85.5±5.1 mmHg in group D. At 45 minute after, mean systolic blood pressure was 94.6±15.6 mmHg and 84.3±5.0 mmHg in group M and group D respectively. At 10, 15, 30 and 45 minute after difference was statistically significant (p<0.05) between two groups. Regarding diastolic blood pressure during follow up, after 15 minute, mean diastolic blood pressure was found 67.6±7.4 mmHg in group M and 61.5±9.7 mmHg in group D. After 45 minute, mean diastolic blood pressure was 66.0±6.8 mmHg in group M and 61.2±9.4 mmHg in group D. Which statistically significant (p<0.05) between two groups but other follow up were not significant (p>0.05) between two groups.

Conclusion

In this study, it was found that intravenous Dexmedetomidine is associated with stable cardiovascular profile and less associated with fear, anxiety and agitation.I conclude that, during spinal anesthesia, IV supplementation of dexmedetomidine is more effective than midazolam infusion, as it provides longer duration of sensory and motor blockade and postoperative analgesia with minimal and similar side effects.It provides satisfactory arousable sedation without respiratory depression. Haemodynamic changes observed in our patients were very small and could be ignored. Patient remained stable haemodynamically throughout the intra-operative period. So dexmedetomidine seems to be a good choice for sedation in spinal anesthesia (SA).

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