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A study of hemodynamics when different doses of dexmedetomidine is used with propofol as an inducing agent

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Abstract

Dexmedetomidine is a potent and highly selective α_2 adrenoreceptor agonist which was approved for clinical use in 1999 and recently introduced in India. It has all the above mentioned properties and can impart significant benefits in the peri-operative use. In spite of the multiple desirable effects of dexmedetomidine, bradycardia and hypotension remain clinically significant adverse effects. High doses of dexmedetomidine can result in a decreased heart rate and cardiac output, with a biphasic dose response relation for BP. High doses of dexmedetomidine can also be a cause of systemic and pulmonary hypertension.

Keywords: Hemodynamics, dexmedetomidine, propofol

Introduction

Dexmedetomidine is a potent and highly selective α_2 adrenoreceptor agonist which was approved for clinical use in 1999 and recently introduced in India. It has all the above mentioned properties and can impart significant benefits in the peri-operative use. In spite of the multiple desirable effects of dexmedetomidine, bradycardia and hypotension remain clinically significant adverse effects. High doses of dexmedetomidine can result in a decreased heart rate and cardiac output, with a biphasic dose response relation for BP. High doses of dexmedetomidine can also be a cause of systemic and pulmonary hypertension^[1]. Many studies have put an effort to find an answer. Some of them were, Mi and colleagues (1998) evaluated the changes in bispectral index (BIS) and hemodynamic changes to intubation during induction with propofol 30 mg/kg/hr or propofol and 2 μ g/kg fentanyl in twenty four patients. They found that hemodynamic responses to intubation were greater with propofol rather than combination of propofol and fentanyl. Post intubation systolic blood pressure, diastolic blood pressure and heart rate increased, compared with pre induction values, more with propofol. They concluded that fentanyl, 2 μ g/kg IV, blunted the hemodynamic responses to intubation, but failed to attenuate the arousal of cerebral cortical activity^[2]. Bloor et al. (1992) evaluated four doses of dexmedetomidine in male volunteers. They evaluated effects of 0.25 μ g/kg, 0.5 μ g/kg, 1 μ g/kg, 2 μ g/kg infusion and compared it with placebo. They studied hemodynamic responses, cardiac output changes, plasma catecholamine changes. Dexmedetomidine produced a maximum decrease in mean blood pressure at 60 minutes of 14%, 16%, 23%, and 27% for the 0.25, 0.5, 1.0, and 2.0 μ g/kg groups, respectively ($P < .05$). At 330 minutes mean blood pressure remained below baseline by 8% and 17% at the two largest doses ($P < .05$). The two largest doses produced a transient (peak at 3 minutes, lasting less than 11 minutes) increase in mean blood pressure (16 \pm 2.5 and 24 \pm 10 mmHg, 35 respectively) and reduced heart rate (22%). Even the lowest dose decreased catecholamine values immediately. These dexmedetomidine doses were well tolerated in the healthy volunteers^[3].

Aims and Objectives

To study the hemodynamics when different doses of dexmedetomidine is used with propofol as an inducing agent.

Materials and Methods

This study was done in the Department of Anesthesia in Shridevi Institute of Medical Sciences and Research Hospital, Tumkur.

This study was done using 60 patients. The study was done from July 2016 to June 2017.

They were divided into 4 groups

- Group A received 1 µg/kg of dexmedetomidine.
- Group B received 0.6 µg/kg of dexmedetomidine.
- Group C received 0.3 µg/kg of dexmedetomidine.
- Group D received 20 ml of normal saline.

Inclusion Criteria

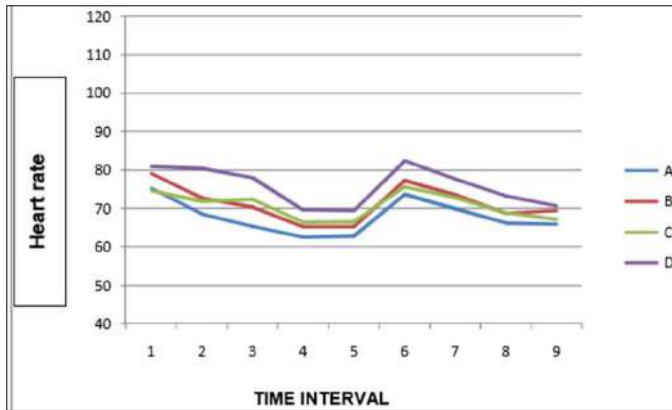
1. The patients were aged between 30-50 years
2. The patients had no co-morbidities

Exclusion Criteria

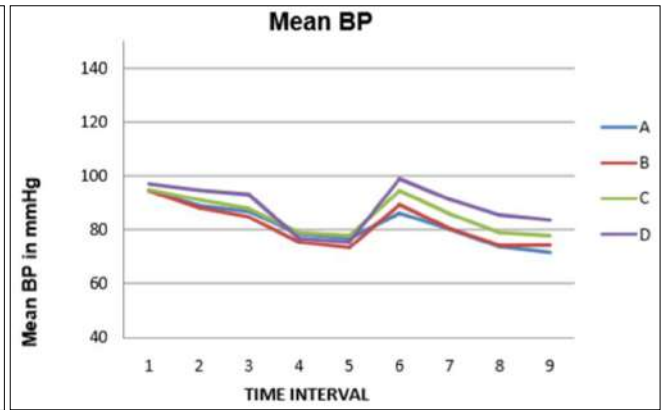
1. Aged below 30 and above 50 years
2. Patients with co-morbidities

All the statistics were done using the SPSS software 2015 (California)

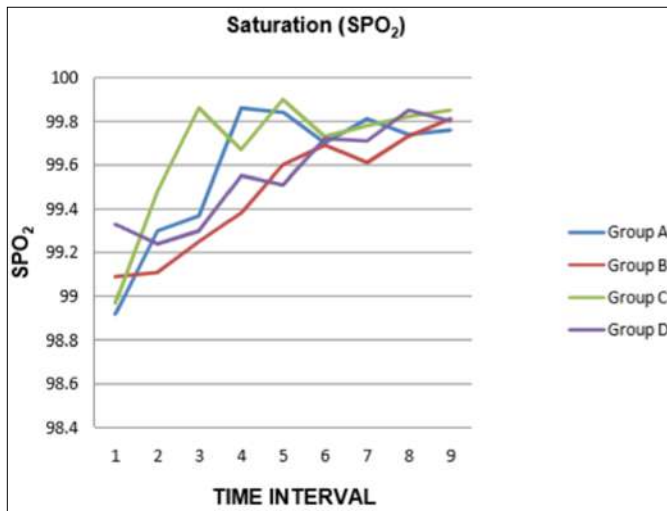
Results



Graph 1: Heart Rate



Graph 2: Mean Blood Pressure



Graph 3: Saturation

Note: Table 1

Key for time intervals

1. Baseline
2. 10 min post infusion
3. 20 min post infusion
4. Post intubation
5. Before intubation
6. 1 min post intubation
7. 2 min post intubation
8. 5 min post intubation
9. 10 min post intubation

Discussion

El-Gohary and coworkers 2010 compared the efficacy of dexmedetomidine and sodium nitroprusside (SNP) in scoliosis surgery as a hypotensive agent in forty patients.

They received either dexmedetomidine 1 µg/kg over before induction followed by 0.2–0.5 µg/kg/hour infusion during maintenance or sodium nitroprusside 1–10 µg/kg/minute infusion after induction of anaesthesia. The propofol dose required for induction of anaesthesia was significantly lower with dexmedetomidine (1.57 ± 0.27 mg/kg) group than in SNP group (2.28 ± 0.44 mg/kg). There was a statistically significant increase in the amount of blood loss and blood transfusion requirement in the SNP group compared to dexmedetomidine ($P < 0.01$). Dexmedetomidine administration resulted in significant reduction in mean arterial pressure, heart rate and cardiac index. During the steady state hypotension SNP group showed significant increase in heart rate and cardiac index compared to dexmedetomidine. They concluded that dexmedetomidine is an effective and safe agent for controlled hypotension. Compared with sodium nitroprusside, it reduced blood loss. In addition, it possesses inherent anaesthetic and analgesic effect [4]. Patel and co-workers (2012) evaluated the effects of intravenous infusion of dexmedetomidine on perioperative hemodynamic changes and postoperative recovery in sixty patients who received either fentanyl (2 µg/kg) or dexmedetomidine loading (1 µg/kg) and maintenance infusion (0.2–0.8 µg/kg/hour). Dexmedetomidine significantly attenuated stress response to 36 intubation with lesser increase in heart rate (10% vs. 17%), systolic blood pressure (6% vs. 23%) and diastolic blood pressure (7% vs. 20%). Dexmedetomidine was associated with significant sedation 2 hours post operatively as compared to the control group. They concluded that dexmedetomidine attenuates stress responses during surgery and maintains the haemodynamic stability. The sedative action of dexmedetomidine delays recovery for the first few hours post extubation [5]. Lee and associates (2012) compared the effects of dexmedetomidine and remifentanyl

used in anaesthetic induction on hemodynamic changes on direct laryngoscopy and intubation in 90 patients. They received either normal saline or dexmedetomidine 1 µg/kg or remifentanyl 1 µg/kg. Anaesthesia was induced with propofol. The heart rate in dexmedetomidine group was significantly lower than other groups 4 minutes after the infusion of dexmedetomidine to immediately before endotracheal intubation. After the intubation, the heart rate in control group remained significantly high compared to the other groups ($P < 0.05$). There were no significant differences between remifentanyl and dexmedetomidine groups post intubation in terms of heart rate. The increase in systolic and diastolic BP due to tracheal intubation with dexmedetomidine and remifentanyl was significantly lower than control group C ($P < 0.05$)^[6, 7].

Conclusion

We conclude that 1 µg/kg and 0.6 µg/kg of dexmedetomidine offer desirable hemodynamics.

References

1. Arcangeli A, Alo D, Gaspari C Dexmedetomidine R. Use in General Anaesthesia. *Curr Drug Targets* 2009;10(8):687-95.
2. Mi WD, Sakai T, Takahashi S, Matsuki A. Haemodynamic and electroencephalograph responses to intubation during induction with propofol or propofol/fentanyl. *Can J Anaesth* 1998;45(1):19-22.
3. Bloor BC, Ward DS, Belleville JP, Maze M. Effects of intravenous dexmedetomidine in humans. II. Hemodynamic changes. *Anesthesiology* 1992;77(6):1134-1142.
4. El-Gohary MM, Arafa A. S Dexmedetomidine as a hypotensive agent: Efficacy and hemodynamic response during spinal surgery for idiopathic 130 scoliosis in adolescents. *Egyptian Journal of Anaesthesia* 2010;26:305-311.
5. Patel CR, Engineer SR, Shah BJ, Madhu S. Effect of intravenous infusion of dexmedetomidine on perioperative haemodynamic changes and postoperative recovery: A study with entropy analysis *Nidan J Anaesth* 2012;56(6):542-6.
6. Lee JH, Kim H, Kim HT, Kim MH, Cho K, Lim SH *et al.* Comparison of dexmedetomidine and remifentanyl for attenuation of hemodynamic responses to laryngoscopy and tracheal intubation. *Korean J Anesthesiol* 2012;63(2):124-9.
7. Shams T, El Bahnasawe NS, Abu-Samra M, El-Masry R Induced hypotension for functional endoscopic sinus surgery: A comparative study of dexmedetomidine versus esmolol. *Saudi J Anaesth* 2013;7(2):175-80.