



Use of Dexmedetomidine as an Adjunct to Pain Control Following OPCAB: A Randomized, Double-Blind Study

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Objectives

Determine whether use of dexmedetomidine leads to improved clinical outcomes in immediately extubated, post-operative off-pump coronary artery bypass (OPCAB) patients

Patients and Methods

- 24 patients were prospectively randomized in a double-blind fashion and scheduled for elective/urgent OPCAB.
- All caregivers were blinded to treatment arm.
- Patients who were previously selected for epidural analgesia or who had elevated serum creatinine levels were excluded.
- Fifteen minutes prior to extubation, patients were randomly selected for one of two groups:
 - Group 1 (n=12) received an 18 hour infusion of dexmedetomidine 0.2 to 0.7 µg/kg/hr
 - Group 2 (n=12) received an 18 hour infusion of normal saline.

All patients received a standard anesthetic.

| Induction | Maintenance |
|----------------------|---------------------------------------|
| Sufentanil 15-20 µg | Sufentanil 10-15 µg/hr |
| Propofol 50-100 mg | Desflurane titrated to a BIS of 50-60 |
| Vecuronium 0.1 mg/kg | Vecuronium titrated to 1/4 twitch |

- All patients were extubated in the operating room.
- For post-operative pain management, patients received ketorolac 30 mg followed by 15 mg IV every 6 hours for 6 doses. 15 minutes prior to extubation, the study infusion was begun at a dosage of 0.5 µg/kg/hr.
- The study drug was adjusted within the range of 0.2 to 0.7 µg/kg/hr to achieve a visual analog scale (VAS) value < 40 on a 100 mm scale. Breakthrough pain was treated with morphine 2 mg every 5 minutes until the VAS was < 40.
- Clinical monitoring recorded every 2 hours for 18 hours post-operatively
 - Hemodynamic values
 - Incentive spirometry volumes
 - Visual analog scale pain ratings
 - Activity and anxiety levels.
- Results are reported as mean ± standard deviation. Student's t-test was used to test the difference in means between the two groups. Paired t-tests were used to evaluate changes across time intervals.

Preoperative Characteristics by Treatment Group

| Risk Factor | Treatment Group N (%) | Control Group N (%) |
|----------------------------|--------------------------|------------------------|
| Diabetes | 6 (50.0) | 2 (16.7) |
| Chronic Lung Disease | 2 (16.7) | 1 (8.3) |
| Prior CAB | 2 (16.7) | 1 (8.3) |
| Previous MI | 4 (33.3) | 2 (16.7) |
| Congestive Heart Failure | 1 (8.3) | 2 (16.7) |
| Number of Diseased Vessels | | |
| One | 1 (8.3) | 0 |
| Two | 2 (16.7) | 2 (16.7) |
| Three | 9 (75.0) | 10 (83.3) |
| Surgical Priority | | |
| Elective | 8 (66.7) | 7 (58.3) |
| Urgent | 4 (33.3) | 5 (41.7) |

No difference in preoperative risk factors by treatment group

Postoperative Complications by Treatment Group

| Complication | Treatment Group N (%) | Control Group N (%) |
|--------------------------|--------------------------|------------------------|
| Blood transfusion | 2 (16.7) | 3 (25.0) |
| Reoperation for bleeding | 0 | 1 (8.3) |
| Perioperative MI | 0 | 1 (8.3) |
| Prolonged ventilation | 0 | 1 (8.3) |
| Tamponade | 0 | 1 (8.3) |
| Atrial fibrillation | 1 (8.3) | 3 (25.0) |
| Mortality | 0 | 1 (8.3) |

No difference in postoperative complications by treatment group

Limitations

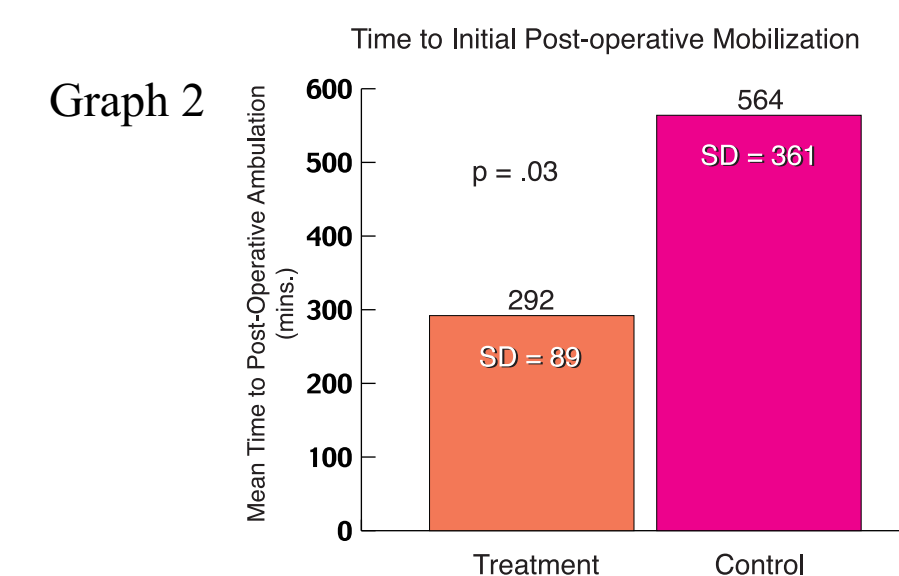
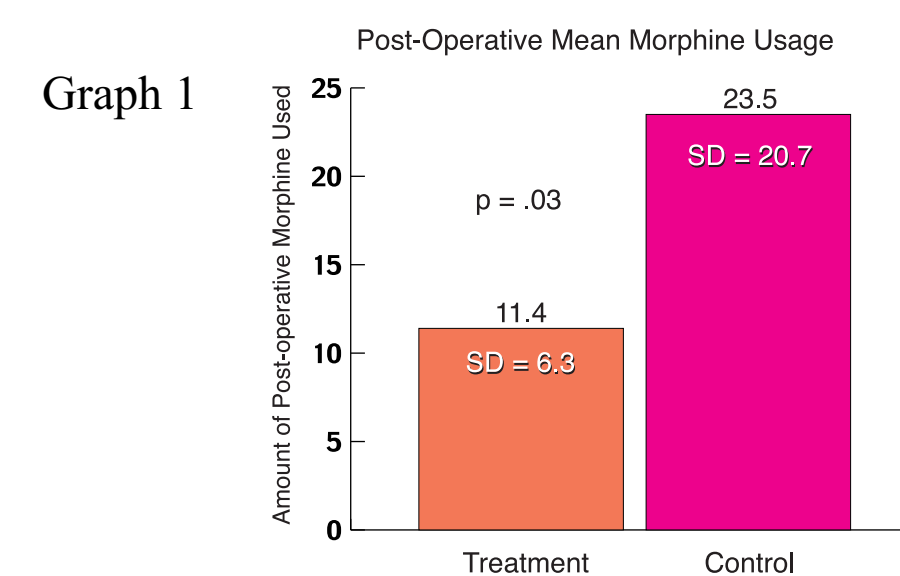
- Limited number of subjects
- By chance, all women were in the control group

Conclusion

- Dexmedetomidine is a safe and effective adjunct to post-operative analgesia, reducing narcotic usage, maintaining hemodynamic stability, and facilitating earlier post-operative mobilization.

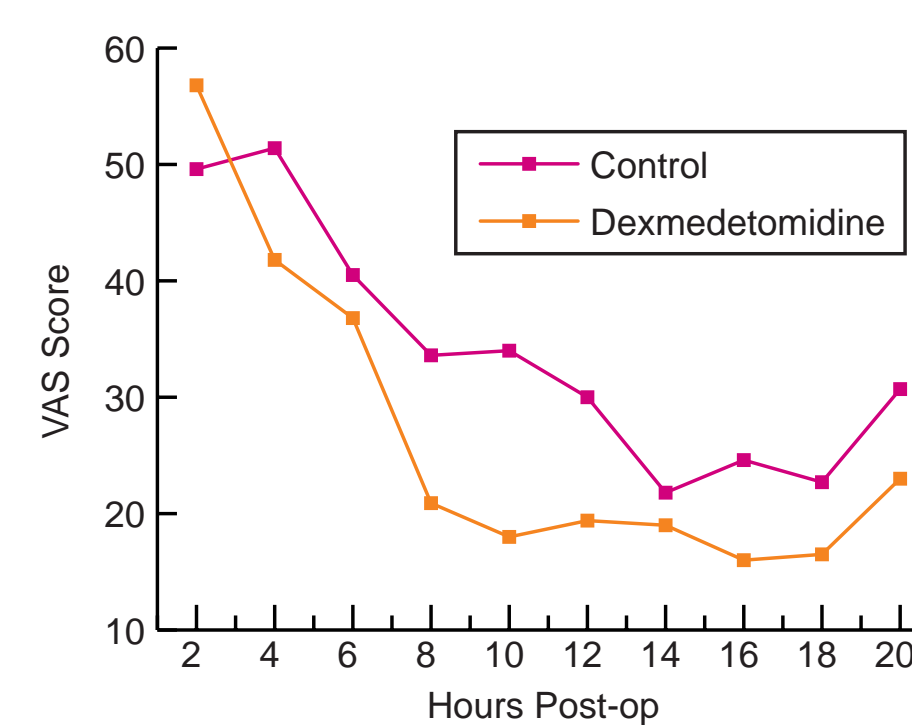
Results

- Mean narcotic use was 2.1 times greater in the placebo group (23.5 ± 20.7 mg) compared to the treatment group (11.4 ± 6.3 mg; p=0.03) *Graph 1*



- Time to post-operative mobilization was reduced significantly in the treatment group (292 ± 89 min) compared to the control group (564 ± 361 min; p=0.03). *Graph 2*
- Time to achieve adequate pain control (VAS rating <35) was more rapid in the treatment group (6 hours vs. 8 hours). Although morphine doses were available on demand to all patients, those in the treatment group reported less pain at all time points.

Mean Pain Ratings



- There were no significant changes in heart rate, blood pressure, pulmonary artery pressure, central venous pressure, cardiac output, or systemic oxygen saturation in either group. When the hemodynamic data was analyzed by subject, no significant changes could be detected.
- Sub-group analysis by diabetes status showed no significant effect on drug use or VAS scores.

ABSTRACT: Use of Dexmedetomidine as an Adjunct to Pain Control Following OPCAB: A Randomized, Double-Blind Study

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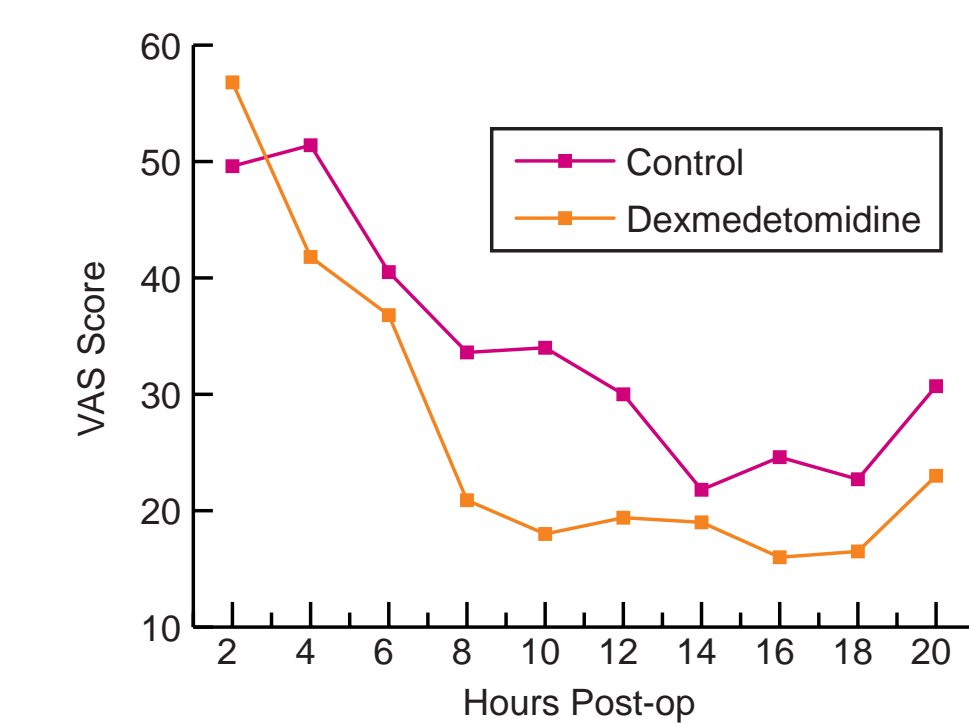
Objectives: The purpose of this study was to determine whether use of dexmedetomidine leads to improved clinical outcomes in immediately extubated, post-operative off-pump coronary artery bypass (OPCAB) patients.

Patients and Methods: 24 patients scheduled for elective OPCAB consented to participate in the study. Patients who were previously selected for epidural analgesia or who had elevated serum creatinine levels were excluded. Fifteen minutes prior to extubation, patients were prospectively randomized in a double-blind fashion into one of two groups: Group 1 (n=12) received an 18 hour infusion of dexmedetomidine 0.2 to 0.7 µg/kg/hr. Group 2 (n=12) received an 18 hour infusion of normal saline. All patients received a standard anesthetic consisting of propofol, sufentanil, vecuronim, and desflurane. Post-operative pain was managed with ketorolac and morphine. Total morphine use was recorded. Hemodynamic monitoring, incentive spirometry volumes, visual analog scale pain ratings, activity, and anxiety levels were recorded every 2 hours for 18 hours post-operatively. Results are reported as mean ± standard deviation. Student's t-test was used to test the difference in means between the two groups. Paired t-tests were used to evaluate changes across time intervals.

Results: Mean narcotic use was 2.1 times greater in the placebo group (23.5 ± 20.7 mg) compared to the treatment group (11.4 ± 6.3 mg; p=.03). Time to achieving adequate pain control (VAS rating <35) was more rapid in the treatment group (6 hours vs. 8 hours). Although morphine doses were available on demand to all patients, those in the treatment group reported less pain at all time points. Patients in the treatment group were out of bed earlier (564 ± 361 vs. 292 ± 89 minutes; p=.03). There were no significant changes in heart rate, blood pressure, pulmonary artery pressure, central venous pressure, cardiac output, or systemic oxygen saturation in either group. When hemodynamic data were analyzed by subject, no significant changes could be detected.

Conclusion: Dexmedetomidine provides effective post-operative pain control without untoward hemodynamic changes in immediately extubated OPCAB patients. Superior pain control can be achieved with minimal doses of narcotics.

Mean Pain Ratings



Demographics of Patient Population

| | All Patients | Treatment Group | Control Group |
|----------------------------|--------------|-----------------|---------------|
| Number of Patients | 24 | 12 | 12 |
| Mean Age | 64.70 | 62.75 | 66.67 |
| Age Range | 38 – 82 | 38 - 82 | 52 - 76 |
| Mean STS Risk of Mortality | 1.91% | 2.00% | 1.81% |
| Gender-Females | 4 (16.7%) | 0 | 4 (33.3%) |
| Gender-Males | 20 (83.3%) | 12 (100%) | 8 (66.7%) |