Effect of intraoperative use of dexmedetomidine on anesthetic requirements and time to tracheal extubation in elective adult heart surgery patients. A retrospective cohort study

C Afanador, L Marulanda, G Torres, A Marín, C Vidal, G Silva

Citation


Abstract

Background and Objectives: Scientific literature about the effects of intraoperative use of dexmedetomidine on anesthetic requirements and time to tracheal extubation in elective adult heart surgery patients is limited. Methods: A retrospective cohort study in adult patients who underwent uncomplicated elective heart surgery was performed. 103 adult patients who received intraoperative dexmedetomidine (DEX cohort) were matched with 97 patients who did not receive intraoperative dexmedetomidine (control cohort). Matching by age, gender and type of heart surgery was done. Intraoperative requirements of anesthetics, tracheal extubation in the operating room and time to tracheal extubation in the ICU were extracted from their medical charts. Results: Both cohorts had similar demographic and preoperative characteristics. DEX cohort received smaller intraoperative anesthetic doses of fentanyl (3.2 mg/kg ± 1.3 vs control 12.5 mg/kg ± 5.9, p= 0.0001), thiopental (3.4 mg/kg ± 1.5 vs control 4.0 mg/kg ± 1.6, p= 0.018), and pancuronium (6.5 mg ± 2.3 vs control 8.0 mg ± 1.8, p= 0.0001). Frequency of intraoperative use of thiopental was low in DEX cohort patients compared with control group (81.6 % vs control 97.9%, p= 0.0001), as midazolam (22.3 % vs control 67%, p= 0.0001) and pancuronium (47.6 % vs control 98%, p= 0.0001). Time to tracheal extubation was shorter in DEX cohort (197 ± 118 min vs control 314 ± 265 min, p= 0.002). Tracheal extubation in the operating room was more frequent in the DEX cohort (46.6% vs control 9.3%, p= 0.0001). Postoperative hospital and UCI lengths of stay were similar in both cohorts.Conclusions: Intraoperative use of dexmedetomidine as coadjuvant of fentanyl-isoflurane based anesthesia for elective heart surgery in adult patients could reduce anesthetic requirements and facilitate early postoperative tracheal extubation.

INTRODUCTION

Dexmedetomidine is an α2-agonist approved in 1999 by FDA for sedation in adult patients in the ICU setting. Previous clinical trials in non-cardiac surgery demonstrate how the use of dexmedetomidine reduces requirements of endovenous and inhalational anesthetic agents, provides intraoperative hemodynamic stability and reduces the requirements of postoperative opioid analgesics (1-6). The use of dexmedetomidine in the ICU , where it could facilitate weaning from mechanical ventilation and improve quality of sedation and pain control for postoperative sedation in patients following cardiac surgery has been described in multiple clinical trials (7-10). However, there is limited information about the intraoperative use of dexmedetomidine in cardiac surgery as a coadjuvant of the anesthetic technique.

In 2003, our cardiovascular anesthesia department introduced progressively dexmedetomidine as part of the anesthetic technique in elective adult heart surgery. Based on this initial experience we designed a retrospective cohort study to describe the effects of intraoperative use of dexmedetomidine on anesthetic requirements, postoperative analgesic and sedative requirements, and the time to tracheal extubation. ICU length of stay and postoperative hospital length of stay were also studied. Indirectly, we also studied the effect of dexmedetomidine on postoperative inflammatory response.

METHODS

A retrospective cohort study was approved by Institutional
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Review Board in Fundación Valle del Lili.

From the institutional cardiac surgery database, adult patients, who underwent heart surgery between January 1, 2004 and December 31, 2006, were identified. These medical records were reviewed by the authors for study eligibility and following inclusion criteria: 1) elective procedure, 2) older than 18 years, 3) left ventricular ejection fraction (LVEF) ≥ 45%, and 4) no surgical complication leading to reintervention or prolonged mechanical ventilation.

PATIENTS SELECTION

Dexmedetomidine cohort: Intraoperative use of dexmedetomidine was identified in 103 patients who meet the inclusion criteria (DEX cohort).

Control cohort: Using the same database and inclusion criteria the 103 patients in the dexmedetomidine cohort were matched for gender, age and type of surgery performed with 97 patients who did not use intraoperative dexmedetomidine (1:1 ratio aprox.).

USUAL ANESTHESIA TECHNIQUE

This is a brief description of a typical anesthetic technique for adult heart surgery at Fundación Valle del Lili: all anesthetic agents are administered at discretion of the anesthesiologist in charge of the case. Midazolam 7.5 mg per oral route is the most common premedication agent administered the night before surgery. Anesthesia induction is provided typically with the use of fentanyl and thiopental and/or midazolam. Pancuronium, rocuronium and succinylcholine are the neuromuscular relaxants available for tracheal intubation. Anesthesia is maintained with continuous inhaled isoflurane and fentanyl boluses as required. At the end of surgery, anesthesiologists are autonomous to decide to extubate or not the patient’s trachea in the operating room. Morphine is the opioid analgesic usually administered for transitional analgesia before transferring the patient to the ICU.

When used, dexmedetomidine 1 µg/kg was administered by i.v. infusion in ten minutes with the induction of anesthesia and maintained at 0.5 µg·kg⁻¹·h⁻¹ until the end of surgery.

ICU CARE

Management of patients in the ICU is directed by intensivist physicians based on their protocols of pain control, sedation and mechanical ventilation weaning.

DATA AND STATISTICAL ANALYSIS

A Case Report Form (CRF) was filled for each included patient with the following data extracted from the medical chart:

- Demographics: Gender, age, weight, cardiovascular disease that indicated the surgery, left ventricular ejection fraction (LVEF) % and use of beta-blockers.

- Preoperative information: Premedication, serum creatinine, and leukocyte count.

- Surgical information: Surgical procedure performed, aortic clamp time (if applicable), CPB time (if applicable), surgical time and anesthetic time.

- Anesthesia technique: Bolus dose and maintenance dose of dexmedetomidine (if applicable), use and total intraoperative doses of fentanyl, midazolam, thiopental, neuromuscular relaxants and morphine. Tracheal extubation (if applicable).

- UCI information: Sedative drugs used, sedation time, time to tracheal extubation, morphine doses at 24 and 48 hours after arrival to ICU, length of stay in ICU, leukocyte count at arrival and 24 h after.

- Postoperative information: Postoperative length of stay in the hospital.

Statistical analysis: Data was collected in a web based database on a platform MySQL (Hughes Technologies, Australia). Values are expressed as mean ± SD and 95% confidence intervals, median and interquartile range or proportions for continuous or categorical variables respectively. A bivariate analysis was performed with χ² or Fisher’s exact tests in categorical variables or Student’s t test or rank sum test in continuous variables for samples matched. A p value < 0.05 was considered as significant statistically.

RESULTS

- Demographic characteristics: Gender, age, weight, cardiovascular disease that indicate the surgery, LVEF % and use of beta-blockers were similar in both cohorts (table1).

- Preoperative information: both cohorts had a similar rate of premedication. There were no significant differences in the preoperative values of serum creatinine and leukocyte count (table 1).
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Table 1. Patient characteristics

<table>
<thead>
<tr>
<th></th>
<th>DEX cohort</th>
<th>Control cohort</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male %</td>
<td>78.6</td>
<td>76.3</td>
<td>0.69</td>
</tr>
<tr>
<td>Age (years)</td>
<td>60.6 ± 12.5</td>
<td>60.7 ± 11.6</td>
<td>0.94</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>70.2 ± 13.6</td>
<td>88.8 ± 11.5</td>
<td>0.38</td>
</tr>
<tr>
<td>CVDIS (%)</td>
<td>78.7</td>
<td>74</td>
<td>0.65</td>
</tr>
<tr>
<td>CAD</td>
<td>28.4</td>
<td>28.1</td>
<td>0.96</td>
</tr>
<tr>
<td>Valvulopathy</td>
<td>2.0</td>
<td>5.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Anrythmia</td>
<td>3.0</td>
<td>4.2</td>
<td>0.64</td>
</tr>
<tr>
<td>CHD</td>
<td>0</td>
<td>3.0</td>
<td>0.05</td>
</tr>
<tr>
<td>Vasculopathy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LVEF (%)</td>
<td>56.7 ± 7.9</td>
<td>54.6 ± 8.1</td>
<td>0.24</td>
</tr>
<tr>
<td>B-blockers (%)</td>
<td>62.1</td>
<td>68</td>
<td>0.68</td>
</tr>
<tr>
<td>Premedication (%)</td>
<td>11.7</td>
<td>12.4</td>
<td>0.87</td>
</tr>
<tr>
<td>Serum creatinine (mg/dl)</td>
<td>1.04 ± 0.22</td>
<td>1.08 ± 0.22</td>
<td>0.2</td>
</tr>
<tr>
<td>Leukocyte count (x 10^9)</td>
<td>8.1 ± 0.49</td>
<td>7.4 ± 2</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Data are mean ± SD. CVDIS = cardiovascular disease that indicated the surgery; CAD = coronary artery disease; CHD = congenital heart disease; LVEF = left ventricular ejection fraction.

Table 2. Surgical information

<table>
<thead>
<tr>
<th></th>
<th>DEX cohort</th>
<th>Control cohort</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery performed (%)</td>
<td>30</td>
<td>27.8</td>
<td>0.7</td>
</tr>
<tr>
<td>On pump CABG</td>
<td>47.6</td>
<td>47.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Off pump CABG</td>
<td>26.2</td>
<td>26.8</td>
<td>0.67</td>
</tr>
<tr>
<td>Valve replacement</td>
<td>3.0</td>
<td>1.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Valvuloplasty</td>
<td>2.0</td>
<td>2.1</td>
<td>0.95</td>
</tr>
<tr>
<td>Anrythmia surgery</td>
<td>2.9</td>
<td>4.1</td>
<td>0.64</td>
</tr>
<tr>
<td>CHD correction</td>
<td>2.9</td>
<td>4.1</td>
<td>0.64</td>
</tr>
<tr>
<td>Major Vascular Surgery</td>
<td>2.9</td>
<td>4.1</td>
<td>0.64</td>
</tr>
<tr>
<td>Aortic clamp time</td>
<td>60.7 ± 29.1</td>
<td>56.5 ± 31.3</td>
<td>0.88</td>
</tr>
<tr>
<td>CPB time</td>
<td>88.3 ± 33.1</td>
<td>84.4 ± 34.6</td>
<td>0.5</td>
</tr>
<tr>
<td>Surgical time</td>
<td>206.1 ± 45.8</td>
<td>190.6 ± 45.4</td>
<td>0.019</td>
</tr>
<tr>
<td>Anesthetic time</td>
<td>263.3 ± 47.1</td>
<td>251.1 ± 48.7</td>
<td>0.03</td>
</tr>
</tbody>
</table>

- Anesthesia technique: All DEX cohort patients received an initial i.v. bolus dose of 1 μg/kg in 10 minutes of dexmedetomidine followed by a continuous i.v. infusion of 0.5 μg.kg⁻¹.h⁻¹ until the end of surgery. All patients received intraoperative fentanyl. DEX cohort had a smaller fentanyl requirement compared with control cohort (3.2 ± 1.3 μg/kg; 95% confidence interval [CI], 2.9 – 3.4 μg/kg vs 12.5 ± 5.9 μg/kg, 95% CI, 11.3 – 13.7 μg/kg, p = 0.0001). Less patients in the DEX cohort received thiopental with respect to control cohort, and the thiopental dose in the DEX cohort was smaller versus control cohort. Less patients in the DEX cohort received midazolam with respect to control cohort, although the dose of midazolam used was similar in both cohorts. Less patients in the DEX cohort received neuromuscular relaxants compared with control cohort. The pancuronium dose used in DEX cohort was smaller versus control cohort. More patients in the DEX cohort received succinylcholine compared with control cohort. Both cohorts had a similar percent of patients that received morphine, however, in the DEX cohort the morphine dose was smaller than control cohort. More patients in the DEX cohort were extubated in the operating room (46.6%; 95% CI, 36.3 – 55.6 % vs control cohort 9.3%; 95% CI, 3.5 – 15.1 %, p = 0.0001) (table 3).
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Figure 3
Table 3. Anesthetic technique

<table>
<thead>
<tr>
<th>Drug Use (%)</th>
<th>DEX cohort</th>
<th>Control cohort</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fentanyl</td>
<td>100</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>Thiopental</td>
<td>81.6 (74.5-89.4)</td>
<td>97.9 (94.9-100)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Midazolam</td>
<td>22.3 (18-30.04)</td>
<td>67 (56.7-76.4)</td>
<td>0.2</td>
</tr>
<tr>
<td>Morphine</td>
<td>25.2 (16.6-33.4)</td>
<td>17.7 (10.4-25.7)</td>
<td>0.2</td>
</tr>
<tr>
<td>Pancuronium</td>
<td>47.6 (38.3-57.7)</td>
<td>98 (95.2-100)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Succinylcholine</td>
<td>4.9</td>
<td>0</td>
<td>0.2</td>
</tr>
<tr>
<td>Dose used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fentanyl (µg/kg)</td>
<td>3.2 ± 1.3 (2.9-3.4)</td>
<td>12.5 ± 5.9 (11.3-13.7)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Thiopental (mg/kg)</td>
<td>3.4 ± 1.5 (3.0-3.7)</td>
<td>4.0 ± 1.6 (3.6-4.3)</td>
<td>0.018</td>
</tr>
<tr>
<td>Midazolam (mg/kg)</td>
<td>3.3 ± 1.5</td>
<td>3.7 ± 1.7</td>
<td>0.4</td>
</tr>
<tr>
<td>Morphine (µg/kg)</td>
<td>30 ± 20 (33.2-54.11)</td>
<td>56 ± 47 (44.4-117.6)</td>
<td>0.025</td>
</tr>
<tr>
<td>Pancuronium (mg/kg)</td>
<td>0.086 ± 0.026</td>
<td>0.11 ± 0.024</td>
<td>0.0001</td>
</tr>
<tr>
<td>Succinylcholine (mg/kg)</td>
<td>42 ± 35.6</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tracheal extubation in the operating room (%)</td>
<td>46.6 (58.3-55.6)</td>
<td>9.3 (3.5-15.1)</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

ICU and postoperative information: There was no significant difference between cohorts with respect to the use of sedative agents. The most used sedative agent in the DEX cohort was dexmedetomidine, and midazolam was the most used in the control cohort. Both DEX and control cohort had an small fraction of patients in whom fentanyl was used in the ICU. Mean sedation time in the ICU was similar in both cohorts. Time to tracheal extubation in DEX cohort was shorter with respect to control cohort (197 min ± 118; 95% CI 163 – 230 min vs 314 min ± 265; 95% CI 258 – 370 min, p = 0.002). Requirement of morphine during first 24 and 48 postoperative hours was similar in both cohorts. Length of stay in the ICU was similar in both cohorts. Postoperative length of stay in the hospital was similar in both cohorts.

DISCUSSION

EFFECT OF DEXMEDETOMIDINE ON ANESTHETIC REQUIREMENTS

In this study the intraoperative use of dexmedetomidine

Figure 4
Table 4. ICU and postoperative information
Effect of intraoperative use of dexmedetomidine on anesthetic requirements and time to tracheal extubation in elective adult heart surgery patients. A retrospective cohort study

allowed a significant reduction in the anesthetic requirements. Mean dose of fentanyl was reduced from 12.5 μg/kg to 3.2 μg/kg, equivalent to a 74% reduction in the requirement. Clinical research about the use of dexmedetomidine in anesthesia for heart surgery is scarce, difficulting results comparison. In 1997 Jalonen et al. administered an 1.5 μg/kg i.v. bolus of dexmedetomidine followed by continuous i.v. infusion of 0.42 μg.kg⁻¹.h⁻¹ to evaluate the intraoperative hemodynamic behavior in patients who underwent CABG. The use of dexmedetomidine reduced supplementary fentanyl boluses. However, the initial induction dose of fentanyl in both groups was high (30 μg/kg) (11). In 2006, Briones et al. described the use of dexmedetomidine in patients who underwent CABG surgery in a non-randomized study. Dexmedetomidine was administered by i.v. bolus dose of 0.1 μg/kg in 10 minutes before anesthesia induction and followed by an 0.5 μg.kg⁻¹.h⁻¹ i.v. infusion. That study showed a total reduction in the fentanyl dose of 48%, but the mean dose of fentanyl in the control group was high (9.3 μg.kg⁻¹.h⁻¹) and the time to tracheal extubation was not registered(12). In 2006, Vargas et al. described, in a prospective non-randomized study, how the intraoperative use of dexmedetomidine with continuous i.v. infusion between 0.3 – 0.5 μg.kg⁻¹.h⁻¹ attenuated the hypertensive intraoperative response to surgical stimuli. Again, total dose of fentanyl was high (47 μg/kg) in control and treated groups, and no difference in the time to tracheal extubation was found (6.8 hours in the dexmedetomidine group vs 8.2 hours in the no-dexmedetomidine group) (13).

During last two decades the new anesthetic techniques for heart surgery had reduced fentanyl doses to facilitate a faster postoperative weaning from mechanical ventilation (fast-track techniques). In the current study, mean total dose of fentanyl in the control cohort was 12.3 μg/kg, which is comparable with total doses reported with fast-track balanced techniques with an inhalational agent (between 5 and 15 μg/kg) (14-30). Our study also found that intraoperative use of dexmedetomidine reduced the total dose of thiopental, from 3.9 mg/kg to 3.3 mg/kg. This reduction, however, probably has no clinical relevance. Although thiopental doses were similar between cohorts, less patients in the DEX cohort received thiopental. Something similar happened with the intraoperative use of midazolam. This finding could be explained by the sedative effect of dexmedetomidine, which could allow to induce hypnosis with a reduction in thiopental or midazolam doses, but also making possible to co-induce hypnosis with an inhalational agent, without using thiopental or midazolam.

Another important finding in this study was that less patients received neuromuscular relaxants in the dexmedetomidine cohort. Use of neuromuscular relaxants in heart surgery was considered for anesthesiologists a must in a survey in USA (31), and the discussion has been focused on the specific agent to be used, favoring those with intermediate-acting agents like rocuronium, cisatracurium and atracurium (32). No use of neuromuscular relaxants during heart surgery has been described in fast-track anesthesia techniques (33), considering that once the trachea is intubated, immobility is provided by general anesthesia (34).

With respect to the reduced requirement of morphine for transitional analgesia in patients in the dexmedetomidine cohort, we have to annotate that our usual dose of 50 μg/kg prolonged the wake up time when dexmedetomidine was used intraoperatively, reducing the probability to extubate the trachea in the operating room. That finding leaded us to reduce morphine dose. Morhine requirement during the first and second postoperative day was similar in both cohorts. Pain control management in our ICU is not based on the use of validated scales of pain, but just for the physical or verbal pain expressions of each patient and for the free interpretation given by the nurse. Postoperative use of dexmedetomidine in heart surgery patients has been shown to reduce opioid analgesic doses (35). The fact that most patients in dexmedetomidine cohort did not receive dexmedetomidine in the ICU could explain why postoperative morphine requirement was similar in both cohorts. In that sense it would be interesting to have continued dexmedetomidine administraton in the ICU. Most patients in this study did not receive postoperative sedation because our UCI policy for heart surgery patients to limit its use in order to facilitate an early tracheal extubation.

**EFFECT OF DEXMEDETOMIDINE TIME TO TRACHEAL EXTUBATION**

Tracheal extubation in the operating room was more frequent in dexmedetomidine cohort patients. The time to tracheal extubation in the operating room was about 15 to 20 minutes. This time was estimated by the existent difference between the anesthetic times of cohorts. Since this is not a prospective randomized study, it is relevant to annotate that the significative difference in the percentage of patients whose tracheas were extubated in the operating room could not be explained totally by the use of dexmedetomidine or
The reduction in the use of other anesthetics or neuromuscular relaxants, because it is not clear how the anesthesiologist in each case took the decision to extubate or not the trachea in the operating room.

One goal of fast-track anesthesia techniques is to extubate patients within 1-6 hours after arrival to ICU (36,37). In our study, dexmedetomidine treated patients had shorter tracheal extubation time in the ICU and the mean time to tracheal extubation was less than 6 hours. Weaning from mechanical ventilation of patients in this study was conducted by intensivist physicians according to their policies with no predefined intention to treat based on the use of intraoperative dexmedetomidine, so it is possible that the difference in time to tracheal extubation between cohorts in the ICU could be explained at some degree by the intraoperative exposition to dexmedetomidine.

Fast-track anesthesia techniques that facilitate early tracheal extubation has been associated with better postoperative hemodynamics (38), lower postoperative incidence of atrial fibrillation (39), lower incidence of postoperative respiratory infections (40), reduction in care costs and optimization of hospital resources (41-43). Based on the results of this study, dexmedetomidine could be a potential anesthetic agent to be included in fast-track and ultra fast-track techniques.

**EFFECT OF DEXMEDETOMIDINE ON LENGTHS OF ICU AND POSTOPERATIVE HOSPITAL STAY**

Both cohorts of this study had similar lengths of ICU and postoperative hospital stay, and values were comparable with those previously reported, by most clinical trials on adult elective heart surgery, where the range of length of stay in the ICU is from 18 to 40 hours, and the range of length of postoperative hospital stay is from 5 to 7 days (44-46).

In our study, exposition to dexmedetomidine facilitates an early tracheal extubation but did not change the length of stay in the ICU or the postoperative hospital length of stay. This is a common finding with other clinical trials about the use of fast-track techniques in which a shorter tracheal extubation time did not change the length of stay in ICU or length of postoperative hospital stay (42,43,44). Use of fast-track anesthesia techniques that facilitates early tracheal extubation can not induce a shorter length of stay in the ICU or in the hospital without a change in the policy of management from the ICU caretakers. In our institution the time to discharge a patient from the ICU after elective heart surgery does not depend on the place (operating room or ICU) or the time of tracheal extubation, but on fixed blocks of time of postoperative care.

**EFFECT OF DEXMEDETOMIDINE ON THE INFLAMMATORY RESPONSE**

In a non-specific form this study evaluated the effect of intraoperative use of dexmedetomidine on the postoperative inflammatory response with the leukocyte count as a marker. Leukocyte count has been included as diagnostic parameter of inflammatory processes like the Systemic Inflammatory Response Syndrome (SIRS) (47). The postoperative peak value of the leukocyte count has been identified as an independent risk factor of atrial fibrillation after valvular and coronary surgery (48,49). Atrial fibrillation usually appears in the second postoperative day in coincidence with the peak of the inflammatory response (50,51). The use of dexmedetomidine for sedation after major surgery in adults has been associated with a reduction in the expression of pro-inflammatory interleukins, eliciting a novel and potential use for this drug (7). In our study, dexmedetomidine cohort had a lower leukocyte count at arrival to ICU, but data about complications, like atrial fibrillation, was not registered. It would be interesting to determine if this reduction in the leukocyte count depends on the time of administration or in the administered dose.

**LIMITATIONS OF THE STUDY**

Retrospective studies have limitations known for all, in special about information bias. In this study there was not control over variables such like anesthetics and anesthetic’s doses choosen. Also it was possible that data registered in the medical charts reviewed were inaccurate. There was no way to obtain precise data about isoflurane dose administered . It was not possible to know exactly how the anesthesiologist in charge determined if the patient’s trachea could or not be extubated in the operating room. There was no systematic registry and following of intraoperative and postoperative complications, so important safety issues could be lost. Cost-effective analysis was not considered in this study.

**CONCLUSIONS**

Inclusion of intraoperative use of dexmedetomidine as coadjuvant of fentanyl-isoflurane based anesthesia for elective heart surgery in adult patients could reduce anesthetic requirements and facilitate early postoperative tracheal extubation. It is possible that dexmedetomidine has
a role in the modulation of the perioperative inflammatory response. Prospective and randomized control trials are needed to determine the safety and potential utility of dexmedetomidine as part of the anesthetic technique in heart surgery.

References

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Author Information

Carlos Afanador, MD.
Staff anesthesiologist, Fundación Valle del Lili

Lorsis Marulanda, MD.
Cardiothoracic anesthesia fellow, Fundación Valle del Lili

Germán Torres, MD.
Staff anesthesiologist, Fundación Valle del Lili

Andrés Marín, MD.
Cardiothoracic anesthesia fellow, Fundación Valle del Lili

Carlos Vidal, MD.
Staff anesthesiologist, Fundación Valle del Lili

Gloria Silva, MD.
Staff anesthesiologist, Fundación Valle del Lili