# Dexmeditomidine

# BACKGROUND
## $\alpha_2$ RECPTOR AGONISTS

- Prototype agent is clonidine
- More recent applications in clinical practice
  - Sedation
  - Behavior disorders (ADHD)
  - Drug withdrawal
  - Hypertension
- **Problem** – hypotension, oral = slow
- **Solution** – 2nd generation - $\alpha_2$ specificity

# DEXMEDETOMIDINE

- Precedex®, Hospira
- Pharmacologically active D- isomer of medetomidine
- 1st synthesized in late 1980's, Phase 1 studies in early 1990's, clinical trials late 1990's
- ~ 8-fold greater $\alpha_2$:$\alpha_1$ selectivity than clonidine
  - 1620:1 vs 200:1
- Shorter elimination half-life than clonidine
  - 2-3 vs 8-12 hr

# METABOLISM

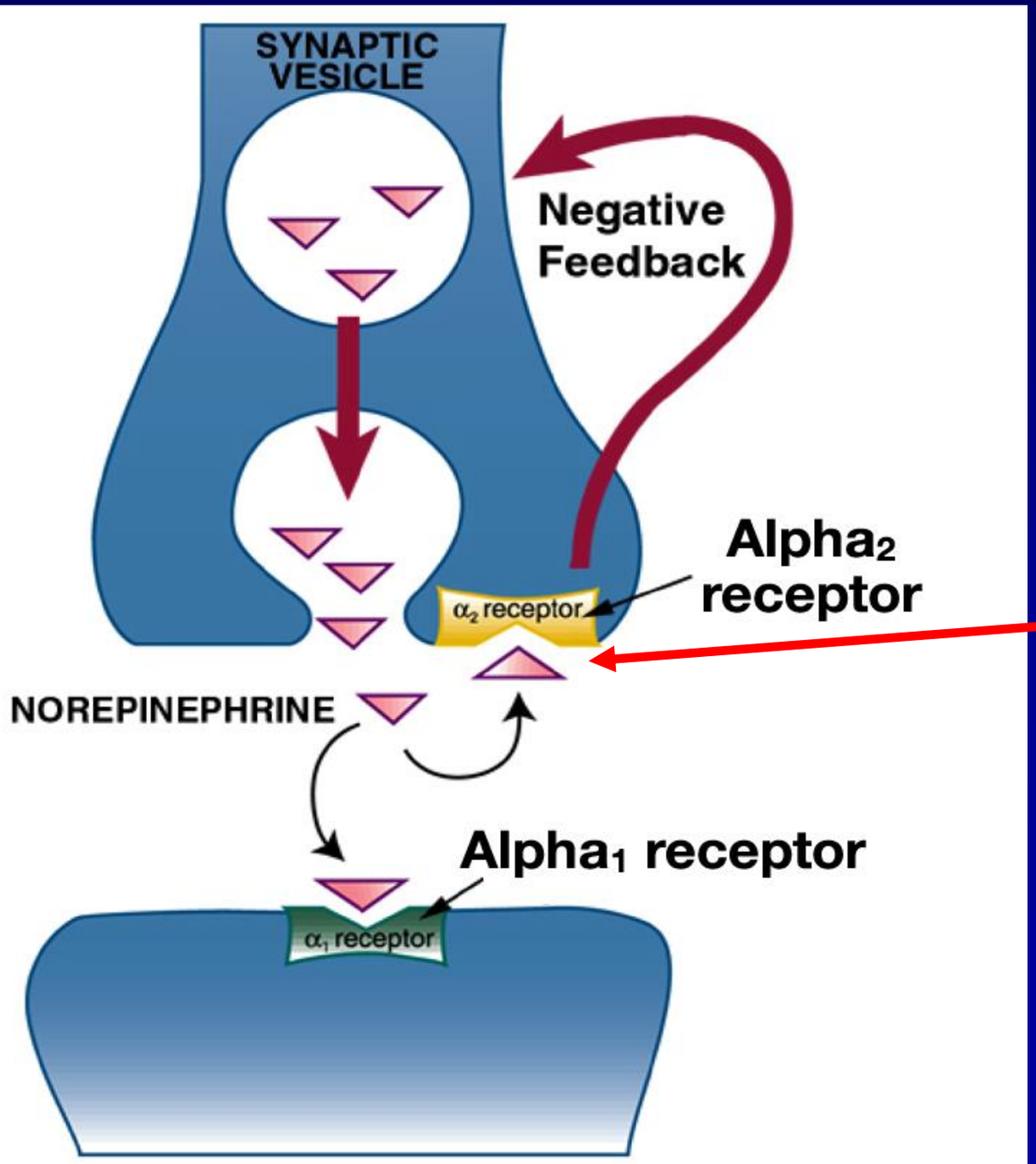
- Almost 100% biotransformation
  - Glucuronidation
  - Cytochrome P450 mediated
  - Metabolites all inactive – urinary elimination
- Significant □ $t_{1/2}$ in hepatic failure (7.5 hr)
- <1% excreted as unchanged
- No significant effect of renal impairment

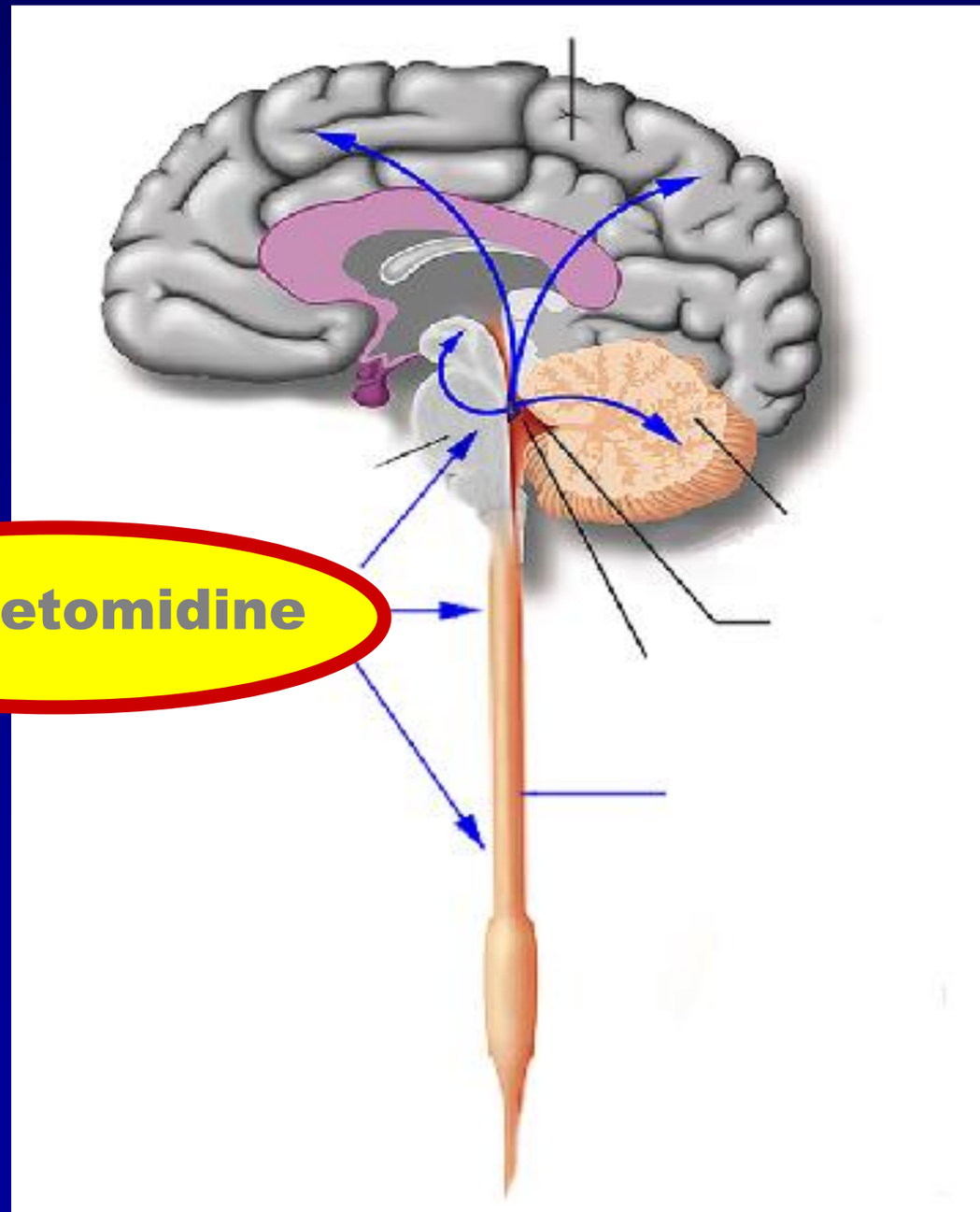
# MECHANISM
## CLINICAL CNS EFFECTS

- Locus ceruleus:
  - Brainstem center - modulates wakefulness
  - Major site for hypnotic actions (sedation, anxiolysis)
  - Mediated via various efferent pathways:
    - Thalamus and subthalamus  cortex
    - Nociceptive transmission via descending spinal tracts
    - Vasomotor center and reticular formation
- Spinal cord:
  - Binding to $\alpha_2$ receptors  analgesia via  release of substance P

# CNS ACTIONS

- Sedation – central, G-proteins (inhibition)
- Analgesia – spinal cord, Substance P

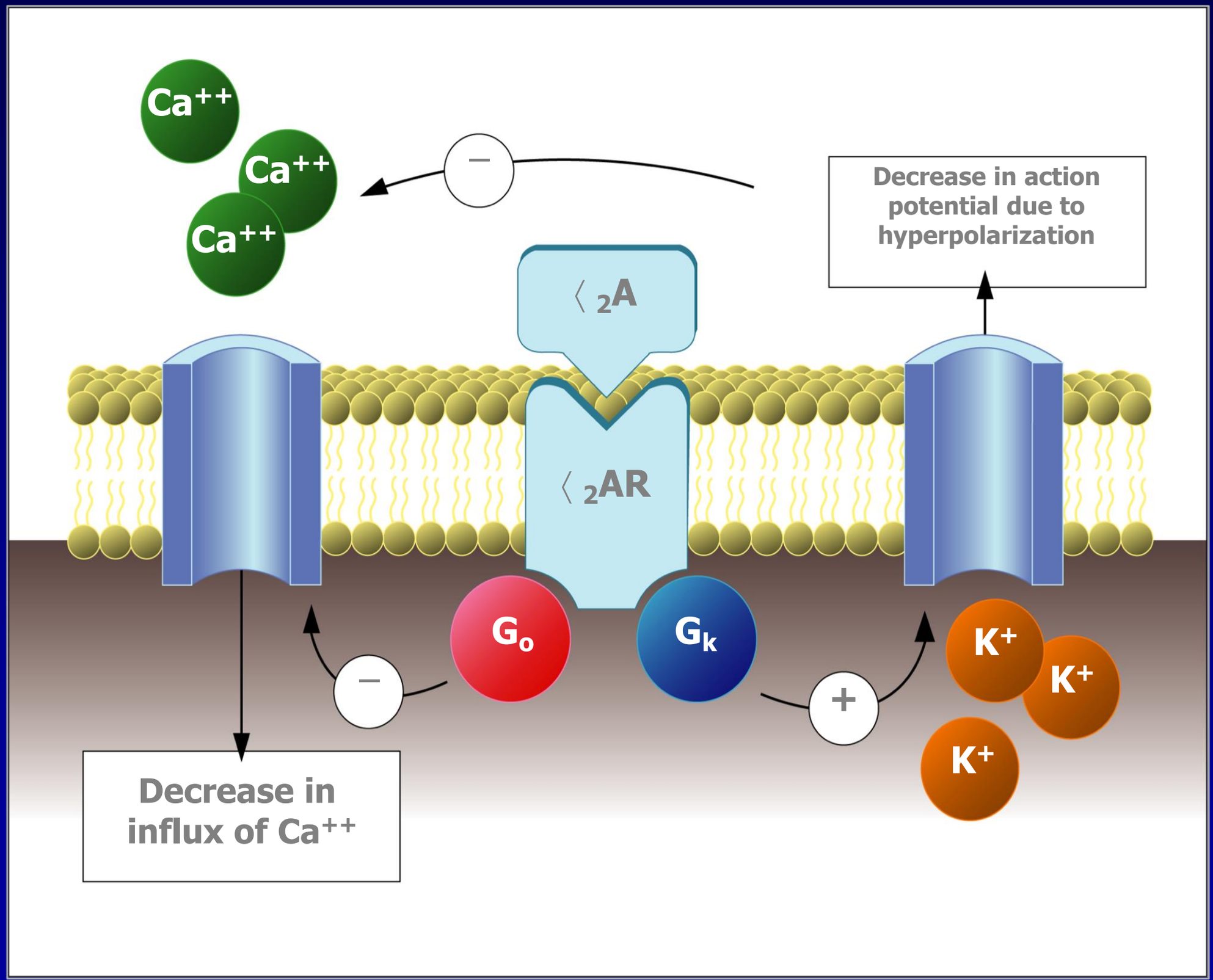


# MECHANISM – CENTRAL $\langle_2$

- Presynaptic receptors:
  - Location:
    - Sympathetic nerve endings
    - Noradrenergic CNS neurons
  - Mechanism/action:
    - Transmembrane receptors
    - Coupled to $G_o$- and $G_i$- type G-proteins
      - ¯ adenylate cyclase and cAMP formation
      - Hyperpolarization ($K^+$-channels)
      □□ $Ca^{++}$ conductance □ NE release

# CELLULAR MECHANISM



# NON-CNS EFFECTS

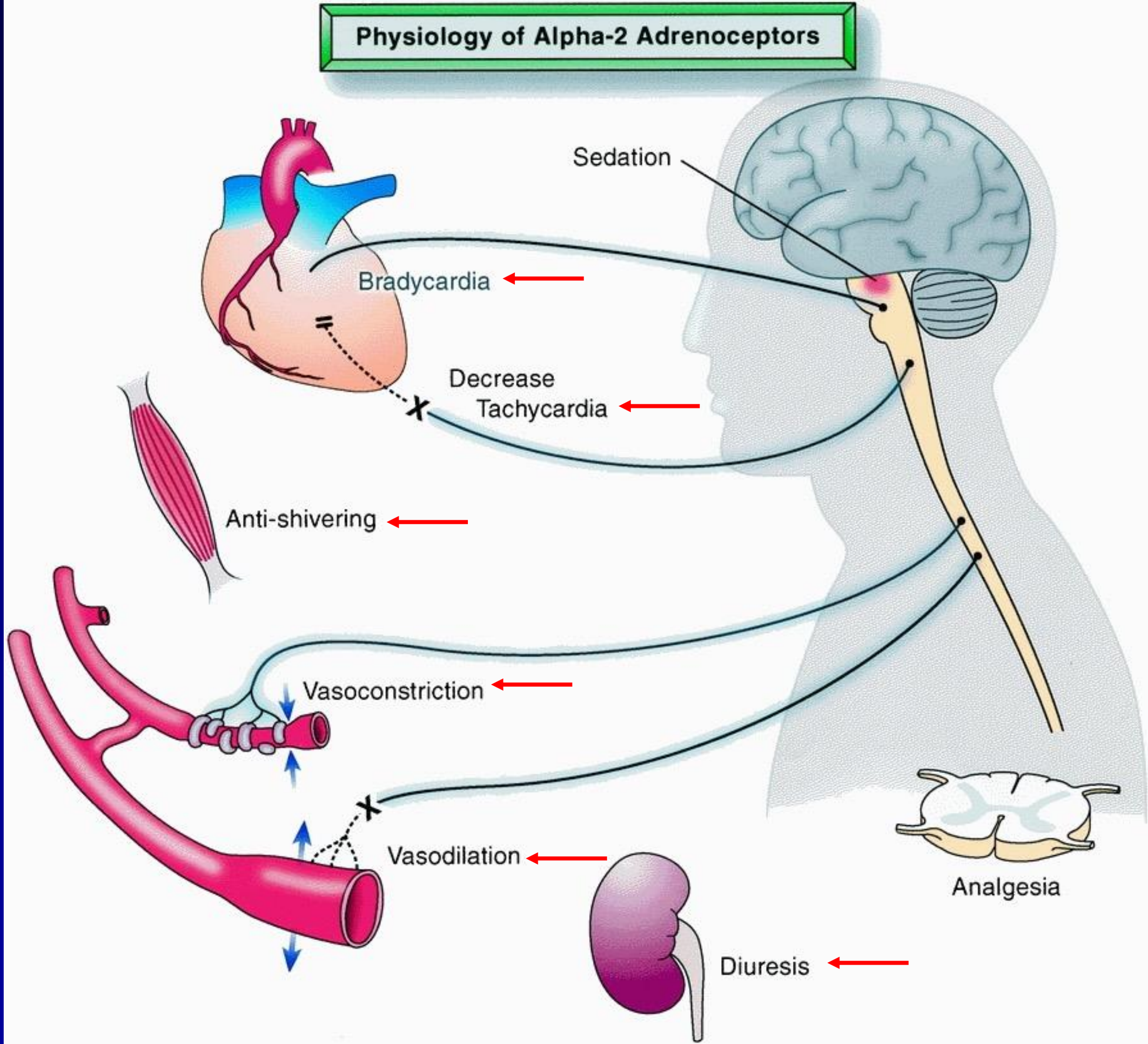
- Hypertension:
  - peripheral ⟨ $_1$-agonism
- Bradycardia/hypotension:
  - Sympathetic inhibition - medullary VMC

□ □ shivering:

- Diuresis:

  □ □ renin, vasopressin; □ ANP

# Physiology of Alpha-2 Adrenoceptors



# Hemodynamic effects of Dexmedetomidine

- **Reduces sympathetic activity- reduction in HR & BP**
- **No rebound effects**

# Special considerations

- Hypovolemic patients
- With other vasodilators or negative chronotropic agents dexmedetomidine have an additive effect
- With renal or hepatic impairment, metabolites may accumulate and dose reductions may be necessary

# Dexmedetomidine Contraindications

- **Infusion over 24 hours**
- **In obstetric procedures , cesarean section deliveries, as the safety has not been studied**
- **Patients with pre-existent severe bradycardia and related bradydysrhythmias (advanced heart block)**
- **Patients with impaired ventricular functions (ejection fraction <30%).**

# DOSAGE

- **2 ml (200µgs) +48 ml NS**

- **Loading dose -0.5µg-1µg/kg over 10 min (36-72 ml /hr)**

- **Maintenance -0.3µg-0.7µg/kg/hr[4-9ml/hr]**

- **Titration ±0.1µg/kg/hr.-1.25ml/hr**

# Administration of Dexmeditomidine

- **Loading dose 1µg/kg**
- **0.5ml[50µg] diluted as10ml ×10min.**
- **Maintenance 0.3-0.6µg/kg/hr**
- **1.5ml[150µg] diluted in 500ml NS**
- **solution conc-0.3µg/ml**
- **infusion-16 to32drops/min**
- **Recovery 10-12mins after cessation.**

# Uses of Dexmeditomidine

- **Bariatric surgery**
- **Sleep apnea patients**
- **Craniotomy: aneurysm, AVM [hypothermia]**
- **Cervical spine surgery**
- **Off-pump CABG**
- **Vascular surgery**
- **Thoracic surgery**

# Uses of Dexmeditomidine

- **Conventional CABG**
- **Spine surgery, evoked potentials**
- **Head injury**
- **Burn**
- **Trauma**
- **Alcohol withdrawal**
- **Awake intubation**

# Clinical Uses of Dexmeditomidine

- **SEDATIVE**
- **SOLE ANAESTHETIC**
- **ADJUVANT**
- **OTHERS**

# PREMEDICATION

- **IV  0.3 - 0.6ug/kg 15mins prior surgery**
- **IM  2.5ug/kg 45-90mins prior**
- **Effective Stress attenuation**
- **Reduces thiopentone doses(±30%)**

***Miller 7 th edition**

# STRESS ATTENUATION

- **Preoperative a single dose(1μg/kg) result in progressive increases in sedation**
- **Blunt the haemodynamic responses during laryngoscopy**
- **Reduce opioid and anaesthetic requirements**
- **Decrease blood pressure and heart rate as well as the recovery time after the operation**

# STRESS ATTENUATION

- **A bolus dose of 1µg/kg over 10 minutes, prior to administration of reversal provided hemodynamic stability associated with extubation**

- **D. Jain, R. Khan & M. Maroof *The Internet Journal of Anesthesiology.* 2009 Volume 21 Number 1**

# The protective and hemodynamic effects of dexmedetomidine on hypertensive cerebral hemorrhage patients in the perioperative period

Open Access

**Authors:** ✉ Junhui Zhao, Chuixian Zhou

View Affiliations

**Published online on:** September 16, 2016 https://doi.org/10.3892/etm.2016.3711

**Pages:** 2903-2908

e and serves as an effective sedative, without causing respirator

# Effect of dexmedetomidine on hemodynamic changes and inflammatory responses in patients undergoing off-pump coronary-artery bypass grafting

Open Access

**Authors:** Wenqian Zhai, Lieming Yang, Peng Sun, Yunfei Li, Jiange Han, ✉ Guolin Wang

View Affiliations

**Published online on:** October 23, 2020 https://doi.org/10.3892/etm.2020.9380

**Article Number:** 250

The aim of the present study was to determine the effect of dexmedetomidine on hemodynamic changes and inflammatory responses in patients undergoing off–pump coronary artery bypass grafting (OPCABG). A total of 300 patients about to receive OPCABG were randomized evenly into the control group (n=116) and study group (n=123). Intravenous dexmedetomidine pump infusion was administered to patients in the study group at a rate of 0.4 $\mu g.kg^{-1}.h^{-1}$. The control group received physiological saline at the same infusion speed. Changes in hemodynamic parameters and inflammatory indices were compared between the two groups. Hemodynamic parameters, such as the heart rate and mean arterial pressure, were lower in patients from the study group, compared with that in the control group (both $P<0.05$). The levels of pro–inflammatory factors, such as interleukin (IL)–6, tumor necrosis factor–α and C–reactive protein, were also reduced in the study group ($P<0.05$). The observed levels of IL–10 were lower in the control group compared with that in the study group, although a statistically significant difference was not achieved. Thus, the administration of dexmedetomidine in patients undergoing OPCABG stabilized hemodynamics and reduced inflammation. The present study was registered at the Chinese Clinical Trial Registry, under the trial registration number ChiCTR–OOC–15005978 (2015).

Show citation

# The Effect of Prophylactic Dexmedetomidine on Hemodynamic Disturbances to Double-Lumen Endotracheal Intubation: A Prospective, Randomized, Double-Blind, and Placebo-Controlled Trial

**Tanyong Pipanmekaporn**,[1,2] Yodying Punjasawadwong,[2] Somrat Charuluxananan,[3] Worawut Lapisatepun,[2] and Pavena Bunburaphong[3]

## Abstract

The purpose of this study was to determine the effect of dexmedetomidine on hemodynamic responses to DLT intubation compared to placebo and to assess the adverse effects related to dexmedetomidine. Sixty patients were randomly allocated to receive 0.7 $\mu$g/kg dexmedetomidine ($n = 30$) or normal saline ($n = 30$) 10 minutes before general anesthesia. Systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), heart rate (HR), and rate pressure product (RPP) between groups were recorded. During intubation and 10 minutes afterward (T1-T10), the mean SBP, DBP, MAP, HR, and RPP in the control group were significantly higher than those in the dexmedetomidine group throughout the study period except at T1. The mean differences of SBP, DBP, MAP, HR, and RPP were significantly higher in the control group, with the value of 15.2 mmHg, 10.5 mmHg, 14 mmHg, 10.5 beats per minute, and 2,462.8 mmHg min$^{-1}$. Four patients in the dexmedetomidine group and 1 patient in the control group developed hypotension, while 2 patients in the dexmedetomidine group had bradycardia. Prophylactic dexmedetomidine can attenuate the hemodynamic responses to laryngoscopy and DLT intubation with minimal adverse effects. This trial is registered with ClinicalTrials.gov NCT01289769.

Journal: JOURNAL OF ADVANCES IN MEDICAL AND BIOMEDICAL RESEARCH January-February 2019 , Volume 27 , Number 120; Page(s) 14 To 19.

Paper: **Comparing the Hemodynamic Effects of Nebulized Dexmedetomidine and Nebulized Lidocaine in Children undergoing Fiberoptic Bronchoscopy**

Author(s): Shafa Amir, Habibzadeh Mohammadreza, Shetabi Hamidreza*, Aghil Ali

* Dept. of Anesthesiology, Faculty of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract:
Background & Objective: Several studies have shown that topical and intravenous Dexmedetomidine and Lidocaine can decrease pain and reduce consumption of analgesic drugs. However, Lidocaine may be accompanied with several side effects such as respiratory suppression, seizure, and cardiac arrhythmias. On the other hand, Dexmedetomidine has favorable properties such as low risk of apnea, analgesia, sympatholysis, and sedation. Therefore, the aim of this study was to compare the effects of nebulized Dexmedetomidine and nebulized Lidocaine on hemodynamic characteristics of the patients undergoing bronchoscopy. Materials & Methods: In the present randomized, double-blind study; 75 children (1-6 years old) undergoing fiber-optic bronchoscopy were allocated to three groups. Group 1 received nebulized solution containing 2 μ g/kg of Dexmedetomidine. Group 2 received nebulized solution containing 4 mg/kg of Lidocaine 1%. Group 3 received nebulized solution containing 0. 9% of normal saline as the control group. Heart rate, mean arterial blood pressure and SpO2, Bispectral Index (BIS) were measured and compared. BIS, indicating the depth of anesthesia was considered as a confounding factor. Statistical analysis was performed using SPSS 20. Results: The mean of arterial blood pressure and heart rate was significantly lower in group 1 compared to groups 2 and 3 during bronchoscopy ($P<0.05$). Blood oxygen saturation and sedation scores were significantly higher in group 1 compared to the other groups during bronchoscopy ($P<0.05$). Furthermore, the hemodynamic parameters were more stable in group 1 compared to the other groups during recovery. Conclusion: Premedication with nebulized Dexmedetomidine was significantly associated with more stable hemodynamic parameters and lower risk of side effects compared to nebulized Lidocaine in children undergoing fiberoptic bronchoscopy.

Keyword(s): Bronchoscopy,Child,Dexmedetomidine,Lidocaine

Medical Gas Research

Med Gas Res. 2019 Apr-Jun; 9(2): 55–61.
Published online 2019 Jun 25. doi: 10.4103/2045-9912.260645

PMCID: PMC6607861
PMID: 31249252

# Effect of different doses of intrathecal dexmedetomidine on hemodynamic parameters and block characteristics after ropivacaine spinal anesthesia in lower-limb orthopedic surgery: a randomized clinical trial

Laleh Farokhmehr,[1] Hesameddin Modir, PhD,[2,*] Bijan Yazdi,[2] Alireza Kamali,[2] and Amir Almasi-Hashiani[3,4]

## Abstract

Go to:

The study aims to compare the efficacy of different doses of intrathecal dexmedetomidine on hemodynamic parameters and block characteristics after ropivacaine spinal anesthesia in lower-limb orthopedic surgery. In a double-blind trial, 90 patients undergoing spinal anesthesia for lower-limb orthopedic surgery were included and then randomly assigned to three groups; dexmedetomidine 5 μg/kg, dexmedetomidine 10 μg/kg and placebo. Blood pressure, heart rate, and oxygen saturation were recorded in the three groups at the first 15 minutes and then every 15 to 180 minutes at recovery by a resident anesthesiologist, as well as sensory-motor block onset. The visual analog scale scores for the assessment of pain were recorded at recovery, and 2, 4, 6, and 12 hours postoperatively and the data were analyzed by Stata software. The onset and time to achieve sensory block to ≥ T8 were faster in the 10 μg/kg dexmedetomidine group than the other groups ($P = 0.001$). The Bromage score was higher in the 10 μg/kg dexmedetomidine group ($P = 0.0001$) with lower pain score as compared with the 5 μg/kg dexmedetomidine and placebo groups ($P = 0.0001$). Therefore, an increase in dexmedetomidine hastens the onset of sensory-motor block but not causes side effects. This study was approved by the Ethical Committee of Arak University of Medical Sciences in 2017 (Ethical Code: IR.ARAKMU.REC.1396.37), and the trail was registered and approved by the Iranian Registry of Clinical Trials in 2017 (IRCT No. IRCT2017070614056N12).

**Keywords:** dexmedetomidine, ropivacaine, hemodynamic changes, block characteristics, blood pressure, heart rate, oxygen saturation, sensory block, motor block, randomized clinical trial

Medical Gas Research

Med Gas Res. 2020 Jan-Mar; 10(1): 1–7.
Published online 2020 Mar 13. doi: 10.4103/2045-9912.279977

PMCID: PMC7871933
PMID: 32189663

# Comparing intravenous dexmedetomidine and clonidine in hemodynamic changes and block following spinal anesthesia with ropivacaine in lower limb orthopedic surgery: a randomized clinical trial

Maryam Javahertalab,[1] Alireza Susanabadi, MD,[1*] Hesameddin Modir,[1] Alireza Kamali,[1] Alireza Amani,[2] and Amir Almasi-Hashiani[3]

## Abstract

Go to:

Dexmedetomidine (DEX) can prolong duration of anesthesia and shorten onset of sensory and motor block relative to clonidine. This study attempted to compare the efficacy of intravenous DEX and clonidine for hemodynamic changes and block after spinal anesthesia with ropivacaine in lower limb orthopedic surgery. In a double-blind randomized clinical trial, 120 patients undergoing spinal anesthesia in lower limb orthopedic surgery were recruited and divided into three groups using balanced block randomization: DEX group ($n$ = 40; intravenous DEX 0.2 μg/kg), clonidine group ($n$ = 40; intravenous clonidine 0.4 μg/kg), and placebo group ($n$ = 40; intravenous normal saline 10 mL) in which pain scores were assessed using visual analogue scales (at recovery, and 2, 4, 6, and 12 hours after surgery) and time to achieve and onset of sensory and motor block. Statistically significant differences were found in mean arterial pressure among the groups at all times except baseline ($P$ = 0.001), with a less mean arterial pressure and a prolonged duration of sensory and motor block ($P$ = 0.001) in the DEX group where pain relieved in patients immediately after surgery and at above mentioned time points ($P$ = 0.001). Simultaneous administration of intravenous DEX with ropivacaine for spinal anesthesia prolongs the duration of sensory and motor block and relieves postoperative pain, and however, can decrease blood pressure. Although intravenous DEX as an adjuvant can be helpful during spinal anesthesia with ropivacaine, it should be taken with caution owing to a lowering of mean arterial pressure in patients especially in the older adults. This study was approved by Ethical Committee of Arak University of Medical Sciences (No. IR.Arakmu.Rec.1395.450) in March, 2017, and the trial was registered and approved by the Iranian Registry of Clinical Trials (IRCT No. IRCT2017092020258N60) in 2017.

Medical Gas Research

Med Gas Res. 2018 Jul-Sep; 8(3): 85–90.
Published online 2018 Sep 25. doi: 10.4103/2045-9912.241065
PMCID: PMC6178638
PMID: 30319762

# Efficacy of dexmedetomidine *versus* remifentanil to blunt the hemodynamic response to laryngoscopy and orotracheal intubation: a randomized clinical trial

Hesameddin Modir,[1] Bijan Yazdi, PhD,[1*] Esmail Moshiri,[1] Abolfazl Mohammadbeigi,[2] and Samira Afshari[3]

▸ Author information ▸ Article notes ▸ Copyright and License information Disclaimer

## Abstract

Go to:

The study aims to compare the efficacy of dexmedetomidine (DEX) *vs*. remifentanil (REM) to blunt the hemodynamic response to laryngoscopy and orotracheal intubation. Enrolled in a double-blind clinical trial, 124 patients undergoing elective surgery under general anesthesia at Amirkabir Hospital (Arak, Iran), were assigned into four groups equally (31 patients in each group), DEX, REM, DEX-REM, and normal saline (NS), who received intravenous DEX (1 μg/kg), REM (1 μg/kg), their equal mixture (each 0.5 μg/kg, 1 minute before tracheal intubation), and NS, respectively. Then, blood pressure (BP), heart rate (HR), and arterial oxygen saturation ($SaO_2$) were measured on arrival to the operating room, 1 minute before laryngoscopy and tracheal intubation, immediately after intubation, and afterwards every 5 to 15 minutes, and finally the data were analyzed using SPSS 18.0. The groups were same regarding to age, sex and baseline hemodynamic variables including mean of BP ($P = 0.157$), HR ($P = 0.105$) and $SaO_2$ ($P = 0.366$). Tukey *post-hoc* test showed that there DEX, REM, and a DEX + REM groups was same regarding to MBP and HR, but these hemodynamic responses were higher in NS group than other groups at all time after laryngoscopy and intubation ($P < 0.05$). Moreover, repeated measure test showed a decreasing trend in MBP and HR in three intervention groups at all time after intubation ($P > 0.05$). A DEX/REM mixture had the lowest BP and three intervention groups had lower HR than the NS group. A mixture of the drugs used seems to lead to not only a prevented increase in HR and BP during laryngoscopy but also a decreased BP and HR. This study was registered in Iranian Registry Clinical Center with the registration No. IRCT2016092722254N1.

**Keywords:** dexmedetomidine, intratracheal, intubation, laryngoscopy, remifentanil, tracheal intubation

Medical Gas Research

Med Gas Res. 2020 Jul-Sep; 10(3): 91–95.
Published online 2020 Sep 30. doi: 10.4103/2045-9912.296037
PMCID: PMC8086618
PMID: 33004704

# Efficacy of dexmedetomidine-ketamine *vs.* fentanylketamine on saturated oxygen, hemodynamic responses and sedation in cystoscopy: a doubleblinded randomized controlled clinical trial

Hesameddin Modir,[1] Esmail Moshiri,[1*] Bijan Yazdi,[1] Tannaz Kamalpour,[2] Davood Goodarzi,[3] and Abolfazl Mohammadbeigi[4]



## Abstract

Go to:

Cystoscopy is a diagnostic and invasive procedure for treatment and follow-up of genitourinary system patients and could be performed with a variety of anesthesia techniques. The study aimed to assess the efficacy of dexmedetomidine-ketamine *vs*. fentanyl-ketamine on sedation and analgesia for cystoscopy. This double-blind randomized controlled clinical trial enrolled 60 patients undergoing cystoscopy in two groups. Patients were assigned randomly by block random allocation method into dexmedetomidine-ketamine group (1 μg/kg dexmedetomidine) and fentanyl-ketamine group (2 μg/kg fentanyl) receiving ketamine (0.5 mg/kg). Subsequently, mean blood pressure, heart rate, saturated oxygen, respiratory rate, pain intensity, Ramsay score for sedation level, cystoscopy duration, and urologic satisfaction were measured and compared between two groups. Both the groups were similar regarding age, sex and baseline hemodynamic parameters ($P > 0.05$). Lower heart rate and pain score were revealed in the dexmedetomidine-ketamine group at 25–50 and 30–60 minutes, respectively, after cystoscopy ($P < 0.05$). Moreover, repeated measure test showed that there was significant difference in trend of respiratory rate and pain score between two groups ($P = 0.017$) and was lower in dexmedetomidine-ketamine group. The dexmedetomidine-ketamine group relieves pain 30 minutes after cystoscopy with stable hemodynamic parameters during operation. Therefore, dexmedetomidine-ketamine is recommended to be employed for pain relief in subjects undergoing cystoscopy. The study was approved by Ethical Committee of Arak University of Medical Sciences with IR.ARAKMU.REC.1397.108 on July 2, 2018, and registered in Iranian Registry Clinical Trial center with code IRCT20141209020258N105 on April 21, 2019.

Med Gas Res. 2021 Jan-Mar; 11(1): 1–5.
Published online 2021 Feb 26. doi: 10.4103/2045-9912.310052
PMCID: PMC8103969
PMID: 33642330

# The effect of dexmedetomidine on decrease of cough, hemodynamic parameters and Ramsay score *versus* lidocaine during general anesthesia: a randomized clinical trial

Soheila Saidie,[1] Hesameddin Modir,[2,*] Bijan Yazdi,[2] Esmail Moshiri,[2] Gholamreza Noori,[3] and Abolfazl Mohammadbeigi[4]

## Abstract

Go to:

Physiological responses remain common during anesthesia emergence and endotracheal extubation, causing some complications. We aimed to address the effect of dexmedetomidine (DEX) on decrease of cough, hemodynamic parameters and Ramsay score in comparing to lidocaine (LID) during anesthesia. In this double-blinded randomized clinical trial 120 hospitalized patients undergoing general anesthesia were enrolled after obtaining written consent. Block random allocation was used to assign patients into three groups including DEX (intravenous injection; 0.5 μg/kg), LID (1.5 mg/kg), and PBO (10 mL normal saline) at 10 minutes before anesthesia. No statistical significance was uncovered among three groups in blood pressure, oxygen saturation, frequency of laryngospasm and duration of surgery amongst the groups ($P > 0.05$), but DEX having lower heart rate and cough frequency ($P < 0.05$). Moreover, the mean of Ramsay score was statistically higher in DEX and LID groups than PBO except at the $50^{th}$ and $60^{th}$ minutes after extubation ($P < 0.05$). Since the mean of Ramsay score was higher in DEX *vs*. LID groups and reduced heart rate and cough frequency demonstrates in DEX, it seems that DEX could be an appropriate drug on suppressing cough during anesthesia without side effects. The study protocol was approved by the Ethical Committee of Arak University of Medical Sciences by code IR.ARAKMU.REC.1397.140 on August 19, 2018, and the protocol was registered at Iranian Registry of Clinical Trials by code IRCT20141209020258N97 on February 22, 2019.

J Family Med Prim Care. 2019 Jul; 8(7): 2223–2228.
doi: 10.4103/jfmpc.jfmpc_318_19
PMCID: PMC6691457
PMID: 31463234

# Comparison of hemodynamic changes of magnesium sulfate and dexmedetomidine for an axillary brachial plexus block

Yousef Shahtaheri,[1] Alireza Kamali,[1] Mohammad Tavakoli Rad,[1] and Bijan Yazdi[1]

## Abstract

Go to:

### Introduction:

Axillary brachial plexus block is used for anesthesia in hands and forearm surgery. The aim of this study was to compare the hemodynamic changes of magnesium sulfate and dexmedetomidine in axillary block.

### Materials and Methods:

This randomized, double-blind clinical trial was conducted on 99 patients undergoing a forearm and hand surgery at the Vali-Asr Hospital. Patients were divided into three groups. Dexmedetomidine group consisted of lidocaine 1.5% plus 0.5 μg/kg dexmedetomidine, magnesium sulfate group included lidocaine 1.5% plus 100 mg magnesium sulfate, and the control group received lidocaine 1.5% with normal saline. The final volume was divided into 35 groups in three groups. Blood pressure, heart rate, and oxygen saturation were measured every 5 minutes during surgery, and data were analyzed by SPSS 23.

### Results:

There was a statistically significant difference between the three groups in terms of the mean blood pressure during surgery ($P < 0.05$). At all times, blood pressure in the dexmedetomidine group was lower as compared to the other two groups. But in the $20^{th}$ and $25^{th}$ minutes, there was a relative increase in blood pressure. There was a significant difference between the three groups in terms of heart rate during surgery in minutes 20, 25, 65–100, and 110–120 ($P < 0.05$).

### Conclusion:

The final result showed that the blood pressure and heart rate of the dexmedetomidine group patients at different times were less than the other two groups.

Formosan Journal of Surgery
Official Publication of Taiwan Surgical Association

ORIGINAL ARTICLE

Year : 2020 | Volume : 53 | Issue : 2 | Page : 41-47

# Effect of various analgesics combined with ropivacaine on pain, sensory-motor block and hemodynamic changes in intravenous regional anesthesia

Amirreza Modir[1], Bijan Yazdi[2], Esmail Moshiri[2], Mehran Azami[3], Amir Almasi-Hashiani[4]

## Abstract

**Background:** The study addressed the compared effects of adding dexmedetomidine (DEX), ketamine (KET), neostigmine (NEO), and magnesium sulfate (MS) to ropivacaine on pain relief and hemodynamic changes in intravenous regional anesthesia (IVRA) during distal radius surgery.

**Materials and Methods:** This randomized, double blinded clinical trial recruited the following five groups of patients ($n$ = 150) undergoing forearm surgery under IVRA, hospitalized at Valiasr Hospital (Arak, Iran): DEX, KET, NEO, MS, and placebo, in which ropivacaine 0.2% was used along with all the drugs. Subsequently, we measured the onset and duration of sensory motor block, pain score, arterial oxygen saturation ($SaO_2$), mean arterial pressure (MAP), and heart rate (HR), as well as the quantity of opioid administration throughout the 24 h postoperatively.

**Results:** In each group, thirty patients were randomized and included in the analysis. The time to the onset of sensory motor block was shorter in the DEX group ($P$ = 0.001) who had a longer duration of sensory motor block ($P$ = 0.001), lower pain score at all times ($P$ = 0.001), and the lowest opioid use ($P$ = 0.001). There was no statistically significant difference between the five groups in terms of MAP ($P$ = 0.148), HR ($P$ = 0.642), and $SaO_2$($P$ = 0.990), but the time trend of MAP ($P$ = 0.001) and $SaO_2$($P$ = 0.001) was statistically significant and also the interaction of time and groups was statistically significant for MAP ($P$ = 0.001) and HR ($P$ = 0.001).

**Conclusion:** DEX demonstrated the least amount of postoperative pain and opioid use, as well as a rapid onset and a longer duration of sensory motor block than other drugs used. Moreover, it could be thought to be an excellent recommendation to use as an adjuvant in IVRA.

**Trial registration:** Clinical trial registration number in Iranian randomized clinical trial: IRCT20141209020258N113.

# Comparison of the effects of propofol and dexmedetomidine on controlled hypotension and bleeding during endoscopic sinus surgery

**Esmail Moshiri, Hesameddin Modir, Bijan Yazdi, Alireza Susanabadi, Neda Salehjafari[1]**

Departments of Anesthesiology, Arak University of Medical Sciences, [1]Rhinology and Ear Surgery, Arak University of Medical Sciences, Arak, Iran

## ABSTRACT

**Introduction:** Due to the nature of the space that endoscopic sinus surgery is performed in it, even a small amount of bleeding has a negative effect on surgeon vision. The aim of this study was to compare the effects of propofol and dexmedetomidine on controlled hypotension and bleeding during endoscopic sinus surgery. **Materials and Methods:** In this randomized clinical trial, 100 patients candidate for endoscopic sinus surgery entered the study. The patients were randomly divided into two groups. In the first group, Group D, 1 μg/kg dexmedetomidine was injected within 10 min as the initial dose and 0.4–0.8 μg/kg/h infusion was continued. In Group P, 50–150 μg/kg/min Propofol was infused. Hemodynamic parameters were measured from the onset of the study to 120 min after surgery, and the intraoperative bleeding was reported by surgeon. **Results:** Mean score of bleeding was 1.14 ± 0.70 in Group D and 1.24 ± 0.74 in Group P ($P = 0.490$). Wilks' group Lambda test showed a significant reduction in heart rate of both groups ($F = 3.45$, $P = 0.002$). Heart rate in Group P was significantly lower than Group D (Greenhouse-Geisser test, $F = 2.70$, $P = 0.015$). There was no statistical difference in mean arterial pressure and $O_2$ saturation. The average time of patients recovery was 32.52 ± 7.9 min in Group D and 29.90 ± 10.6 min in Group P ($P = 0.166$). **Conclusion:** Propofol could reduce heart rate significantly more than dexmedetomidine. However, about reduction of bleeding and obtaining an appropriate surgical field which were the main outcomes of the study, there was no significant difference between groups.

Med Gas Res. 2021 Jul-Sep; 11(3): 88–93.
Published online 2021 Apr 27. doi: 10.4103/2045-9912.314327
PMCID: PMC8174407
PMID: 33942777

# An investigation of the effects of dexmedetomidine and fentanyl as an adjuvant to ropivacaine on pain scores and hemodynamic changes following laparoscopic cholecystectomy

Hesameddin Modir,[1] Bijan Yazdi, MD,[1*] Masha Piri,[2] and Amir Almasi-Hashiani[3]

## Abstract

Go to:

Postoperative pain control is recognized as a challenging surgical issue receiving high priority in the healthcare system, and opioids are routinely prescribed for anesthesia and pain relief. This study aimed to investigate the effects of ropivacaine administered intraperitoneally alone or combined with dexmedetomidine or fentanyl on postoperative pain control following laparoscopic cholecystectomy. This randomized double-blind clinical trial recruited three equal-size block-randomized groups of patients ($n$ = 138) scheduled for elective laparoscopic cholecystectomy at Valiasr Hospital, Arak, Iran, in 2019–2020 who received ropivacaine (40 mL/0.5%), ropivacaine (40 mL/0.5%) + dexmedetomidine (1 μg/kg), and ropivacaine (40 mL/0.5%) + fentanyl (1 μg/kg). No significant differences were observed among the three groups according to the vital signs (mean arterial pressure/heart-rate/oxygen saturation) in the study period and during surgery ($P > 0.05$). Lower pain was revealed in the ropivacaine + dexmedetomidine group ($P$ = 0.001), with the lowest opioid dose in postoperative 24 hours ($P = 0.001$). Moreover, no clinically significant differences were observed in complications among the three groups ($P = 0.483$), and no patient developed ileus. Intraperitoneal ropivacaine administered with dexmedetomidine could relieve pain and reduce opioid use in postoperative 24 hours, without any complication and ileus. Therefore, intraperitoneal ropivacaine administered with dexmedetomidine is recommended for postoperative pain control in patients undergoing laparoscopic cholecystectomy. This study was approved by the Ethical Committee of Arak University of Medical Sciences (approval No. IR.ARAKMU.REC.1397.267) on December 30, 2018 and was registered in the Iranian Registry of Clinical Trials (No. IRCT 20141209020258N117) on July 13, 2019.

Med Gas Res. 2020 Oct-Dec; 10(4): 144–148.
Published online 2020 Dec 25. doi: 10.4103/2045-9912.304220
PMCID: PMC8092148
PMID: 33380579

# Change in saturation oxygen and hemodynamic responses by adding intrathecal dexmedetomidine *vs.* sufentanil to bupivacaine in patients undergoing dynamic hip screw operation: a randomized clinical trial

Bijan Yazdi,[1] Hesameddin Modir, PhD,[1*] Alireza Kamali,[1] and Hanieh Masouri[2]

## Abstract

Go to:

Sufentanil (SUF) and dexmedetomidine (DEX) are used as bupivacaine in the spinal technique that providing stable hemodynamic conditions with least side effects. This study aimed to compare the change in saturation oxygen and hemodynamic responses after intrathecal DEX and SUF as adjuvants to bupivacaine in patients undergoing dynamic hip screw. This clinical trial was conducted with 80 patients referring to Valiasr Hospital, Arak, Iran, who were randomly assigned to two groups ($n$ = 40): DEX group (8 mg bupivacaine with 5 μg DEX) and SUF group (8 mg bupivacaine with 2.5 μg SUF). The pain severity was lower in DEX group at different hours and the systolic pressure and diastolic blood pressure were lower in DEX group than in SUF group after surgery. Saturation oxygen was generally lower and more stable in DEX group but there was no significant difference between two groups. The incidence of sensory and motor block was lower in DEX group than in SUF group, but the duration of assessment of sensory block was lower in SUF group than in DEX group. DEX relieves pain up to 24 hours postoperatively. Nevertheless, Care should be taken to avoid the DEX induced shivering in patients. The study was approved by Ethical Committee of Arak University of Medical Sciences by IR.ARAKMU.REC.1395.32 code on April 25, 2016 and was registered in Iranian Registry of Clinical Trials by code number: IRCT2017050220258N45 on August 4, 2017.