



Ketofol for Procedural Sedation and Analgesia

Gabriel Vázquez-López, BSN, SRNA, Christian G. Navarro-Cruz, BSN, SRNA
Milagros Figueroa, RN, PhD & José L. Bonilla, RN, CRNA-Preceptors
University of Puerto Rico, Medical Sciences Campus



IRB # A5580419

STATEMENT OF THE PROBLEM

Nowadays, there is an extensive variety of surgical procedures performed in operating rooms that do not require general anesthesia and are completed in less than sixty minutes. During some minor procedures, anesthesia providers may use neuraxial anesthesia or a combination of intravenous anesthetic agents with opioids. These common anesthetic approaches may bring negative side effects that may be deleterious for patients. Whether spinal anesthesia or opioid plus propofol are being used, providers must be aware of their potential for cardiorespiratory instability, nausea and vomiting. Propofol alone and narcotics may increase the risk for respiratory complications. It is also important to consider that patients undergoing short procedures under long acting drugs, such as intrathecal bupivacaine, will have longer recovery time. A combination of propofol and ketamine (ketofol) has been shown to minimize cardio-respiratory complications.

PICOT QUESTION

- P** Adult patients (21 - 75) undergoing minor surgical procedures under procedural sedation and analgesia
- I** Ketofol for procedural sedation and analgesia
- C** Standard anesthetic approaches
- O** Hemodynamic and respiratory stability
- T** Surgery and PACU stay

In adult patients undergoing minor surgical procedures, how does the use of ketofol for procedural sedation and analgesia, compared to standard anesthetic approaches, affect hemodynamic and respiratory stability during surgery and PACU stay?

SYNTHESIS AND ANALYSIS OF EVIDENCE

A thorough literature search was conducted by using the following databases:

- PubMed, Cochrane Library, OvidSP & EBSCO Host

Keywords: ketamine, propofol, ketamine-propofol, ketofol, PSA, Sedation, Analgesia, Monitored Anesthesia Care.

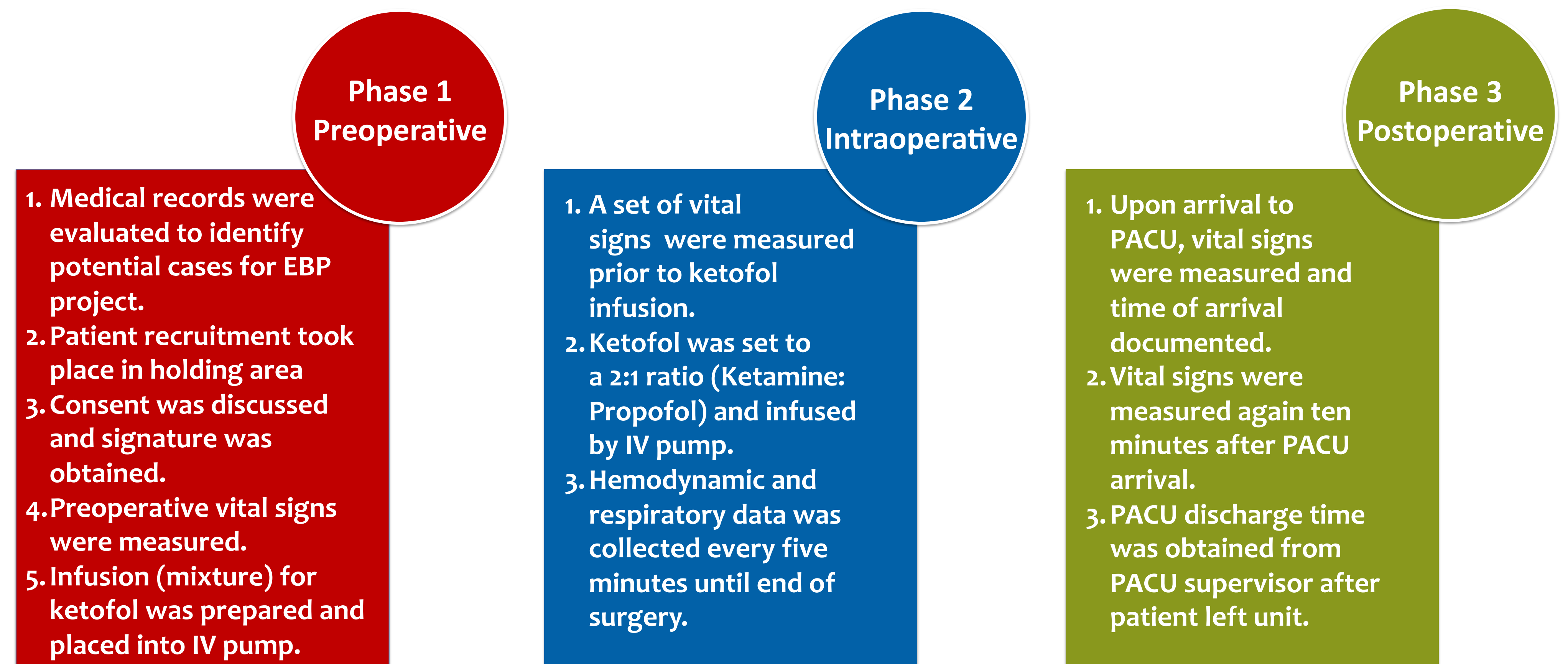
Synthesis: Most studies that evaluated the effectiveness of ketofol for PSA showed hemodynamic and respiratory stability when compared to the individual use of each pharmacological agents.

Level of Evidence	1	2	3	4	5	6	7	8
Level I: Systematic review or meta-analysis	X	X						
Level II: Randomized controlled trial			X	X	X	X	X	X

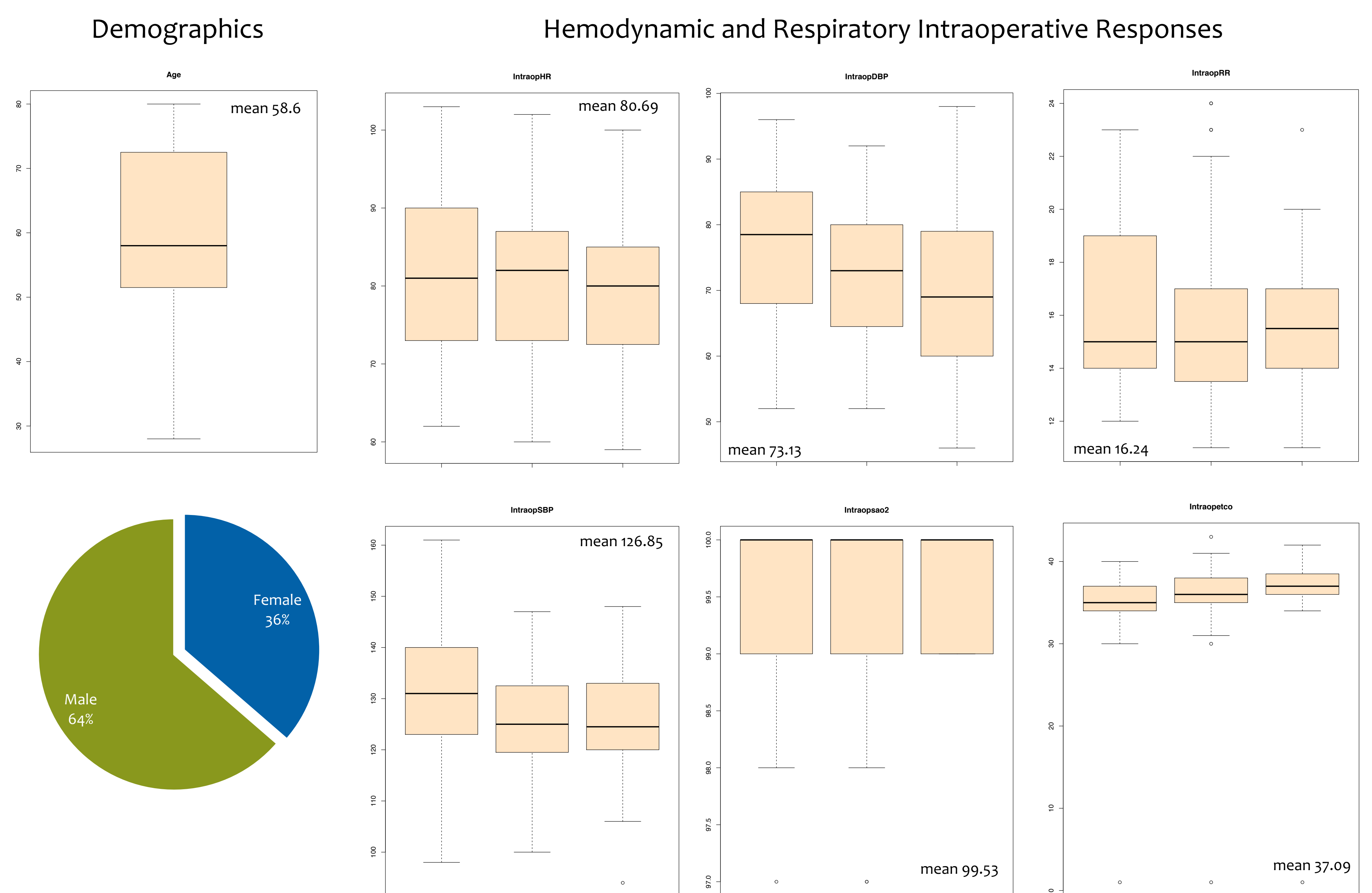
Outcomes	1	2	3	4	5	6	7	8
Blood Pressure	↔NS	↔NS	↑SS	↔NS	↔NS	↑SS	↔NS	NR
Heart Rate	↑NS	NR	NR	↑NS	↔CS	↑NS	↔NS	NR
Respiratory Rate	↔CS	↔CS	↔NS	NR	↔CS	NE	NR	NR
SaO ₂	NR	↑CS	↑CS	↑SS	↑NS	↑NS	NR	NR
EtCO ₂	NR	NR	↓CS	NR	NR	NE	NE	↓CS

SS= statistically significant findings, NS= non-statistically significant findings, CS= clinically significant findings, NE= not evaluated, NR= not reported
↓, worse; ↑, improve; —, no effect, ↔, maintain

PROJECT IMPLEMENTATION



RESULTS



IMPLICATION FOR PRACTICE

This project presents anesthesia providers with a safe, evidence-based approach that maintains hemodynamic stability, in patients undergoing minor surgical procedures using sedation and analgesia. Thus, contributing to better patient outcomes.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the anesthesia team members Lilliana Villar, CRNA, Jesamil Cruz, CRNA, Dr. María V. Castellvi, Dr. Peter Portilla and the OR faculty of the UPR Hospital Dr. Federico Trilla for their support and being key for the success of this project.

REFERENCES

1. Jalili, M., Bahreini, M., Doosti-Irani, A., Masoomi, R., Arbab, M., & Mirfazaelian, H. (2016). Ketamine-propofol combination (ketofol) vs propofol for procedural sedation and analgesia: Systematic review and meta-analysis. *American Journal of Emergency Medicine*, 34(3). DOI: 10.1016/j.ajem.2015.12.074
2. Yan, J. W., McLeod, S. L., & Iansavitchene, A. (2015). Ketamine-Propofol Versus Propofol Alone for Procedural Sedation in the Emergency Department: A Systematic Review and Meta-analysis. *Academic Emergency Medicine*, 22, 1003-1013. https://doi.org/10.1111/acem.1273
3. Kiliç, I., Doğan, G., Çakır, E., Akdur, F., Başkan, S., Serap, D., ... Gogus, N. (2017). Sedoanalgesia Administration with Propofol and Ketamine for Minor Urologic Interventions. *International Journal of Anesthesiology & Research*. 422-428. https://doi.org/10.19070/2332-2780-1700087
4. Lemoel, F., Contenti, J., Giolito, D., Boiffier, M., Rapp, J., Istria, J., ... Levraut, J. (2017a). Adverse Events With Ketamine Versus Ketofol for Procedural Sedation on Adults: A double-blind, randomized controlled trial. *Academic Emergency Medicine*, 24, 1441-1449. doi: 10.1111/acem.13226
5. Frizelle, H., Duranteau, J., & Samii, K. (1997). A Comparison of Propofol and Propofol-Ketamine Combination for Sedation During Spinal Anesthesia. *Anesthesia and Analgesia*, 84, 1318-22.
6. Nazemroaya, B., Majedi, M., Shetabi, H., & Salmani, S. (2018). Comparison of Propofol and Ketamine Combination (Ketofol) and Propofol and Fentanyl Combination (Fenofol) on Quality of Sedation and Analgesia in the Lumpectomy: A Randomized Clinical Trial. *Advanced Biomedical Research*, 24, 1-5. doi: 10.4103/abr.abr_85_18. eCollection 2018
7. Badrinath, Avramov, Shadrack, Witt & Ivankovich. (2000). The use of a ketamine-propofol combination during monitored anesthesia care. *Anesthesia and Analgesia*, 90, 858-62. DOI: 10.1097/0000539-200004000-00016
8. Mortero, R. F., Clark, L. D., Tolan, M. M., Metz, R. J., Tsueda, K., & Sheppard, R. A. (2001). The Effects of Small-Dose Ketamine on Propofol Sedation: Respiration, Postoperative Mood, Perception, Cognition, and Pain. *Ambulatory Anesthesia*, 92, 1465-9