



A Comparative study between Dexmedetomidine versus Propofol for sedation in upper GI endoscopy procedure considering effect on intraoperative vital data, patient amnesia and onset of recovery after the procedure

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

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List of Abbreviations

Abb.	Full term
<i>ACTH</i>	<i>Adrenocorticotropic hormone</i>
<i>ANOVA</i>	<i>Analysis of variance</i>
<i>ASA</i>	<i>American Society for Anesthesiologists</i>
<i>BIS</i>	<i>Bispectral index</i>
<i>BVMV</i>	<i>Bag-valve-mask ventilation</i>
<i>cAMP</i>	<i>Cyclic adenosine monophosphate</i>
<i>CBF</i>	<i>Cerebral blood flow</i>
<i>CMRO₂</i>	<i>Cerebral oxygen consumption</i>
<i>CNS</i>	<i>Central nervous system</i>
<i>DEX</i>	<i>Dexmedetomidine</i>
<i>DSST</i>	<i>Digit symbol substitution test</i>
<i>ECG</i>	<i>Electrocardiography</i>
<i>ED</i>	<i>Effective dose</i>
<i>EEG</i>	<i>Electroencephalogram</i>
<i>ERCP</i>	<i>Endoscopic Retrograde Cholangio-pancreatography</i>
<i>FDA</i>	<i>Food and Drug Administration</i>
<i>GABA</i>	<i>γ-aminobutyric acid</i>
<i>GI</i>	<i>Gastrointestinal</i>
<i>HR</i>	<i>Heart rate</i>
<i>ICP</i>	<i>Intracranial pressure</i>
<i>ICU</i>	<i>Intensive care unit</i>
<i>MAC</i>	<i>Monitored anesthesia care</i>
<i>MAP</i>	<i>Mean arterial blood pressure</i>

List of Abbreviations (cont...)

Abb.	Full term
<i>NIBP</i>	<i>Non-invasive blood pressure</i>
<i>NMLA</i>	<i>N-methyl-L-arginine</i>
<i>NO</i>	<i>Nitric oxide</i>
<i>PACU</i>	<i>Postanesthesia care unit</i>
<i>PCS</i>	<i>Patient-controlled sedation</i>
<i>PF</i>	<i>Propofol</i>
<i>PRST SCORE</i>	<i>Systolic Blood Pressure, Heart Rate, Sweating, Tears. Score</i>
<i>PSAA</i>	<i>Procedural sedation and analgesia</i>
<i>RR</i>	<i>Respiratory rate</i>
<i>SBP</i>	<i>Systolic blood pressure</i>
<i>SpO₂</i>	<i>Peripheral arterial oxygen saturation</i>

INTRODUCTION

Over the past 30 years, gastrointestinal (GI) endoscopy has become one of the most commonly performed procedures in clinical practice. Gastroscopy and colonoscopy have become established as the definitive diagnostic procedures for the upper gastrointestinal tract and colon, respectively. GI endoscopy is usually performed on an outpatient or day-case basis. During most of these examinations, the case is sedated to ensure patient comfort and enable the procedure to be completed without interference from patient restlessness (*Hassan et al., 2019*).

Although once largely diagnostic, GI endoscopy has evolved such that therapeutic procedures are often performed at the same time. This may prevent the need for major surgery. Safe and effective sedation has been a major factor in the development of therapeutic endoscopy (*Mori et al., 2018*).

Sedation for endoscopy reduces patient anxiety and pain. It increases the acceptability of procedures to patients, results in greater willingness to undergo repeat procedures, and improves endoscopists' satisfaction (*Vargo et al., 2018*).

As GI endoscopy is performed so frequently, it is vital that it is undertaken as safely as possible. However, all drugs used to sedate endoscopy patients can result in airway obstruction, hypotension or respiratory depression. In particular, even small doses of benzodiazepines may

occasionally induce prolonged apnea. Therefore, it is essential that endoscopy is performed only in a setting where complications can be promptly recognized and corrected; whatever drugs are used (*Zacharias et al., 2018*).

Procedural sedation produces a suppressed level of consciousness adequate enough to alleviate the unpleasantness and the pain induced by the procedure. It also aims to minimize the awareness and memories related to the procedure. On the other hand, the sedation should preserve spontaneous respiration and air-way protective reflexes (*Storan et al., 2019*).

AIM OF THE WORK

The aim of the study is to compare the use of propofol and dexmedetomidine in upper GI endoscopy regarding the hemodynamics, sedative effect and the patient satisfaction.

UPPER GIT ENDOSCOPY

An **endoscope** is used for looking inside hollow organs. Different from many other medical imaging techniques, endoscopes are inserted directly into the organ. Most often the term endoscopy is used to refer to an examination of the upper segment of the gastrointestinal tract, known as an esophagogastroduodenoscopy (*Wilkinson et al., 2010*).

Normal Results of Endoscopy

The oesophagus, stomach, and duodenum must be smooth and of normal colour. There must be no bleeding, growths, ulcers, nor inflammation (Figure 1, 2).



Figure (1): Normal esophagus
(*Wilcox, 2012*)

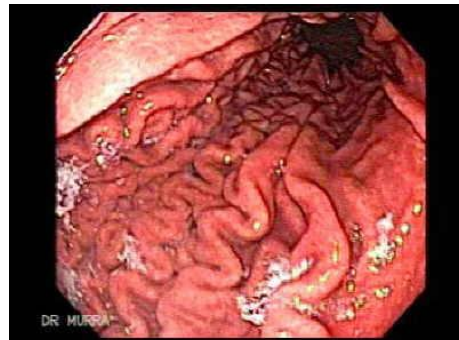


Figure (2): Normal stomach
(*Wilcox, 2012*)

Abnormal Results of Endoscopy

An abnormal endoscopy may be the result of:

- Celiac disease
- Oesophageal varices (Figure 3)
- Esophagitis
- Gastritis
- Gastroesophageal reflux disease
- Hiatal hernia
- Mallory-Weiss syndrome (oesophageal tear)
- oesophageal ring
- Tumours
- Ulcers, gastric or duodenal (Figure 4)

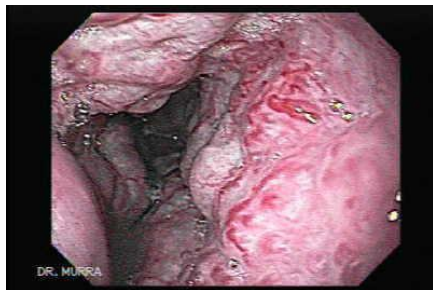


Figure (3): Esophageal varices
(Wilcox, 2012)



Figure (4): Peptic ulcer
(Wilcox, 2012)

Complications of endoscopy

Although it is considered safe under appropriate monitoring, it still carries some risks. The risks mostly involve cardiopulmonary complications such as hypoxia and changes in electrocardiography or blood pressure. The risks of pulmonary aspiration are usually overlooked, unless the patient has a history of gastrointestinal diseases such as gastroesophageal reflux disease, upper gastrointestinal bleeding, intestinal obstruction, and inadequate fasting time. Indeed, aspiration pneumonia is seldom observed in healthy patients undergoing regular endoscopy (*Gilbert et al., 2010*).

Sedation in Upper GI Endoscopy

Sedation is an essential part of most GI endoscopic procedures performed nowadays. The goals of sedation are to enhance the patient experience by reducing pain and anxiety, eventually leading to better compliance with recommended screenings and follow-up (*Trevisani et al., 2014*).

Anesthesia specialists have become progressively involved in sedation for screening colonoscopies, flying from 11% in 2001 to 53.4% in 2015. This increase is likely due to a perceived increase in satisfaction with propofol sedation compared with narcotic/benzodiazepine-based sedation (*Khaiyani et al., 2012*).

Relatively healthy patients who undertake simple procedures, such as endoscopy or colonoscopy, often bear the procedure fine with conscious sedation, which allivates anxiety, discomfort and pain without compramize of cardiovascular and ventilatory function (*Igea et al., 2014*).

The ideal sedative agent must allow for quick modification of the sedation level by adjusting the dosage and should not have any side effects. It should be inexpensive and have rapid onset and short duration of action without cumulative effects. The metabolites of the sedative agents should be deactivated at the end of the procedure, so that hospitalization is not lengthy. Because no such an ideal sedative agent occurs; opioids, benzodiazepines, barbiturates, propofol and antipsychotics can be given in combinations with each other (*VanNatta et al., 2006*).