

## PRE-ANESTHETIC MEDICATIONS IN PATIENTS UNDERGOING EXPLORATORY LAPAROTOMY: RESULTS OF A CROSS-SECTIONAL STUDY

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### ABSTRACT

**Objective:** The objective of this study was to understand the pattern of pre-anesthetic medication utilization in patients undergoing exploratory laparotomy.

**Methods:** In this cross-sectional study, we reviewed the records of patients who underwent exploratory laparotomy under general anesthesia. Descriptive data of the pre-anesthetic medications used in the patients are presented.

**Results:** A total of 49 patients with mean  $\pm$  SD age of 65.85 $\pm$ 34.15 years were included in the study. The study population was dominated by male patients (65.85%). Two major indications for exploratory laparotomy in the study population were perforation peritonitis 19 (38.77%) and intestinal obstruction 9 (18.37%). Ondansetron was used in all patients. Metoclopramide and ranitidine were used in 48 (98%) patients each. Midazolam was given to 43 (87.8%) patients. A total of 41 (83.7%) patients received anticholinergic agent glycopyrrolate or atropine. Pentazocine and fentanyl were used in 39 (79.6%) and 10 (20.4%) patients, respectively.

**Conclusion:** Ondansetron, metoclopramide, ranitidine, midazolam, glycopyrrolate, and pentazocine were the major pre-anesthetic medications in patients undergoing exploratory laparotomy. Glycopyrrolate was the most preferred anticholinergic agent.

**Keywords:** Drug utilization, Exploratory laparotomy, Pre-anesthetic medications.

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### INTRODUCTION

Drug utilization studies are useful for ensuring regular availability of routinely required medicines, especially in large multi-specialty clinical setups. Such studies are also important for ensuring rational use of medicines, understanding drug interactions and reducing the risk of adverse events. There are limited drug utilization studies showing a pattern of pre-anesthetic medicine usage in Indian settings.

Anxiety, pain and risk of post-operative complications are major concerns in patients undergoing surgery under general anesthesia. Pre-anesthetic medications are administered for prevention of anxiety and pain, facilitate operative procedure, and minimize the risk of complications [1]. Commonly used pre-anesthetic medications include benzodiazepines [2-4], anticholinergic agents [1,5-7], pentazocine [8,9], opioids [1], 5-HT<sub>3</sub> antagonists [10], and metoclopramide and ranitidine [11]. Recently, we reported drug utilization pattern of pre-anesthetic medicines in patients undergoing major surgeries under general anesthesia [12]. The pattern of pre-anesthetic medications may differ based on the type of surgery, anesthetic agent and profile of the patient.

### Objective

The objective of this study was to understand utilization pattern of pre-anesthetic medications in patients undergoing exploratory laparotomy.

### METHODS

This cross-sectional study was performed in a tertiary care hospital from Maharashtra. We reviewed utilization pattern of pre-anesthetic medications in patients from all age groups who underwent exploratory laparotomy under general anesthesia. Demographic data, indication for exploratory laparotomy and details of pre-anesthetic medications were recorded. Approval from the Institutional Ethics Committee was obtained before initiating the study.

### Statistical analysis

Categorical variables are presented as number and percentages whereas continuous variables are described as mean and standard deviations.

### RESULTS

A total of 49 patients were included. The mean  $\pm$  SD age of the patients was 65.85 $\pm$ 34.15 years. The age of patients ranged from 3 days to 76 years. The study included male patients predominantly (Table 1).

The number and percentages of indications for surgeries are shown in Table 2.

Two major indications for exploratory laparotomy were perforation peritonitis 19 (38.77) and intestinal obstruction 9 (18.37) (Table 2). Data for 2 (4.08%) patients were missing.

Ondansetron was used in all patients whereas metoclopramide and ranitidine were used in 48 (98%) patients each. Midazolam was used in 43 (87.8%) patients. Out of these, 41 (95.3%) patients received midazolam 1 mg whereas only 2 (4.7%) patients received midazolam 0.5 mg. A total of 41 (83.7%) patients received anticholinergic agent glycopyrrolate or atropine. Pentazocine and fentanyl were used in 39 (79.6%) and 10 (20.4%) patients, respectively (Fig. 1).

Table 1: Baseline characteristics

Parameter	Result (n=49)
Mean ( $\pm$ SD) age in years (n=35)	65.85 $\pm$ 34.15
Age range	3 days to 76 years
Male n (%)	27 (65.85)
Female n (%)	14 (34.15)

Table 2: Indications for exploratory laparotomy

Condition	n (%)	Condition	n (%)
Perforation peritonitis (alone, with pulmonary tuberculosis, strangulated incisional hernia, secondary to appendicitis, with ileal perforation, anastomosis leak, urinary bladder rupture)	19 (38.77)	Penetrating injury	1 (2.04)
Duodenal perforation with peritonitis	1 (2.04)	Renal cell carcinoma	1 (2.04)
Congenital diaphragmatic hernia	1 (2.04)	Malignant ovarian tumor	1 (2.04)
Bowel gangrene	1 (2.04)	Colon cancer	2 (4.08)
Peritonitis (alone or with small bowel obstruction)	2 (4.08)	Intestinal obstruction (alone, with gangrene, with ovarian tumor)	9 (18.37)
Blunt trauma to abdomen	2 (4.08)	Blunt abdominal trauma with liver laceration	1 (2.04)
Gastroschisis	2 (4.08)	Small bowel gangrene with peritonitis	1 (2.04)
Appendicitis with perforation	2 (4.08)	Stab injury to abdomen	1 (2.04)

Glycopyrrolate was given to 33 (67.3%) patients. Eight (16.3%) patients received atropine. In other 8 (16.3%) patients anticholinergic agent was not used (Fig. 2). Out of 33 patients who received glycopyrrolate, 31 (93.9%) patients received 0.2 mg whereas 2 (6.1%) patients received 0.1 mg.

Out of 10 patients who received fentanyl, 3 (6.12%) patients underwent exploratory laparotomy for intestinal obstruction and 2 (4.08%) for perforation peritonitis. One patient undergoing bowel gangrene, perforation, perforation peritonitis with a strangulated incisional hernia, gastroschisis, and malignant ovarian tumor each received fentanyl.

## DISCUSSION

Use of pre-anesthetic medicines for facilitation of surgery and decrease the risk of surgery-related complications is a common practice worldwide. There may be geographical variations in the pattern of pre-anesthetic medicine usage. In this study, we report the usage of pre-anesthetic medications in patients with exploratory laparotomy performed for various indications over the period of 6 months.

The study population was predominantly adult patients. The mean  $\pm$  SD age of patients was  $65.85 \pm 34.15$  years. The study included two babies; one of 3 days and other of 15 days. Perforation peritonitis was the most common indication for exploratory laparotomy in this study. Male population dominated the study population. Almost two-third study population was male. Separate gender-wise analysis may provide some valuable insights regarding indications for exploratory laparotomy.

Post-operative nausea and vomiting are the common problems in patients undergoing surgical procedures [10,13-15]. Risk of acid aspiration is another concern in patients undergoing surgery under general anesthesia [16]. Pre-anesthetic medicines are used to reduce gastric acid and volume of gastric secretion, increase gastric pH and reduce the risk of nausea and vomiting [13,16]. Ranitidine given is more effective than proton pump inhibitors in reducing volume of gastric secretion and increasing gastric pH [16]. Another prospective, randomized, double-blind study showed that intravenous prophylactic ranitidine and metoclopramide is useful to reduce the volume of gastric content and increase gastric pH [11]. In our study, use of ranitidine and metoclopramide injection was very common, and ondansetron, a 5 HT<sub>3</sub> antagonist [17,18] was given to all patients undergoing exploratory laparotomy.

Pre-operative intravenous administration of pentazocine is useful to reduce intraoperative hemodynamic changes and post-operative pain [9]. We observed common use of pentazocine as a pre-anesthetic medication for exploratory laparotomy. As pre-surgical period is often associated with stress, fear, and anxiety [19-21]. Benzodiazepines are commonly used as pre-anesthetic medications to reduce anxiety [19]. In a retrospective study from India, alprazolam was the most commonly used anti-anxiety benzodiazepine [19]. In our study, midazolam was the preferred. It is used as pre-anesthetic medication in adults as well as children [19,21].

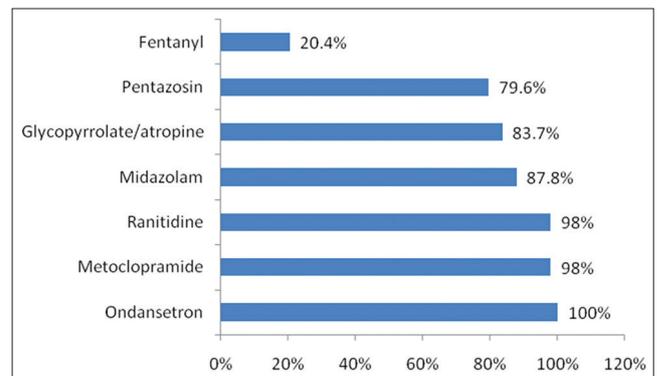


Fig. 1: Pre-anesthetic medications used in the study (n=49)

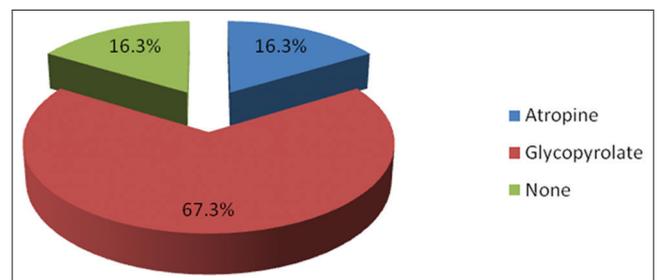


Fig. 2: Usage of anticholinergic agents as pre-anesthetic medication (n=49)

In an old survey, anticholinergic premedication use was reported in 36% and 56% of adults and children, respectively. The results showed atropine and hyoscine to be the most commonly used anticholinergic drugs [22]. In our study, 83.7% patients received either glycopyrrolate or atropine. Glycopyrrolate is more potent than atropine [5]. Glycopyrrolate was the preferred anticholinergic agent in our study as evidenced by its more than 4 times use compared to atropine.

Use of short-acting opioids such as fentanyl for the management of post-operative pain and reduction of surgical stimulation during anesthesia management is common [23]. We observed a considerable difference in the usage pattern of fentanyl in patients undergoing exploratory laparotomy. Although 19 patients underwent exploratory laparotomy for perforation peritonitis, only two of them received fentanyl. Similarly, nine patients underwent surgery for intestinal obstruction, but three received fentanyl. We feel that the reasons for the use of fentanyl may be related to the severity of pain.

Our study results provide useful insights regarding the use of pre-anesthetic medicines in a tertiary care center. However, our study has some limitations. Considering small sample size, cross-sectional retrospective study design and single center data, observations of our study should be carefully extrapolated.

**CONCLUSION**

The major pre-anesthetic medications used in patients undergoing exploratory laparotomy include ondansetron, metoclopramide, ranitidine, midazolam, glycopyrrolate, and pentazocine. Glycopyrrolate is the most preferred anticholinergic agent in these patients.

**AUTHOR'S CONTRIBUTIONS**

Dr. Madhuri Kulkarni conceptualized the study, collected data, assisted in statistical analysis and writing manuscript. Dr. Anant Patil performed literature, Search, statistical analysis of the data and wrote the manuscript.

**CONFLICT OF INTEREST**

None.

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