

## INCIDENCE OF POST-OPERATIVE ADR OF ANESTHETICS IN TERTIARY CARE TEACHING HOSPITAL: CLINICAL PHARMACIST PERSPECTIVES

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### ABSTRACT

**Objective:** The objective of the study was to evaluate the use of anesthetics in various general surgical conditions and to identify the adverse clinical outcomes of anesthetics in post-operative patients using questionnaire and verbal rating scale (VRS) score and to assess the treatment pattern of adverse clinical outcomes of anesthetics.

**Methods:** A prospective study was carried out in the Inpatient Department of General Surgery and ICU in S.R.M Medical College Hospital and Research Center involving patients up to 65 years of age. A total of 160 patients were recruited for the study based on inclusion and exclusion criteria. Patient demographics, medical history, type of surgery, type of anesthetics, duration of anesthesia, ASA Grade physical status, system examination, general examination, vital signs, and anesthetics drugs were assessed using pro forma. Adverse clinical outcomes of anesthetics were assessed using VRS score. Day of incidence of adverse outcomes was also monitored, and management of post-operative side effects and its effectiveness were assessed.

**Results:** During the study period, approximately 50% of the patient's undergone general anesthetics reported post-operative pain. The incidence of post-operative nausea/vomiting, sore throat, and cough was highest in patient's undergone general anesthetics. The adverse outcomes were measured by VRS score, showed that mild adverse outcomes were predominated.

**Conclusion:** Patients who undergone general anesthetics developed high risk of adverse outcomes. The post-operative recovery of the patient was the main challenge. If an adverse drug reaction is not monitored the patients satisfaction can be weakened in general surgery. Hence, it is concluded that pharmacists can play a major role in assessing adverse clinical outcomes and its management.

**Keywords:** Anesthesia, General surgery, Post-operative, Verbal rating scale.

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### INTRODUCTION

An estimated 234 million surgical cases occur worldwide each year. The impact of this burden on individuals, health-care providers, and society as a whole is difficult to estimate, but there are data suggesting that in developed nations, surgical mortality may be between 0.4% and 0.8% and complications may occur in between 3% and 17% of patients. These data highlight post-operative morbidity and mortality as a major public health issue. As a result, development of strategies aimed at reducing post-operative morbidity and mortality is a major health challenge. Various interventions aimed at improving surgical outcomes [1].

Surgery induces important disturbances in body homeostases such as hypercatabolism, hypercoagulability, and inflammation, leading to a series of symptoms, and signs such as hypoxemia, pain, nausea, vomiting, ileus, sleep disturbances, and fatigue, and complications including pneumonia and myocardial infarction [2,3] areas of the body treated by general surgery include the stomach, liver, intestines, appendix, breasts, thyroid gland, salivary glands, some arteries and veins, and the skin. The brain, heart, lungs, eyes, feet, kidneys, bladder, and reproductive organs, to name only a few are areas that require specialized surgical repaired in a standard surgical residency. However, post-operative symptoms such as pain and nausea have been reported to occur frequently in the immediate post-operative period [4-6].

Anesthesia facilitates a patient's ability to tolerate surgery and other procedures, and so it serves a vital function in health care. Anesthesia is provided by physicians, dentists, and nurse anesthetists and is essential for the over 26 million surgeries performed in the United States each year. The variation in anesthesia is due to the individual differences in

patients and patient's preferences, the requirements of the surgery, the large selection of anesthetic agents to choose from, and the preference of the anesthesia provider.

### METHODS

A prospective study was carried out in the Inpatient Department of General Surgery and ICU in S.R.M Medical College Hospital and Research Center involving patients up to 65 years of age. 160 patients were enrolled for the study based on inclusion and exclusion criteria. Patient demographics, medical history, type of surgery, type of anesthetics, duration of anesthesia, ASA Grade physical status, system examination, general examination, vital signs, and anesthetics drugs were assessed using pro forma. Adverse clinical outcomes of anesthetics were assessed using verbal rating scale (VRS) score. Day of incidence of adverse outcomes was also monitored, and management of post-operative side effects and its effectiveness were assessed.

### Ethical aspects

The study was approved by the Institution Ethics Committee of the SRM Hospital. The investigators signed a commitment term related to data utilization for the study purposes, ensuring the ethical aspects, according to the resolution.

### RESULTS

A total of 160 patients were recruited in the study. Post-operative questionnaire was successful in 150 patients. 15 patients were discarded from the study due to incomplete records. Thus, finally 135 samples were enrolled for the study.

**Type of surgery**

Table 1 shows that Lap. appendectomy was found to be most common surgery done with 14% followed by hemorrhoidectomy (13%) and split skin graft (12%).

**Type of anesthetics**

General anesthetics were found to be used more than spinal anesthetics. Table 2 shows that the percentage of general anesthetics used was 52% and spinal anesthetics used was 42%.

**Duration of anesthesia compared with the adverse outcomes**

Table 3 showed that the adverse outcomes were predominated in the duration of anesthesia >1 h. In the duration of anesthesia <1 h, pain occurred was found to be 15, followed by vomiting, backache 4, and headache were found to be 0. In the duration of anesthesia >1 h, pain occurred was found to be 52, followed by vomiting 18, nausea 10, and headache were found to be 6.

**Table 1: Distribution of type of surgery**

Type of surgery	Frequency (%)
Lap. appendectomy	19 (14.1)
Mesh plasty	15 (11.1)
Open appendectomy	16 (11.9)
Total thyroidectomy	9 (6.7)
Split skin graft	17 (12.6)
Excisional biopsy	8 (5.9)
Open cholecystectomy	11 (8.1)
Lap. cholecystectomy	3 (2.2)
Hemorrhoidectomy	18 (13.3)
Lap. splenectomy	5 (3.7)
Hernioplasty	4 (3.0)
Amputation	10 (7.4)
Total	135 (100.0)

**Table 2: Distribution of type of anesthetics**

Type of anesthetics	Frequency (%)
General anesthetics	70 (51.9)
Spinal anesthetics	65 (48.1)
Total	135 (100.0)

**Table 3: The duration of anesthesia compared with the adverse outcomes**

Adverse outcomes	Duration of anesthesia		Total
	<1 h	>1 h	
Head ache	0	6	6
Pain	15	52	67
Sore throat	0	4	4
Cough	1	6	7
Vomiting	4	18	22
Nausea	2	10	12
Backache	4	7	11
Fever	1	5	6
Total	27	108	135

**Table 4: The distribution of ASA - grade in surgical patients**

ASA grade	Frequency (%)
ASA-I (healthy patients)	68 (50.4)
ASA-II (mild systemic disease)	64 (47.4)
ASA-III (moderate systemic disease)	3 (2.2)
Total	135 (100.0)

**Distribution of ASA - grade in surgical patients**

The ASA-I healthy patients were found to be undergone general surgery more as compared to other ASA grades. The percentage distribution of ASA-I patients (healthy patients) was found to be 50% followed by ASA-II (mild systemic disease) 48% and ASA-III (moderate systemic disease) 2% as shown in Table 4.

**Adverse outcomes of anesthetics in post-operative patients**

Table 5 showed that among all the post-operative symptoms, pain (50%) was found to be the most frequently reported symptom followed by vomiting (16%) and nausea (9%).

**Table 5: The distribution of adverse outcomes of anesthetics in post-operative patients**

Adverse outcomes	Frequency (%)
Headache	6 (4.4)
Pain	67 (49.6)
Sore throat	4 (3.0)
Cough	7 (5.2)
Vomiting	22 (16.3)
Nausea	12 (8.9)
Backache	11 (8.1)
Fever	6 (4.4)
Total	135 (100.0)

**Table 6: Comparison between the type of anesthetics and adverse outcomes**

Adverse outcomes	Type of anesthetics		
	General anesthetics	Spinal anesthetics	Total
Headache	1	5	6
Pain	41	26	67
Sore throat	4	0	4
Cough	6	1	7
Vomiting	14	8	22
Nausea	9	3	12
Backache	1	10	11
Fever	6	0	6
Total	82	53	135

**Table 7: The day of incidence of adverse outcomes**

Day of incidence	Frequency (%)
POD-I	100 (74.1)
POD-II	31 (23.0)
POD-III	4 (3.0)
Total	135 (100.0)

**Table 8: The measurement of VRS score of adverse outcomes**

Adverse outcomes	VRS-score				Total
	None	Mild	Moderate	Severe	
Headache	0	5	1	0	6
Pain	0	21	42	4	67
Sore throat	0	4	0	0	4
Cough	0	7	0	0	7
Vomiting	0	21	1	0	22
Nausea	0	12	0	0	12
Backache	0	10	1	0	11
Fever	0	6	0	0	6
Total	0	86	45	4	135

VRS: Verbal rating scale

Table 9: The treatment pattern of adverse outcomes of anesthetics in post-operative patients

Adverse outcomes	Treatment						
	Nil	Tramadol (100 mgim)	Diclofenac (75 mg iv)	Ondansetron (4 mg iv)	Paracetamol (650 mg oral)	Syp.Ascoril (oral)	Betadine gargle
Headache	0	1	5	0	0	0	0
Pain	0	46	21	0	0	0	0
Sore throat	2	0	0	0	0	0	2
Cough	2	0	0	0	0	5	0
Vomiting	0	0	0	22	0	0	0
Nausea	0	0	0	12	0	0	0
Backache	0	1	10	0	0	0	0
Fever	3	0	0	0	3	0	0
Total	7	48	36	34	3	5	2

Table 10: The effectiveness of therapy in post-operative patients

Adverse outcomes	Effectiveness of therapy		Total
	Effective	Not effective	
Headache	6	0	6
Pain	48	19	67
Sore throat	4	0	4
Cough	7	0	7
Vomiting	22	0	22
Nausea	12	0	12
Backache	11	0	11
Fever	6	0	6

#### Comparison between the type of anesthetics and adverse outcomes

Table 6 shows that the incidence of adverse outcomes was found to be more with the use of general anesthetics. The patients suffering from pain in general anesthetics were found to be 41 followed by vomiting 14 and nausea 9. The patients suffering from pain in spinal anesthetics were found to be 26 followed by backache 10 and vomiting 8. The Chi-square value was found to be 26.594 which was statistically significant at  $p < 0.001$ .

#### Day of incidence of adverse outcomes

The adverse outcomes occurred were found to be more in the post-operative day 1 than the 2<sup>nd</sup> and 3<sup>rd</sup> day. The percentage distribution of adverse outcomes occurred in post-operative day 1 was found to be 74%, whereas on post-operative day 2 it was found to be 23% and on post-operative day 3 it was found to be 3% as shown in Table 7.

#### Measurement of VRS score of adverse outcomes

The adverse outcomes of anesthesia were measured by VRS score. Table 8 shows that mild headache was found in 5 patients and moderate headache in 1 patient. Moderate pain was found to be more in 42 patients followed by mild in 21 patients, and severe pain was found in 4 patients. In the case of vomiting, mild was found in 21 patients and moderate was found in only 1 patient. Mild backache was found in 10 patients, moderate backache was found in 1 patient, and mild fever was found in 6 patients. Chi-square value was found to be 61.087 which was statistically significant at  $p < 0.001$ .

#### Treatment pattern of adverse outcomes of anesthetics in post-operative patients

In the study, it was observed that injection diclofenac 75 mg was found to be prescribed more for pain followed by backache and headache. Injection tramadol 100 mg was found to be prescribed more for pain followed by headache and backache. Injection ondansetron was found to be prescribed more for vomiting followed by nausea as shown in Table 9.

#### Effectiveness of therapy in post-operative patients

The treatment was found to be effective for 116 patients. 19 patients who suffered from pain reported that the treatment was not as effective as shown in Table 10.

#### DISCUSSION

The role of adverse clinical outcomes of anesthetics after general surgery is often underestimated [7,8]. Compared to other perioperative complications it might seem to be of minor importance. It rarely kills the patient and almost never becomes chronic. However, it is a very unpleasant experience for patients. All of these results in prolonged ICU stay, delayed discharge from the hospital and, last but not least, have an economic impact. Hence, it is more urgent necessity to minimize the occurrence of adverse clinical outcomes of anesthetics after surgery so that the patients could be discharged early after surgery [9].

The progress of the post-operative recovery process remains to be studied from a patient perspective. The patient reported questionnaire addressed in this study could be useful to study adverse clinical outcomes of anesthetics after general surgery [10,11]. This improves their understanding about the adverse clinical outcomes and importance of medication decreased the morbidity rate.

The development of adverse outcomes postoperatively is influenced by many factors-type of patients, type of anesthetics, duration of anesthesia, etc. Nausea, vomiting, pain, headache, backache, sore throat, cough, and fever were found to be common among the more frequent minor sequel that occurred after general surgery [12].

The type of anesthetics was found to play a role in determining the adverse outcomes. Approximately 50% of the patients undergoing general anesthetics reported post-operative pain. The incidence of post-operative nausea/vomiting, sore throat, and cough was found to be high in patients undergoing general anesthetics. The incidence of backache and headache was highest in local anesthetics patients followed by spinal anesthesia [13,14].

The adverse outcomes were measured by VRS score which showed that mild adverse outcomes were predominated. Optimal management was given to patients and was found to be effective. Similar results were found in the study conducted by Guillermo *et al.* who reported that predicting the post-operative grade of the patient in the 1<sup>st</sup> h after surgery was effective in the faster recovery of patients.

#### CONCLUSION

In this study, postoperatively pain, nausea and vomiting, headache, cough, fever, backache, and sore throat were found to be the most frequent adverse outcomes of anesthetics in general surgery. Patients undergone general anesthetics were at developed high risk of adverse outcomes. The lowest complication was associated with local anesthetics. The post-operative recovery of the patient is the main challenge. If it is not monitored the patient's satisfaction can be diminished in general surgery. These studies may improve anesthetic care and will assist in the development of new treatment strategies for improving adverse outcomes. Hence, it is concluded that pharmacists can play a major role in assessing adverse clinical outcomes and its management.

**CONFLICTS OF INTEREST**

All authors have none to declare.

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