



RESEARCH ARTICLE

Evaluation of Anesthetic Drugs and Disposables Wastage in the Operating Room: Cross Section Study

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Abstract

Context:

The cost of anesthetic technique has three main components that is disposable supplies, equipments, and anesthetic drugs. More often they are overprescribed or wastage can happen.

Aim:

To estimate the amount of anesthetic drug wastage in operation theatres (OT) and to determine the amount of disposable wastage in OT's conducted for surgeries.

Settings and Design:

Cross section study conducted in 12 operation theatre room of tertiary care hospital.

Materials and methods:

Drug wastage was considered as the amount of drug left unutilized in the syringes/vials after completion of case. An estimation of cost and wastage of drug was made.

Results:

The study revealed that out of 34 total participants, majority of them were females (64.7%), with mean age of study participants is 45.44 ± 19.6 years. Drug wastage varied from 2.9%(adrenaline) to 100%(atropine), with an overall mean wastage rate of 54%.In addition to the drugs, a high amount of waste was the syringes (24.5%). With consumption rate of 95.4%.
Conclusions: Judicious use of drugs and disposables with appropriate interventional measures can effectively decrease this cost.

Key words:

Anesthetic drugs, Cost, Operation theatre, Wastage

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1 | INTRODUCTION

Anesthetists are often called to react promptly to a Patient's sudden pathophysiology variations. Pharmacological treatments for critical processes should be initiated as rapidly as possible. Intravenous drugs do not always come in prefilled syringes (PFSs), but need to be drawn from a vial and diluted into a syringe. This is time consuming procedure and a potential cause of attention diversion from patient care. For this reason, it is a standard practice to prepare the main anesthesia and emergency drugs in advance. However, surveys have shown 20%-50% of the unused prepared drugs have to be discarded, contributing to the production of hospital waste¹.

The cost of anesthesia drugs and equipment has increased considerably and this may have important implications especially in poor countries. A major area of decreasing the cost of anesthesia is through a decrease in drug wastage, which may decrease the cost of anesthesia without compromising on the quality of care being given.

2 | MATERIALS AND METHODS

SOURCE OF DATA:

This study was conducted on 31 Patients admitted for surgery in R. L. Jalapa Hospital and Research Centre, Tamaka, Kolar.

- Study Design: Cross sectional study.
- Study area: 12 operation theaters (OT) of the Sri Devaraj Urs Medical College, Kolar
- Study participants: Patients posted for surgeries
- Duration of study: 3 months.
- Sampling Method: Purposive sampling, where in there are 12 OT under institute all were included.

Sample size:

Based on previous study by Dr.Kapil Chaudhary et.al.considering the maximal wastage in drug lignocaine of 93%.Using the formula $4pq/d^2$

Sample size = $4pq/d^2$

p - 93%

q-(100 -93) =7

d- Relative precision of 10% of 93 =9.3

$n = 4 \times 93 \times 7$

$(9.3)^2$

$n = 2604 = 30.107$

86.49

n = 31

31 subjects were included in the study

INCLUSION CRITERIA

- Age 20 to 80 years
- Either sex
- ASA physical status 1 and 2
- Patients undergoing elective surgery- included surgery, ENT, OBG, neurosurgery, orthopedic surgery, oncology surgery.

EXCLUSION CRITERIA

- Patients undergoing emergency surgery.

3 | ANALYSIS AND STATISTICAL METHODS

• After obtaining permission from the ethical committee, this study was conducted in 12 OT,s of our institute. Patients undergoing various surgical procedures were selected randomly by computer generated random numbers. Informed consent was taken from patients. Pre tested semi- structured questionnaire was used to determine the amount of anaesthetic drug and disposable wastage in OT. For data collection excel sheet was used and presented as percentage and average.

4 | RESULTS:

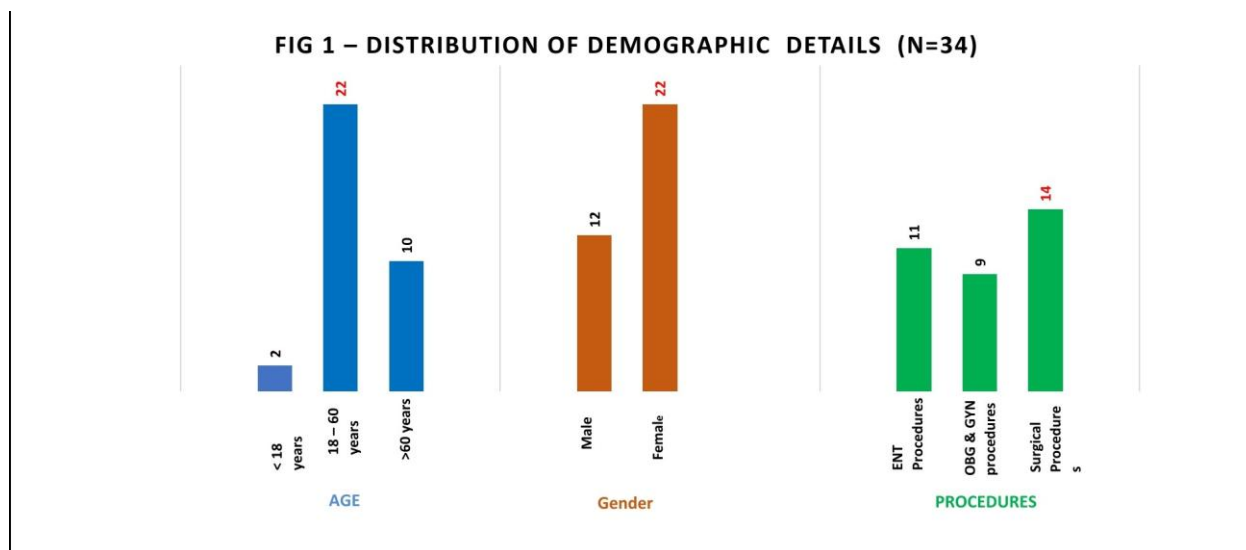
The study revealed that out of 34 total participants, majority of them were females (64.7%), with mean age of study participants is 45.44 ± 19.6 years. Drug wastage varied from 2.9%(adrenaline) to 100%(atropine), with an overall mean wastage rate of 54%.In addition to the drugs, a high amount of waste was the syringes (24.5%). With consumption rate of 95.4%.

Table 1: Details of drugs used and wastage

Name of the Drug	Amount of the drug loaded (in ml)	Amount of the drug used (in ml)	Amount of drug wasted (%)
PROPOFOL	1000	686	314 (31.4)
THIOPENTONE	0	0	0 (0)
SUCCINYLCHOLINE	44	38	6 (13.6)
LIGNOCAINE	66	35	31 (47%)
ATROPINE	34	0	34 (100)
FENTANYL	220	211	9 (4.1%)
PETHIDINE	30	9	21 (70%)
VECURONIUM	520	282	238 (45.7%)
GLYCOPYRROLATE	72	72	0 (0)
NEOSTIGMINE	175	129	46 (26.2%)
MIDAZOLAM	6	2	4 (66.6)
MEPHENTERMINE	170	11	159 (93.5%)
ADRENALINE	1	0	1 (100)

Table 2: Usage of Disposables and wastage

Name of the disposal	Number of disposals planed	Number of disposal used	Number of disposals wasted (%)
10ML SYRINGE	124	119	5 (4.3)
5ML SYINGE	119	108	11(9.2)
2ML SYRINGE	138	126	12(8.6)
IV SET	35	34	1(2.8)
BG SET	5	5	0(0)
IV CANNULA	40	36	4(1)
10 COM EXTENSION	2	2	0(0)
100 CM EXTENSION	19	17	2(11.7)
ETT	23	20	3(13.1)
ECG LEADS	202	199	3(1.4%)
SPINAL NEEDLE	13	12	1(7.6)
The consumption rate of 95.4%.			
TOTAL	2338	1475	863 (30)
The overall mean wastage rate of 30%.			



5 | DISCUSSION

In this study we decided to look at direct costs of disposables and drugs used in Anaesthesia practice. The drug expenditures can also be limited by decreasing wastage of drug's used. Decreasing waste is an attractive strategy because it doesn't limit specific drug selection by Anaesthesia provider. Waste is defined as the appropriate or inappropriate disposal of unused or partially used ampoules, vials, syringes or drugs.

Preparing the emergency drugs and regular anaesthesia drugs can be a part of protocols or standard of care. Some times 20%–50% of the prepared drugs can remain unused and may be discarded. So optimizing drug use can be an attractive strategy for both cost containment and sustainability.¹

We observed that the maximum percentage wastage of loaded drugs was seen with Atropine and Mephentermine, which showed wastage of about 100% and 93.5% respectively. 1 ampoule Atropine was loaded preoperatively as a Prophylaxis for treatment of any intraoperative bradycardia.

It was found that no patient required more than 20ml of Propofol for induction of anaesthesia. Majority of wastage of Propofol observed were due to drug left in the vial. So, prudent way would be to load up to upper limit range for induction (2.5mg/kg) which would be less than 20ml for average 60-70kg patient as to prevent wastage due to drug left in the syringe.

Kanival et al found that propofol, thiopentone sodium, vecuronium, mephentermine, lignocaine, midazolam, atropine, succinylcholine, and atracurium are wasted more. It amounted to Rs. 59,631.49,per year.²

Mephentermine wastage can be minimized by avoiding the loading of 30mg in each case and instead loading 15mg in cases anticipating hypertension.

Chaudary et al reported wastage was more with adrenaline and lignocaine (100% and 93.63%, respectively) and the cost was 46.57% (Rs. 16,044.01) of the total cost of drugs issued/loaded (Rs. 34,449.44)³.

Proper fluid pre-loading/ co-loading before neuroaxial anaesthesia, assessment of vascular status of the patient and assessment of the level of sensory block may be helpful in predicting the need of Mephentermine. Easy availability of the drug intraoperative in case of need should also be observed.

The drug doses should be calculated for each case being posted in operation theatre based on patient weight and the usual dose range of that drug for the procedure. The calculated dose may be displayed on the machine before the start of each case. This would help in estimating the drug need of the patient for that procedure and ensure appropriate loading thus preventing wastage.

The use of ampoule cutters to break ampoules reduces the wastage due to breakage of ampoule before loading.

Educational programmes if conducted may help on this issue of cost containment and can definitely bring down the overall health care expenditure⁴.

Anesthetic cost can come from pharmacological and equipment based use, so decreasing drugs and materials wastage without compromising quality of patient care is of utmost importance and financial burden can be lessened.⁵

6 | CONCLUSION

We conclude that drug wastage and final loss may be significant during anesthetic management. The use of drugs should not and cannot be restricted to decrease costs and hence compromise patient care, the simple measures suggested would be helpful in decreasing drug wastage and cost of anesthetic without altering the quality of patient care.

7 | REFERENCES

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