

A Study on Drug Wastage and Cost Analysis of Anaesthetics in A Secondary Care Hospital

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Abstract

Introduction: Anesthesia is state of temporary induced loss of sensation which is used during surgeries.

Aim: To estimate the drug wastage and cost of different anesthetics.

Method: A Prospective observational study was done in a secondary care hospital of OBG and general surgeon department. The data was categorized based on different parameters like gender, age, prescribing drugs during hospital stay, route of administration, drug left and cost of drug left of anesthesia during hospital stay, types of operations and project appraisal.

Result: Among all the 150 cases, the most commonly used anesthetic drug was bupivacaine in the age group of 20-30 years which was observed mostly in females. The drug wastage and cost analysis was observed in the following pattern of bupivacaine (50%) (Rs.876.85), propofol (1.25%) (Rs.35), vecuuronium (1.7%) (Rs.207), myoglucopyrolate (25%) (Rs.140) and ketamine (9.09%) (Rs.174).

Conclusion: From our study we conclude that bupivacaine 2ml ampoules can be used instead of 4ml ampoules to reduce drug wastage and cost of the drug as 4ml ampoules are available in the market. Similarly ketamine can also be reduced to 2ml dosage instead of using 5ml.

Keywords: anesthetics, drug wastage, cost analysis.

Date of Submission: 13-02-2018

Date of acceptance: 01-03-2018

I. Introduction

Anesthesia is the substance that makes loss of bodily sensation with or without loss of consciousness. Anesthesia in other words can be defined as insensitivity to pain, especially as artificially induced by the administration of gases or the injection of drugs before surgical operations

II. Types Of Anesthesia:-

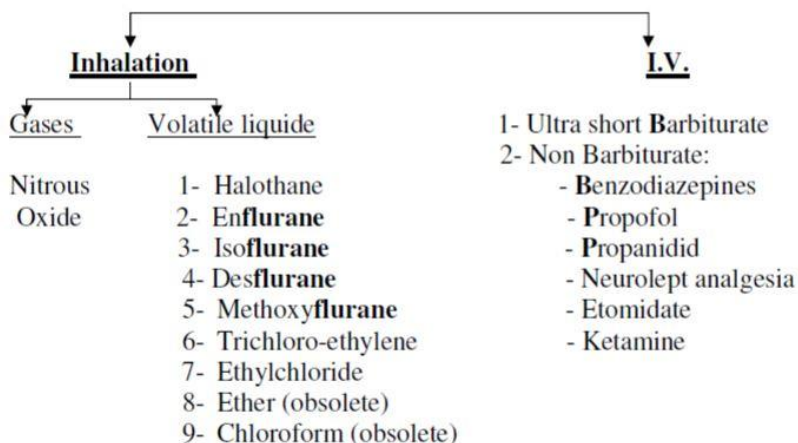
- 1) General anesthesia
- 2) Local anesthesia
- 3) Regional anesthesia

GENERAL ANESTHESIA: General anesthesia is the state produced when a patient receives medication for amnesia, analgesia, muscle paralysis and sedation. General anesthesia acts primarily on the brain and central nervous system to make the patient unconscious and unaware. It is administered via circulatory system by a combination of inhaled gas and injected drugs.

CLASSIFICATION OF GENERAL ANESTHESIA:-

The general anesthetics are divided into 2 categories i.e., inhalation and intravenous.

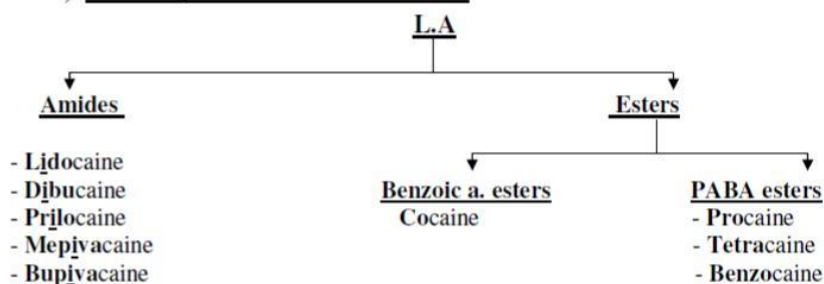
Classification:



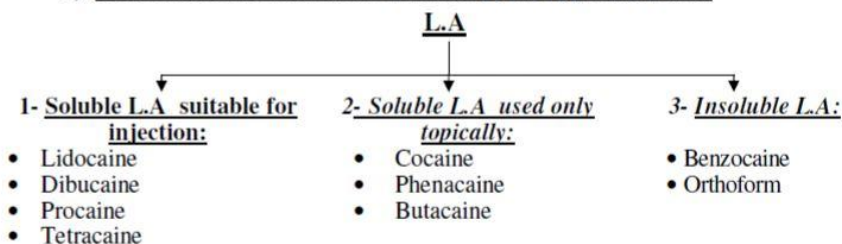
2. LOCAL ANESTHESIA: Local anesthesia involves the injection or application of an anesthetic drug to a specific area of the body, as opposed to the entire body and brain as occurs during general anesthesia

Classification:

a) According to their chemical structure.



b) According to their solubility and therapeutic application into:



Local anesthetics are classified in two groups that is AMIDES and ESTERS, among esters it is further classified in to two groups that is BENZOIC ESTERS and PABA ESTERS

III. Regional Anesthetics:

Regional anesthesia is the use of local anesthetics to block sensations of pain from a large area of the body, such as an arm or leg or the abdomen. Regional anesthesia allows a procedure to be done on a region of the body without your being unconscious.

DRUG WASTAGE

Drug wastage means the drug amount that is discarded and not administered to any patient. Generally two types of vials are used they are –

- Single use vials: is a vial of medication intended for administration by injection or infusion that is meant for use in a single patient for a single procedure. These vials are labeled as single dose or single vial by the manufacturer and typically do not contain a preservative.
- Multi dose vials: is a vial of medication intended for administration by injection or infusion that contains more than one dose of medication. These vials are labeled as multi dose by the manufacturer and typically contain an antimicrobial preservative to help prevent growth of bacteria

COST ANALYSIS

- Cost analysis is defined as the act of breaking down a cost summary in to its constituents and studying and reporting on each factor.
- Comparison of cost purpose of disclosing and reporting on conditions subjective improvement
- Cost analysis in the wastage is done through the drug which is left in vials. The amount of drug left is taken in quantity (ml) according to (ml) left in vial cost is analyzed.

METHODOLOGY:

OBJECTIVES:

- To determine the prescription pattern of anesthetics.
 - To determine the types of anesthetics administered in various surgeries.
 - To determine frequency of administration of general anesthetics, local anesthetics and regional anesthetics.
- To estimate the drug wastage and cost of different anesthetics

IV. Materials And Methods:

The data was collected in a predesigned Performa from the medical case sheets, drug charts, and physical observation of 150 in-patients. This was a prospective observational study carried out for in-patients in surgical and gynaecology departments. Prescribing data are usually extracted from inpatient prescription forms. Prescribing data were extracted from patient records. Information that may be obtained from prescriptions includes patient demography, drug name, dosage form, strength, dose frequency, route of administration and duration of treatment. Anaesthetics co-prescribed with other Anaesthetics, varies Anaesthetics utilization in hospital stay, department wise Anaesthetics utilization.

2.1.1 STUDY SITE: Vijay Marie Hospital, Khairatabad, Hyderabad.

2.1.2 STUDY DESIGN: Study is designed to be a Prospective Observational Study.

2.1.3 STUDY PERIOD: Study will be conducted over period of 6 months.

2.1.4 STUDY SUBJECTS: The participants enrolled in the study involved in patients admitted in the hospital, only after filling a properly written informed consent. Basic demographic information and details of prescribing patterns of anaesthetics, surgeries for which they were indicated, dosage form of anaesthetics, route of administration and whether single or in combination anesthesia is used.

2.1.5 STATISTICAL ANALYSIS: Descriptive analysis will be done by using simple percentage mean method.

2.3 SELECTION CRITERIA:

2.3.1 INCLUSION CRITERIA:

- Department of Surgery
- Department of gynecology

2.3.2 EXCLUSION CRITERIA:

- Nil

2.4 SOURCE OF DATA: Patient data relevant to our study was obtained from the following sources and recorded in the well designed patient data collection form:

- Treatment chart/case sheet, lab report.

2.5 DATA COLLECTION:

A Performa were designed and pre tested to be used for entry of patient's specific information. The format provided the following information:-

- Patient's Name
- IP Number
- Bed number , ICU room name
- Age, Sex
- Date of admission (DOA) and Date of discharge (DOD)
- Different specialties and consultant name
- Previous drug allergy
- Diagnosis
- Past medical & medication history
- Dose of the drug
- Dosage form
- Route of administration
- Frequency of administration
- Anesthetics prescribed at the time of surgery
- Patient demographic details, medical and medication history will be collected and will be documented in a suitably designed data collection form.

2.6 ITEMS MONITORING IN THE STUDY:

1. Sex and age distribution of patients.
2. Types of Anesthesia prescribed.
3. Duration, dosage form & route of administration of Anesthetics.
4. Anesthetics co-prescribed with other anesthetics.
5. Department wise anesthetics utilization.
6. Monitoring cost evaluation anesthetics.
7. Monitoring cost evaluation of anesthetics as per wastage.
8. Monitoring drug left or drug wastage amount in 150 cases.
9. Monitoring number of anesthetics and number of units calculated in 150 cases.
10. Monitoring number of monotherapy and combinational therapy were done.

2.7 LIMITATIONS:

- There are maximum gynecological operations were present, very few were other cases.
- Few anesthetics were used.

V. Results & Discussions:

3.1 TOTAL NUMBER OF PATIENTS:

Corresponding to table (3.1) represents One hundred fifty (150) patients were treated with anesthetics during the six months period of study from July to November 2017.

The study included total of 150 patients among which 142(94.6%) patients were female and 8(5.3%) patients were male.

3.2 DISTRIBUTION OF PATIENTS AGE:

Corresponding to table 3.2 represents age with gender distribution of the study population. It was found that 01(0.6%) patient was between the age of <1 year out of which 1 patient was female and 0 were male. 7(4.6%) patients were between the age of 10 to 20 years, out of which 5 were female and 2 were male. 105(70%) patients were between the age of 20 to 30 years, out of which 103 were female and 02 were male. 22 (14.6%) patients were between the age of 30 to 40 years, out of which 20 were female and 2 were male. 6(4%) patients were between the age of 40 to 50 out of which 06 were female and 0 were male. 6(4%) patients were between the age of 50 to 60 years, out of which 4 were female and 2 were male. 4(2.6%) patients were between the age of 60 to 70 years, out of which all 4 were female. Among all the age groups, 20-30 years of age were given the highest number of anesthetics (70%).

3.3 ROUTE OF ADMINISTRATION:

Corresponding to the table (4.3) represents the route of administration of anesthetics used in this project which are intravenous route of 135 units (53.35%), nasal route of 39 units (15.41%) and spinal route of 79 units (31.22%) were given to patients.

3.4 MONOTHERAPY AND COMBINATION THERAPY OF ANESTHESIA USED IN HOSPITAL STAY:

Comparing to table (4.4) represents the observed monotherapy drugs which have been given have the higher rate than the combinational treatment, in which the monotherapy drugs utilized are, bupivacaine of 79 units (71.8%), ketamine of 25 units (22.7%), propofol of 2 units (1.8%), vecuronium of 1 unit (0.9%) and lidocaine of 3 units (2.7%). From the total, 14 units of two combinational treatment, propofol+vecuronium used were 5 units (35.7%), propofol+ketamine were 8 units (57.14%) and thiopentone+nitrous oxide was 1 unit (7%). In addition, rest 25 units were used as (+3) combinational treatment.

3.5 DRUG LEFT OF ANESTHESIA DURING HOSPITAL STAY:

During the administration of anesthesia to the patient, a small amount of drug has been leftover in ampules and vials, in the findings we have found 5 drugs which were analyzed in our project. They are bupivacaine, propofol, vecuronium, myoglycopyrrolate and ketamine. The bupivacaine remained is 50% from the total of 4ml i.e., only 2ml was used and 2ml was left unused; propofol was 25% left, in which only 15ml was used from 20ml and 5ml was left unused; vecuronium was 25% left in which only 3mg was used from 4mg of drug and 1mg of drug has been left unused; myoglycopyrrolate was 40% left, in which 3ml was used from 5ml and 2ml was left unused; ketamine was 20% left, in which 4ml was used from 5ml and 1ml has been left unused.

3.6: COST ANALYSIS OF DRUG LEFT:

According to amount of drug left in containers, the cost analysis was done. The drug left of bupivacaine was 50% in 79 cases and its cost of drug left was 876.85 rps. The drug left of propofol was 1.25% in 2 case among 40 cases and cost of drug left was 35 rps. The drug left of vecuronium was 1.7% in 2 cases among 28 cases and cost of drug left was 207.28 rps. The drug left of myoglycopyrrolate was 25% in 5 cases among 8 cases and cost of drug left was 140 rps and the drug left of ketamine was 9.09% in 15 cases among 33 cases and cost of drug left was 174 rps.

3.7 PROJECT APPRIASAL:

- We have observed in hospital that bupivacaine 4ml ampoules has been used so instead of that bupivacaine 2ml ampoules can be used as it is available in the market.
- Using 2ml of bupivacaine we can decrease the patient economic burden.
- To improve more sterility and ease of availability ketamine 2ml ampoules can be used.
- Industrial appraisal
- As we observed in our hospital (max cases) myopyrrolate 3ml ampoule has been used from 5ml ampoule, so 3ml ampoules can be manufactured.

FIGURES AND TABLES:

TABLE 3.1 NUMBER OF PATIENTS TABLE: n=150

GENDER	NO. OF PATIENTS	PERCENTAGE (%)
MALE	8	5.3
FEMALE	142	94.6
TOTAL	150	100
MEAN	75	50%

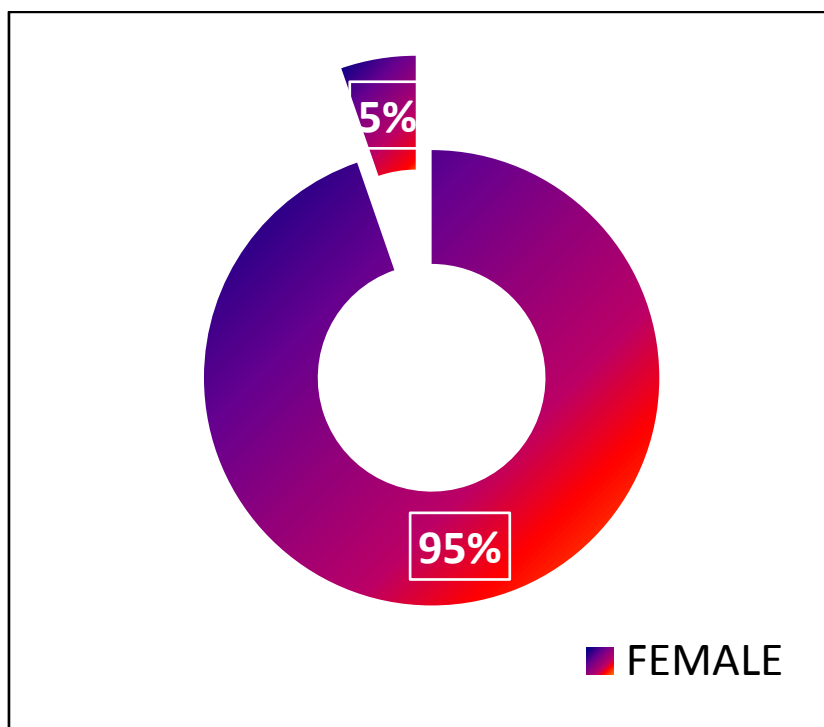


FIGURE 3.1: TOTAL NUMBER OF PATIENTS

TABLE 3.2 DISTRIBUTION OF PATIENTS AGE

AGE	MALE	FEMALE	TOTAL	PERCENTAGE(%)
<1yr	0	01	01	0.6
10-20	02	05	07	4.6
20-30	02	103	105	70
30-40	02	20	22	14.6

40-50	0	06	06	4
50-60	02	04	06	4
60-70	0	04	04	2.6
TOTAL	08	142	150	100
MEAN	1.14	20.2	21.4	14.2%

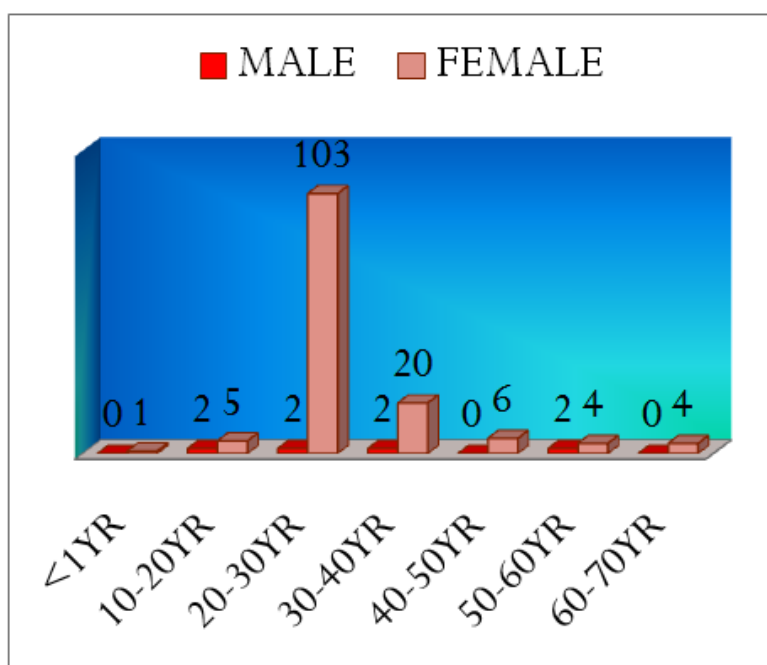


FIGURE 3.2: DISTRIBUTION OF PATIENTS AGE

TABLE 3.4 ROUTE OF ADMINISTRATION TABLE

S.NO	ROUTE OF ADMINISTRATION	NUMBER OF UNITS	PERCENTAGE(%)
1	INTAVENOUS	135	53.35%
2	NASAL	39	15.41%
3	SPINAL	79	31.22%
TOTAL		253	100%
MEAN		84.33	33.3%

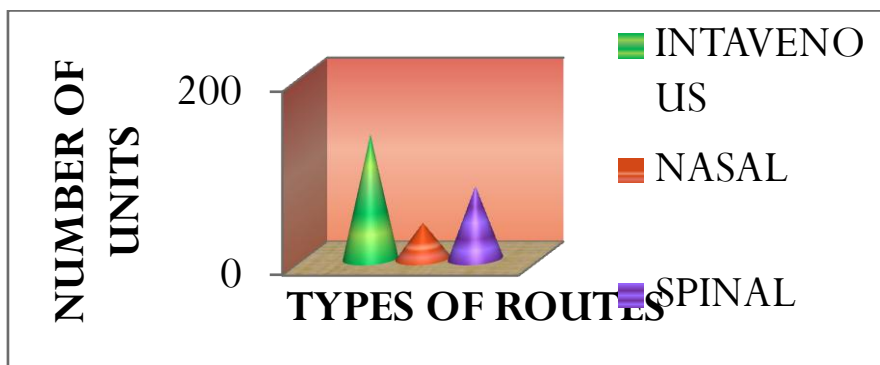


FIGURE 3.3: ROUTE OF ADMINISTRATION:

TABLE 5.5 MONOTHERAPY AND COMBINATION THERAPY OF ANESTHESIA USED IN HOSPITAL STAY

CATEGORY	GENERIC NAME	UNITS	TOTAL
MONOTHERAPY	BUPIVACAINE	79	110
	KETAMINE	25	
	PROPOFOL	2	
	VECCURONIUM	1	
	LIGNOCAIN	3	
COMBINATION(2)	PROPOFOL+ VECURREONIUM	5	14
	PROPOFOL+ KETAMINE	8	
	THIOPENTONE+NITROUS OXIDE	1	
COMBINATION(+3)	ISOFLURANE	25	25
	PROPOFOL		
	NITROUS OXIDE		
	VECURREONIUM		
	GLYCOPYROLTE		
	HALOTHANE		
	THIOPENTONE		

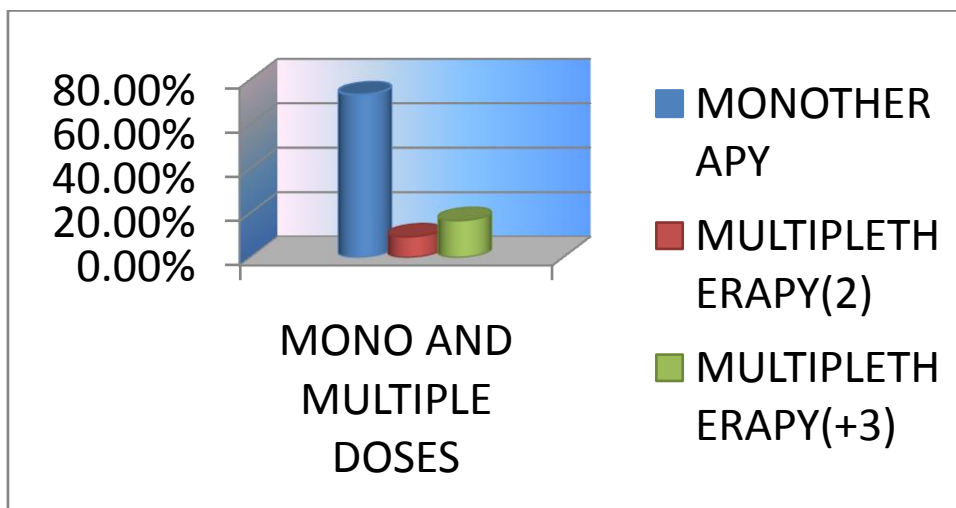


FIGURE 3.4 MONOTHERAPY AND COMBINATION THERAPY OF ANESTHESIA USED IN HOSPITAL STAY

TABLE 3.5 DRUG LEFT OF ANESTHESIA DURING HOSPITAL STAY

S NO	DRUGS	STANDARD DOSE	AMOUNT USED	DRUG LEFT	OVERALL WASTAGE
1	BUPIVACAINE	4ml	2ml	2ml	50%
2	PROPOFOL	10ml,20ml	15ml	5ml	25%
3	VECCURONIUM	4mg	3mg	1mg	25%
4	MYOGLYCOPYROLATE	5ml	3ml	2ml	40%
5	KETAMINE	5ml	4ml	1ml	20%

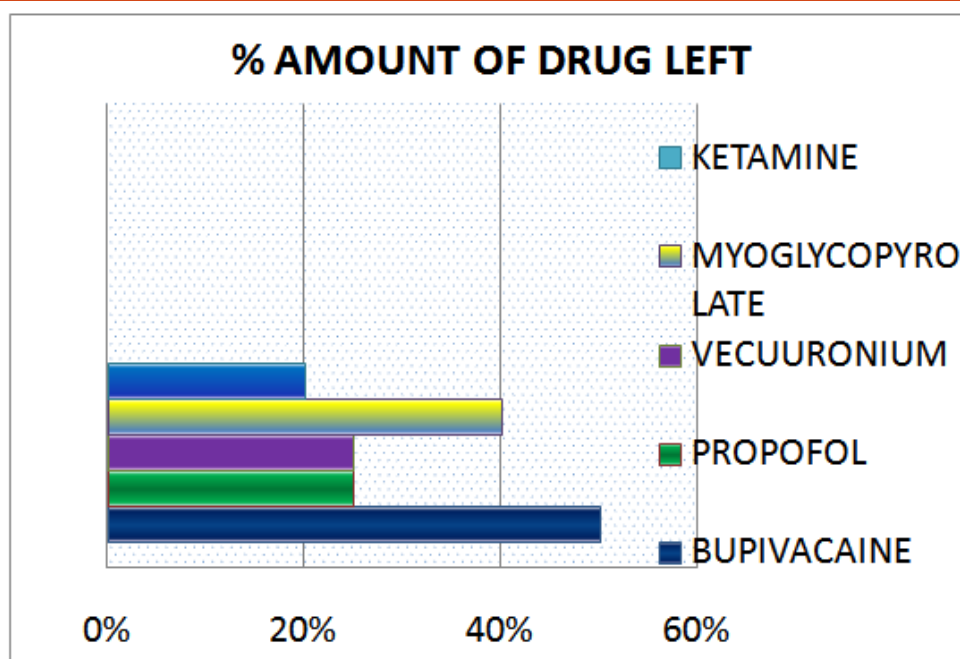


FIGURE 3.5: DRUG LEFT OF ANESTHESIA DURING HOSPITAL STAY

TABLE 3.6 COST ANALYSIS OF DRUG

S. NO	DRUGS	TOTAL CASES	DRUG WASTAGE SHEETS	OVERALL WASTAGE	COST OF WASTAGE (rs)
1	BUPIVACAINE	79	79	50%	876.85
2	PROPOFOL	40	02	1.25%	35.00
3	VECCURONIUM	28	02	1.7%	207.28
4	MYOGLYCOPYROLATE	8	5	25%	140.00
5	KETAMINE	33	15	9.09%	174.00

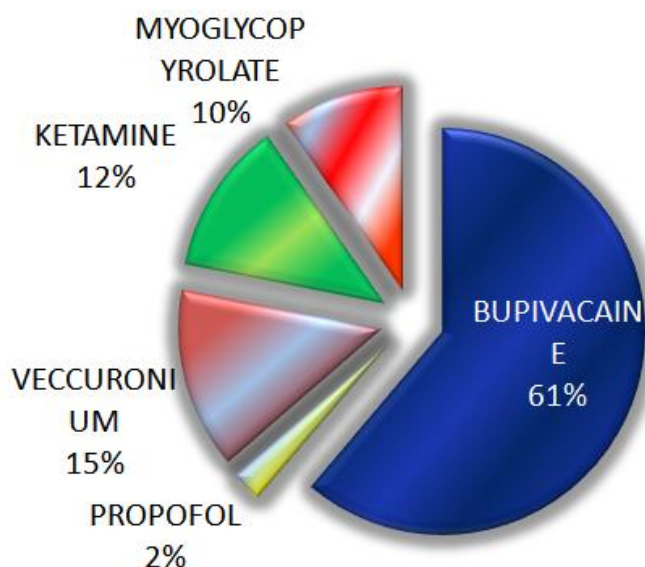


FIGURE 3.6: COST ANALYSIS OF DRUG LEFT

VI. Conclusion:

After all analysis in our study we conclude that:

- We have observed in hospital that bupivacaine 4ml ampoules has been used, so instead of that bupivacaine 2ml ampoules can be used as it is available in the market.
- Using 2ml of bupivacaine we can decrease the patient economic burden.
- To improve more sterility and ease of availability ketamine 2ml ampoules can be used.
- As we observed in our hospital (max cases) myopyrrolate 3ml ampoule has been used from 5ml ampoule, so 3ml ampoules can be manufactured.

Acknowledgements:

We would like to thank all those people who made this dissertation possible for us. It is a pleasant task to express our thanks to all those who contributed in many ways to the success of this study.

We take this opportunity to express our deep sense of gratitude and respect to our esteemed teacher and guide Dr. CH.DEEPTHI REDDY, Assistant Professor, Pulla Reddy Institute of Pharmacy, Hyderabad for her support, guidance and encouragement throughout this work. It has been an honor and privilege for us to work under her for this dissertation. We would like to express our deepest sincere gratitude to Dr. D.K.SURESH, Head of Department, Pharm D Pulla Reddy Institute of Pharmacy for giving us a unique opportunity to work on such an important topic.

With immense gratitude, we would like to thank our Principal, Dr.V.RAMA MOHAN GUPTA, Pulla Reddy Institute of Pharmacy, for providing help and support throughout the project. His continuous guidance, valuable suggestions, affectionate encouragement, generous help and important acumen are greatly acknowledged. His enthusiastic support on our effort was a source of inspiration to carry out the study. He has paid much of the valuable time and the painstaking effort for the whole dissertation. We are also extremely indebted to Management of Pulla Reddy Institute of Pharmacy, for their support throughout our course work.

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Dr.Ch.Deepthi Reddy "A Study on Drug Wastage and Cost Analysis of Anaesthetics in A Secondary Care Hospital." *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)* 13.1 (2018): 17-26.