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Study on post-operative pain management in surgery patients

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Abstracts
Introduction: Prior to surgery, patient is given a medical examination, receives preoperative tests and their physical status is rated according to the ASA physical status classification system. If these results are satisfactory, the patient signs a consent form and is given a surgical clearance.
Methodology
Study site: The study was conducted in the ward of Department of surgery, Rajah Muthiah Medical College Hospital (RMMCH), Annamalai University, Annamalainagar, Tamil Nadu and 1400 bedded multispecialty tertiary care teaching hospital.
Study Design: Prospective observational study
Study Period: This study was conducted for a period of 6 months (November 2017 to April 2018)
Conclusion: The prescribing pattern of analgesics shows that most prescribed monotherapy (NSAIDS, opioids for mild pain) and double therapy (Opioids and non-opioids for moderate to severe pain) for each disease of inguinal hernia, haemorrhoid, appendicitis, cholelithiasis, diabetic foot ulcer, breast cancer, and goitre. The study reveals that spinal anaesthesia procedure is mostly done with anaesthetic drugs are reported. These prescribed pattern of drugs for post-operative pain management with compliance with STG.

Keywords: Pain scale, post-op care, pain management, cost analysis, analgesics and anaesthetics

Introduction
After completion of the surgery, the patient is transferred to the post anaesthesia care unit and closely monitored. When patient is judged to have recovered from the anaesthesia, he/she is either transferred to a surgical ward elsewhere in the hospital or discharged home. During post-operative period, the patient's general function is assessed, the outcome of the procedure is assessed, and the surgical site is checked for signs of infection. Other follow up studies or rehabilitation may be prescribed during and after the recovery period.

Pain management
Effective postoperative pain control is an essential component of the care of surgical patient. Inadequate pain control, apart from being inhumane, may result in increased morbidity or mortality. Evidence suggests that surgery suppresses the immune system and that this suppression is proportionate to the invasiveness of the surgery. Good analgesia can reduce this deleterious effect. Data available indicate that afferent neural blockage with local anaesthetics is the most analgesic technique. Next in order of effectiveness are high-dose opioids, epidural opioids and clonidine, patient controlled opioid therapy, and non-steroidal anti-inflammatory agents.

Methodology
Study site: The study was conducted in the ward of Department of surgery, Rajah Muthaiah Medical College Hospital (RMMCH), Annamalai University, Annamalai nagar, Tamil Nadu and 1400 bedded multispecialty tertiary care teaching hospital.

Study design: Prospective observational study.

Study period: This study was conducted for a period of 6 months (November 2017 to April 2018).

Study criteria: This study method involves selection of patient based on the inclusion and exclusion.

Inclusion criteria

1. Patients who were admitted in surgery ward and undergone surgery
2. Patients of both male and female were added
3. Patients who were consuming analgesics after surgery
4. Those patients without co-morbidities

Exclusion criteria

1. Patients who were discontinued with the treatment
2. Patients who were not willing to participate

Source of data

1. Literature review
2. Designing of data collection form
3. VAS (visual analogue scale) for monitoring and study the efficacy of analgesic therapy.

Statistical analysis

Simple-t test and paired-sample t-test was employed to calculate p-value.

1. For the statistical analysis IPM SPSS software version 22 was used.
   The above prescribed analysis was done at the confidence interval of 95%.

Result and Discussion

Pain scale comparision

In this study, we have identified there is no significant difference in scoring among the three pain scales, which was compared by using the graphical representation of 20 surgical patients mean pain scores and its compliance with Amelia Williamson MSc, et al (2012) report, which says both the three pain-rating scales are valid and Not significant different among them but choosing self-pain rating scale should be made by patient's preference.

Results

Table 1: Baseline characteristics

Baseline parameters	No of patients	Percentage (%)
Age		
0-20	11	12.64
20-30	9	10.34
30-40	15	17.24
40-50	18	20.68
50-60	15	17.24
60-70	9	10.34
Gender		
Male	45	51.71
Female	42	48.27

The age distribution of the study shows that the maximum number of patients were in the age group between 40-50s, similarly in gender distribution maximum 45(51.71%) of male patients were observed.

Table 2: Surgery wise distribution of patients

Procedure	No of patients	Percentage (%)
Hernioplasty	21	24.13
Appendectomy	12	13.79
Haemorrhoidectomy	12	13.79
Cholecystectomy	12	13.79
Amputation	18	20.68
Mastectomy	6	6.89
Thyroidectomy	6	6.89
Total	87	100

The study shows that out of 87 patients, 21(24.13%) patients of hernia have undergone hernioplasty; which is the maximum.

Table 3: Hospital Stay

Disease	No of days
Hernia	8
Appendicitis	4
Haemorrhoid	14
Cholelithiasis	9
Diabetic foot	6
Breast cancer	7
Thyroid	4

In this study, maximum number of stay in hospital were seen in haemorrhoid patients (14 days)

Study of drug effect on various type of surgeries

Inguinal hernia

Table 4: Treatment chart

Drugs	No of patient	Percentage (%)
Monotherapy		
1. Paracetamol	18	50
2. Tramadol	3	8.33
Double therapy		
1. Paracetamol + Aceclofenac	3	8.33
2. Pentazocine + Diclofenac	9	25.00
3.Pentazocine + Paracetamol	1	8.33

Comparison	Mean	SD	t-value	p-value
Before vs After VAS scores	3.83333	.58509	30.024	.000413

Anaesthesia	No of patients	Percentage (%)
General	12	57.14
1.Glycopyrollate		
2.Fentanyl		
3.Thiopentone		
4. Succinylchloride		
5. Ketamine		
Spinal	9	42.85
1. Bupivacaine		
2. Xylocaine		

Mentes O, *et al*. (2004) results shows tramadol 1mg/kg is effective one compare to lornoxicam 8mg, similarly in Kelly Byrne MBCh, *et al*. (2016) no difference were found in effect but compare to morphine tramadol shows quick onset relief. In our observation Paracetamol is the maximum of 18(50%) and in combination Pentazocine + Diclofenac are highly prescribed and the other hand the therapy shows the clinical significant in pain reduction. In SPSS paired sample t test the P-Value of p< (.000413) was obtained by comparing the VAS scores of before and after the therapy. The study shows significant difference in the pain scores at the confidence of 95%.

Anaesthetics
In this study the maximum number of hernia patients have undergone general anaesthesia 12(57%).

Hemorrhoids
Treatment chart

Drugs	No of patients	Percentage (%)
Monotherapy		
Tramadol	3	25
Double therapy		
1.Aceclofenac+Paracetamol	6	50
2.Tramadol + Pentazocine	3	25

Comparison	Mean	SD	t-value	p-value
Before vs after VAS scores	3.43333	.50151	23.715	.000853

Anaesthesia	No of patients	Percentage (%)
General	0	0
1. Glycopyrollate		
2. Fentany		
3. Thiopentone		
4. Succinyl chloride		
5. Ketamine		
Spinal	12	100
1. Bupivacaine		
2. Xylocaine		

Giovanni Tomksello Jein, *et al.* (2012) result shows that Sphincterotomy is the only therapeutic technique able to reduce the haemorrhoidectomy pain compare with paracetamol 1000mg, diosmin 500mg at the (p<0.000853) among groups; but in our study, we found that the maximum prescribed drug for haemorrhoids were 6(50%) Aceclofenac+Paracetamol. The p< (0.000853), is explicatesthe presence of significant difference among the groups in pain reduction by the prescribed therapy.

Anaesthetics: In this study maximum number of haemorrhoid patients underwent spinal anaesthesia 12(100%).

Appendicitis
Treatment chart

Drugs	No of patients	Percentage (%)
Monotherapy		
1. Paracetamol	9	30
2. Tramadol	3	10
3. Pentazocine	3	10
Double therapy		
1. Aceclofenac + Paracetamol	9	30
2. Pentazocine +Diclofenac	3	10
3. Pentazocine + paracetamol	3	10
Comparison	**Mean**	**s-d**
Before vs after VAS scores	2.80833	.64591

Anaesthesia	No of patients	Percentage (%)
General	9	75
1.Glycopyrollate		
2.Fentanyl		
3.Thiopentone		
4. Succinyl chloride		
5. Ketamine		
Spinal	3	25
1. Bupivacaine		
2. Xylocaine		

The Alireca Ahmadi, Shelrzed *et al*. Jul (2016) study reports reveals that acetaminophen (23.3%) is the effective therapy compared with Ibuprofen and Morphine, Similarly From the above table we have observed the maximum prescribed monotherapy is paracetamol (30%) and double therapy is Aceclofenac+Paracetamol (30%).

Visual analogue scale score
The P-value of (.000916) shows the significant difference among the groups in pain reduction.

Anaesthetics
In this study most of the appendicitis patient underwent general anaesthesia.

Cholelithiasis
Treatment chart

Drugs	No of patients	Percentage (%)
Monotherapy		
Tramadol	3	25
Double therapy		
Pentazocine + Diclofenac	6	50
Aceclofenac + Paracetamol	3	25

Comparison	Mean	SD	t-value	p-value
Before vs after VAS scores	3.45833	56082	21.091	.00030

Anaesthesia	No of patients	Percentage (%)
General	9	75
1.Glycopyrollate		
2.Fentanyl		
3.Thiopentone		
4. Succinyl chloride		
5. Ketamine		
Spinal	3	25
1. Bupivacaine		
2. Xylocaine		

Magrini M, et (2004) study states that the tramadol is effective as compare with pentazocine the ($p<0.01$) shows significant different in pain reduction on tramadol. But in our study, we found that tramadol is about only 25% of prescription and the maximum prescribed drug in Cholelithiasis is Pentazocine+ Paracetamol 6(50%).

Visual analogue scale score
The P-Value of (.00030) shows the significant difference among the groups states the effectiveness of prescribing pattern in our hospital.

Anaesthetics: In this study maximum number of Cholelithiasis patients underwent general anaesthesia.

Diabetic foot
Treatment chart

Drugs	No of patients	Percentage
Monotherapy		
1. Paracetamol	6	33
2. Tramadol	3	16
3. Pentazocine	3	16
4. Diclofenac	3	16
Double therapy		
1. Paracetamol +Diclofenac	3	16

Comparison	Mean	SD	t-value	p-value
Before vs after VAS scores	4.53333	.46146	11.680	.00014

Anaesthesia	No of patients	Percentage (%)
General	0	0
1.Glycopyrollate		
2.Fentanyl		
3.Thiopentone		
4. Succinylchloride		
5. Ketamine		
Spinal	18	100
1. Bupivacaine		
2. Xylocaine		

From the above table the most prescribed drug in diabetic foot ulcer is Paracetamol 6(33%). Followed by Tramadol, Pentazocine, Diclofenac.

Visual analogue scale score
The P-value of <0.05 shows the significant difference among the groups.

Anaesthetics
In this study the maximum number of diabetic foot ulcer patient underwent spinal anaesthesia.

Breast cancer
Treatment chart

Drugs	No of patients	Percentage (%)
Monotherapy		
Paracetamol	3	50
Double therapy		
Tramadol + paracetamol	3	50

Comparison	Mean	SD	t-value	p-value
Before vs after VAS scores	2.10000	.42895	11.992	.000071

Anaesthesia	No of patients	Percentage (%)
General	6	100
1.Glycopyrollate		
2.Fentanyl		
3.Thiopentone		
4. Succinyl chloride		
5. Ketamine		
Spinal	0	0
1. Bupivacaine		
2. Xylocaine		

Kaya M, *et al*. J Anish., *et al.* (2013) the study states that the brachial plexus block is the alternative for morphine and tramadol which effectively optimize stimuli of the pain; but in our study we found that the prescribed therapy itself is enough to decrease significant volume of pain and the observation shows the equal use of monotherapy, paracetamol 50% and double therapy (50%).

Visual analogue scale score
As mentioned earlier the value of pain were significantly decreased after the therapy was administered the p-value of less than 0.05 shows the significant difference among the groups. P< (0.000071)

Anaesthetics
In this study maximum number of breast cancer patients underwent general anaesthesia.

Goitre

Anaesthesia	No of patients	Percentage (%)
General	6	100
1.Glycopyrollate		
2.Fentanyl		
3.Thiopentone		
4. Succinylchloride		
5. Ketamine		
Spinal	0	0
1. Bupivacaine		
2. Xylocaine		

Treatment chart

Drugs	No of patients	Percentage
Double therapy		
Paracetamol + Aceclofenac	6	100

Comparison	Mean	SD	t-value	p-value
Before vs after VAS scores	2.86667	.63140	11.121	0.000102

Irene Lou, MD, Todd B. Chennell, NP, *et al.* Jul (2017) study shows 325 mg of acetaminophen is required to treat effectively the post-operative pain, similarly in our study we found that most prescribed drug was paracetamol+aceclofenac (100%), and value of VAS were decreased dramatically.

Visual analogue scale score

The table P<(0.000102) shows the significant difference in group 2 which represent the drug therapy efficacy.

Anaesthetics

In this study maximum number of goitre patients underwent general anaesthesia.

Standard treatment guidelines compliance

STG guidelines for post-operative care states that it is necessary to give analgesics by intramuscular or intravenous route in the immediate post-operative period and till the patient is able to access orally.

Standard therapy guides

Intravenous injections

1. Inj diclofenac sodium 75mg 6-8hourly
2. Inj pentazocine (30mg/ml) IV 3-4 hourly
3. Inj tramadol (50mg/ml) 4-6 hourly
4. Inj morphine (15mg/ml)4-6 hourly

Oral doses

1. Tab paracetamol 500mg 3-4 times daily
2. Tab ibuprofen 400-600mg 8 hourly
3. Tab nimesulide 100mg BD

Comparision with STG

Drugs (STG)		Drugs(non-STG)	
No of drugs	Percentage	No of drugs	Percentage
5	83.3	1	16.6

Compared to standard treatment guidelines, the analgesics prescribed for post-operative patient is about 83.3%, compliance.

Cost minimization analysis

Prescribed drug	Price of prescribed drug (for 5 days)	Minimum generic price(for 5 days)	Cost reduction	% cost reduction
Zerodol (Aceclo100mg+Para325mg+Serratio15mg)	37.4	7.36	30.04	81.28
Hifenac (Aceclo100mg+Para 325mg)	64	11.25	52.75	82.42
Seronac (Diclo 50mg+Serratio 10mg)	67	12.50	54.5	81.34
Fortwin (Pentazocine 30mg)	5.58	2.46	3.12	55.91
Doloban(Diclo 75mg)	22	4	198	81.81

The cost of the drugs prescribed is compared with minimum generic price of same and the cost reduction were calculated.

Early post-operative complication

Complications	No of patients	Percentage (%)
Hematoma	-	-
Infection	4	80
Headache	-	-
Urinary retention	2	20
Persistence incisional pain	-	-

In this study out of 87 patients 4 patients got an infection and 2 patient got urinary retention.

Adverse drug reaction

Drugs and ADRs	No of patients	Naranjo score	Causality
Bupivacaine			
1. Vomiting	1	+2	Possible
2. Tachycardia	2	+2	Possible
Lignocaine			
1. Vomiting	1	+2	Possible
2. Diarrhoea	1	+3	Possible
3. Cough	6	+2	Possible
Fentanyl			
1. Vomiting	2	+2	Possible
2. Cough	4	+2	Possible
3. Diarrhoea	2	+2	Possible
4. Tachycardia	2	+3	Possible

The study shows that the patient experienced ADR from the anaesthetic drugs that are monitored using Naranjo scale and are reported.

Who standard operative procedure list

An operative procedure list is needed whenever a surgical team will perform several operations in succession. The list is a planned ordering of the cases on a given day. The lists are as follow:

- Standard practice to count supplies
- Operative procedure list
- Safe surgery and anaesthesia list

Standard operative procedure list was given to 18 surgeons and anaesthesiologist.

Standard operative procedure list

Suggestion	No of participants	Percentage (%)
Should improve	2	11.1%
Useful		
Moderate	5	27.7
High	9	50.1
Time consuming	2	11.1

From the above report, which we have gathered will be useful in conducting the study in furthermore patients. It may tend to be useful in providing information comparing the surgical standard of urban and rural.

Conclusion

The prescribing pattern of analgesics shows that most prescribed monotherapy (NSAIDS, opioids for mild pain) and double therapy (opioids and non-opioids for moderate to severe pain) for each disease of Inguinal hernia, haemorrhoid, appendicitis, cholelithiasis, diabetic foot ulcer, breast cancer, and goitre. The study reveals that spinal anaesthesia procedure is mostly done with anaesthetic drugs are reported. These prescribed pattern of drugs for post-operative pain management with compliance with STG.

On other hand, the efficacy of analgesics was studied by calculating VAS scores of before and after therapy initiation. It clearly demonstrates the maximum clinical significance in appendicitis and minimum clinical significance difference in goitre, by using IPM SPSS version 22. The ADR is monitored using Naranjo scale in which cough is most occurring ADR when lignocaine is used.

Finally, the cost of prescribed drug was compared with minimum generic price. By using cost-minimization analysis, the study shows maximum reduction in Hifenac (Aceclofecac 100mg + Paracetamol 325mg) and minimum reduction in Fortwin (Pentazocine 30mg).

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