INTRODUCTION

Postoperative pain management effective relief of postoperative pain is of paramount importance as it offers significant psychological and physiological benefits to the recovering patient. Not only does it mean a smooth postoperative course with earlier discharge from hospital, but it also helps to reduce the incidence of complications. In addition, there is evidence that good pain relief can reduce the onset of chronic pain syndromes. Inadequate pain management could lead to reduced deep breathing, causing impaired oxygenation. It can also cause inability to cough and clear lung secretions which may lead to lung atelectasis. Pain reduces a patient’s mobility, leading to slower recovery and increased risk of morbidities such as deep venous thrombosis. The first step in achieving good pain control is preoperative prediction and accurate postoperative assessment of the degree of pain. Such pain is subjective and can vary greatly in severity between patients from almost no pain to very severe pain. There are two main factors determining the degree of postoperative pain: firstly, the nature, extent and site of the surgery; and secondly, factors related to the patient including fear, anxiety and pain threshold.

A previous experience of postoperative pain may also influence the patient’s expectation and perception of pain. It is therefore important to plan postoperative pain management through consultation between the surgeon and the anaesthetist based on the predicted pain severity. It is also important to explain to the patient the expected degree of pain and the steps that will be taken to ensure effective pain relief afterwards. It is usually helpful to establish the patient’s expectations of pain before surgery. This approach has been shown to minimize the patient’s fear and anxiety from pain and to reduce the requirement for postoperative analgesia.

There are three main objectives of postoperative care

✓ supporting the patient during restoration of physiological functions;
✓ promoting healing of tissues;
✓ recognizing and managing complications.

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Postoperative care should be tailored to each individual’s circumstances with attention to the particular needs of every patient. Standardization of care can be developed, but should be applied with a degree of flexibility to allow the individualization of care. Postoperative care should be provided by well-trained and skilled nursing staff with input from the surgical team as well as members of other multidisciplinary teams including physiotherapists, dieticians, pharmacists and microbiologists. Other specialist postoperative management should be provided as necessary, such as wound care and rehabilitation.

Pain

Pain is one of the most common complaints, which is an unpleasant emotional and sensory experience associated with actual or potential tissue damage. Pharmacological approaches are using non-opioid and opioid analgesics drugs by decreasing the generation of the mediators of pain at the site of tissue damage and also acting at higher brain centers, controlling the affective components of the pain.

Risk factors for chronic postsurgical pain

- Pain, moderate to severe, lasting more than 1 month
- Repeat surgery
- Catastrophizing
- Anxiety
- Female gender
- Younger age (adults)
- Workers’ compensation
- Genetic predisposition
- Surgical approach with risk of nerve damage

Types of Pain

<table>
<thead>
<tr>
<th>Nociceptive Pain</th>
<th>Normal processing of stimuli that damages normal tissues</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Responds to opioids</td>
</tr>
<tr>
<td></td>
<td>Pain arises from bone, joint, muscle, skin, or connective tissue</td>
</tr>
<tr>
<td>Somatic</td>
<td>Aching, throbbing</td>
</tr>
<tr>
<td></td>
<td>Localized</td>
</tr>
<tr>
<td></td>
<td>Arises from visceral organs</td>
</tr>
<tr>
<td>Visceral</td>
<td>Tumor: localized pain</td>
</tr>
<tr>
<td></td>
<td>Obstruction of hollow viscus: poorly localized</td>
</tr>
<tr>
<td>Neuropathic Pain</td>
<td>Abnormal processing of sensory input by PNS or CNS</td>
</tr>
<tr>
<td></td>
<td>Deafferentation pain: injury to PNS or CNS (eg, phantom pain)</td>
</tr>
<tr>
<td>Centrally generated</td>
<td>Sympathetically maintained pain: dysregulation of autonomic nervous system (eg, complex regional pain syndrome I and II)</td>
</tr>
<tr>
<td></td>
<td>Painful polyneuropathies: pain is felt along the distribution of many peripheral nerves (eg, diabetic neuropathy)</td>
</tr>
<tr>
<td>Peripherally generated</td>
<td>Painful mononeuropathies: associated with a known peripheral nerve injury (eg, nerve root compression, trigeminal neuralgia)</td>
</tr>
</tbody>
</table>

Medication Therapy Options

There are numerous medications that may be used for postoperative pain treatment, but these traditionally fall into a few select classes. The World Health Organization (WHO) developed a stepwise approach to chronic pain management, which is often applied to the management of acute pain. This is known as the WHO pain ladder. Opioids (synthetic opium derivatives) are used for the treatment of moderate-to-severe pain. (The term opiates refers to naturally occurring and semisynthetic opium agents.) Nonsteroidal anti-inflammatory drugs (NSAIDs) or acetaminophen is usually used for mild-to-moderate pain or as adjuvant therapy. There are oral and IV formulations of opioids and NSAIDs that are helpful in certain patient populations (e.g., patients who have undergone surgery). There are also numerous nonopioid analgesics such as N-methyl D-aspartate (NMDA) receptor antagonists (e.g., ketamine, amantadine), antidepressants (e.g., tricyclics, selective serotonin reuptake inhibitors), and antiepileptics (e.g., gabapentin, pregabalin), as well as agonist-antagonist combination therapy, which may have some benefit in certain situations. Although the type of agent prescribed needs to be individualized to the patient, there are certain general recommendations that should be applied when choosing the proper medication.

Opioids are widely used in the treatment of moderate-to-severe pain (pain scores 4 or greater). Opioids bind to the mu receptors in the central nervous system, resulting in analgesia. Common side effects include nausea and vomiting, constipation (exacerbated by increased periods of immobility that often follow surgical procedures), sedation, and pruritus. These adverse effects may be more pronounced in the elderly. Tolerance often develops to most of these side effects over time, with the main exception being constipation. A stimulant laxative should be prescribed when initiating opioids due to decreased peristalsis. Respiratory depression and hypotension are serious side effects of opioid therapy. Respiratory depression is defined as fewer than 10 breaths per minute, although specific hospital protocols may vary. The risk of severe respiratory depression is increased in the first 24 hours following surgery and with higher doses of opioids. Hypersensitivity reactions may also occur with opioids. It is important to note that if a hypersensitivity reaction occurs to an opioid, care should be taken not to rechallenge the patient with another medication in the same or similar class of medications, such as tramadol or tapentadol.

Pain Intensity

Can be broadly categorized as: mild, moderate and severe. It is common to use a numeric scale to rate pain intensity where 0 = no pain and 10 is the worst pain imaginable.

- Mild: <4/10
- Moderate: 5/10 to 6/10
- Severe: >7/10

Analgesic Ladder

If pain occurs, there should be prompt oral administration of drugs in the following order: nonopioids (acetaminophen, aspirin); then, as necessary, mild opioids (codeine); then strong opioids such as morphine, until the patient is free of pain. To treat neuropathic pain, additional drugs – “adjuvants” – should be used. To maintain freedom from pain, drugs should be given “by the clock”, respecting pharmacological half life of the analgesic selected (that is every 3-6 hours), rather than “on demand”. This three-step approach of administering the right drug in the right dose at the right time is inexpensive and 80-90% effective. Surgical intervention on appropriate nerves may provide further pain relief if drugs are not wholly effective.
Vargas-Schaffer (2010) suggests the adaptation of the original WHO ladder to include: the treatment of acute, chronic, noncancer, cancer and pediatric pain, the addition of a fourth step, the new opioids, and can be used in a bidirectional fashion: the slower upward pathway for chronic pain and cancer pain, and the faster downward direction for intense acute pain, uncontrolled chronic pain, and breakthrough pain.10

MATERIALS AND METHODS

Study Site

The study is to be conducted in male and female surgical department of government district head quarters hospital, tiruppur, a secondary care hospital

Study Design

This is a prospective observational study involving the collection of data from patient case sheet who are admitted in postoperative ward. The statistical data collected is measured using numerical rating scale / Wong-Baker pain scale

Study Period

The study is conducted over a period of 6 month from February 2019 to August 2019

Study Population

Study population includes the patient of government head quarter hospital tiruppur.

A total number of 100 patients cases were selected from male and female post operative surgical ward.

Study Procedure

✓ Data’s are analyzed on the basis of drug utilization study in post-operative pain management.
✓ The relevant data such as the use of opioids to provide analgesic, treatment etc were collected and entered in the proforma.
✓ Prospective study is conducted on total of 100 patients case sheet from male and female post-operative ward

Study Criteria

Inclusion Criteria

✓ Patient with age group 20-80 both the gender with no co-morbid conditions admitted in the surgery ward.

Exclusion Criteria

✓ Patients with co-morbid renal impairment
✓ Non willing patients
✓ Patients on long term medications for psychiatry problems
✓ Pregnant women, breast feeding females

Statistical analysis

1. Data analysis and statistical analysis will be done with the help Microsoft Excel.
2. Graphical representation is used for visual representation of the analysed data.
RESULT

Based on the objective the result where collected from the Tirupur GH and following are tabulated & diagrammatically represented.

### Disease Wise Distribution

<table>
<thead>
<tr>
<th>S.no</th>
<th>Type of surgeries</th>
<th>No of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Appendectomy</td>
<td>30</td>
</tr>
<tr>
<td>2.</td>
<td>Herniotomy</td>
<td>23</td>
</tr>
<tr>
<td>3.</td>
<td>Myomectomy</td>
<td>8</td>
</tr>
<tr>
<td>4.</td>
<td>Haemorrhoidectomy</td>
<td>18</td>
</tr>
<tr>
<td>5.</td>
<td>Amputation</td>
<td>14</td>
</tr>
<tr>
<td>6.</td>
<td>Wound debridement</td>
<td>7</td>
</tr>
<tr>
<td>7.</td>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

### Pain Intensity Rating Scale

#### Prescription Pattern in Post Operative Pain Management

<table>
<thead>
<tr>
<th>S.no</th>
<th>Category</th>
<th>Drug</th>
<th>No of drug</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Analgesics</td>
<td>Tramadol</td>
<td>65</td>
<td>10.2%</td>
</tr>
<tr>
<td>2.</td>
<td>Non-opioids</td>
<td>Diclofenac, paracetamol</td>
<td>139</td>
<td>21.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ceftotaxime, ciprofloxacin, ceftriaxone, amikacin, metronidazole, ampicilin, streptomycin, gentamycin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Antibiotics</td>
<td>Cefotaxime, ciprofloxacin, ceftriaxone, amikacin, metronidazole, ampicilin, streptomycin, gentamycin</td>
<td>256</td>
<td>40.5%</td>
</tr>
<tr>
<td>4.</td>
<td>Antacids</td>
<td>Ranitidine, pantoprazole</td>
<td>115</td>
<td>18.1%</td>
</tr>
<tr>
<td>5.</td>
<td>Antiemetic</td>
<td>Domperidone, ondansetron</td>
<td>57</td>
<td>9%</td>
</tr>
<tr>
<td>6.</td>
<td>Total</td>
<td></td>
<td>632</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Percentage of Analgesics Use in Post-Operative Periods

<table>
<thead>
<tr>
<th>S.NO</th>
<th>DRUG</th>
<th>1st POD</th>
<th>2nd POD</th>
<th>3rd POD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tramadol</td>
<td>30%</td>
<td>16%</td>
<td>12%</td>
</tr>
<tr>
<td>2.</td>
<td>Diclofenac</td>
<td>55%</td>
<td>61%</td>
<td>53%</td>
</tr>
<tr>
<td>3.</td>
<td>Paracetamol</td>
<td>15%</td>
<td>23%</td>
<td>35%</td>
</tr>
</tbody>
</table>
Drug utilization studies are helpful in determining prescribing manner and its utilization by patients. Pain is an individual and subjective experience, influenced by various physiological and psychological factors, education, prognosis, sleep deprivation, race, gender and environmental influence. Proper diagnosis of the type and intensity of pain is crucial for an adequate and targeted treatment of acute pain.

The examination of acute pain should include medical history, physical examination and specific evaluation of pain. The type and extend of surgery, the type of anesthesia, the quality of post operative care, and the incidence of complications play a key role in post operative pain management.

The post operative study was conducted the secondary care hospital for a period of 6 months in the department of surgery. A total of 100 patients were enrolled in the study, based on inclusion and exclusion criteria. We were able to observe that male patients (64%) were predominant than female patients (34%). This was similar to the studies conducted by F marghoubi et al (2018). In our study the age group of 40-50 years (30%) this was similar to the study conducted by Sen et al (2015). In our study, surgery for appendectomy was the most common procedure done for a total of 100 (30%) patients which was similar with the study of arshad et al (2018). The second most common procedure done in our study was hernioplasty (23%). Our study shows post operative pain was from moderate to severe in most of the patients (54%) followed by mild to moderate (40%).

The pain score was higher with female than male same observation also supported by Chaudhari JS et al (2013). The present study shows the use of conventional NSAIDs with higher frequency of diclofenac (44%) followed by paracetamol (33%) and tramadol (23%). The above findings is similar with Roshini et al, Padmannabha TS et, Shivaleela B studies. A diclofenac is non selective cox inhibitor and more effective for revealing inflammations. This is more common after surgical procedure. The advantage of diclofenac usage for post-operative pain is that it can be administered parenteral route in initial post-operative period then which can be shifted later on to enteral route. Paracetamol was prescribed second most common drug in monotherapy, but it is having antipyretic effect than analgesic effect by selective COX-3 inhibition. The study showed NSAIDs analgesics were preferred than opioid drugs. This shows non-opioid drugs produces less side effects than opioid drugs. It shows sever pain was controlled by tramadol then shifted to non-opioid drugs, to prevent addiction to opioid drugs. This shows post-operative pain management was more near to rational approach.

Parental therapy was use for acute management of cases for pain relief. A novel trend notice the increased use of NSAIDs with less frequency of non NSAIDs like tramadol which was similar with the study of Padmannabha TS et, al (2016). Our study shows that totally 632 drugs were prescribed to the patients in which antibiotics 256 (40.5%), non-opioids were 139 (21.9%), antacids were 115 (18.1%), analgesic were 65 (10.2%) and antiemetics were 57 (9%). Antibiotics were the drugs given adjuvant. The higher number of antibiotics per patient indicates that more and more antibiotics were used for prophylaxis purpose rather than definitive treatment purpose. It
is used more as a blanket therapy to prevent any or all types of infection. This not only leads to the increased cost of therapy, but also to increased incidence of adverse drug reactions and to the selection of drug resistant bacterial strains. Beta-lactam and aminoglycosides were the most commonly used antibiotics. This is consistent with the findings of the study conducted by Abula T, Kedir M, who showed that ampicillin and gentamicin were commonly used. In our study the percentage of analgesics use in post operative days were diclofenac (55%), tramadol (30%), paracetamol (15%) in 1st POD; in second pod diclofenac (61%), paracetamol (23%), tramadol (16%) followed by diclofenac (53%), paracetamol (35%), tramadol (12%) in 3rd post-operative day.

More females than males suffered moderate to severe pain in the immediate postoperative period in the current study. This may be explained by the fact that women experience pain differently from men due to biological, psychological, and social factors.8 Nausea was the most common side effect in this study with (28.4%) of patients reporting this, followed by dry mouth (22%), vomiting (15.6%), and urinary retention (7.5%), with (26.5%) of patients reporting no side effects at all. Although there could be many other reasons for these side effects, these are likely to be opioid-related. In a review article by Werner et al., the most frequently investigated treatment-related side effects were postoperative nausea and/or vomiting (reported in 20 of 25 studies), pruritus (15 of 25 studies), urinary retention (7 of 25 studies), and sedation (7 of 25 studies). Majority of patients (78.2%) in the current study still reported that their postoperative pain management was satisfactory. This is similar to the report by Kolawole and Fawole, which noted that despite the high incidence of pain, 85.2% of their patients still expressed satisfaction with the level of pain relief. The high level of satisfaction expressed by patients despite high levels of pain and side effects may be due to patients being afraid to express their true opinions for fear of negative consequences from the health care providers. For various reasons, effective treatment of acute postsurgical pain presents unique challenges for medical practitioners. Adequacy of postoperative pain control is one of the most important factors in determining when a patient can be safely discharged from a surgical facility and has a major influence on the patient’s ability to resume their normal activities of daily living.

Multimodal or balanced analgesic techniques involving the use of smaller doses of opioids in combination with non-opioid analgesic drugs (eg, local anesthetics, ketamine, acetaminophen, and NSAIDs) are becoming increasingly popular approaches to preventing pain after surgery. Despite the high incidence of pain and other side effects, the majority of patients (85%) in the current study still reported that their postoperative pain management was satisfactory. This is similar to the report by Elizabeth Ogбли-Nwasor et al., which noted that despite the high incidence of pain,( 78.2%) of their patients still expressed satisfaction with the level of pain relief. 

CONCLUSION
This study has suggested that postoperative pain control was able to be achieved by non-opioid drugs like Diclofenac monotherapy itself which is cheap with less ADR. Tramadol opioid was also used for severe pain relief and then shifted to NSAIDs. Utilization of analgesics was found to be based on the type of surgery and the physician’s preference. It is suggested that the choice of analgesic should also be based on the age of the patients. With proper and safe use of analgesics it will be possible to achieve good and effective pain control in post-operative patients and routine auditing of prescriptions will be helpful for the improvement of proper use of drugs which in turn can provide good quality health care. Drug utilization studies promote use of rational prescription pattern and this improves the safety, efficacy of drugs and decreases the cost of treatment. More studies of these type are needed in Indian rural population. Use of anti-emetics, PPIs or H2 blockers and antibiotics in our surgical practices to avoid any post-operative nausea and vomiting (PONV), the post-operative stress bleeds and prevented infections is seen to the great extent.The investigation is valuable in diminishing the irrational prescription, which help to reduce the morbidity and health care burden in the general public. The Pain intensity scale was used to determine the appropriateness of the treatment for the management of pain depending on mild, moderate and severe. Paracetamol is the most preferred drugs in mild to moderate pain. The study shows that prescription pattern in treatment of pain is in accordance with WHO pain ladder.

Reference
1. SLCOA National Guidelines / Pre-operative preparation & Post-operative care 69


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