Postoperative pain assessment & management

Responsibilities of nurses (Based on the Nurse-Based Anaesthetist-Supervised Acute Pain Services, initiated in Surgical Nursing Department, CMC Vellore)
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Introduction: Pain is an almost universal phenomenon, especially so, in instances of surgical intervention. Pain from surgery may continue through the late postoperative period and even through discharge. The duration of pain and its severity after surgery depends on various factors like the type of procedure, the patient's general condition at the time of surgery, pain threshold of the patient and most importantly, the pain management in the perioperative period.

What is perioperative pain management?
Perioperative pain management has been referred as actions before, during and after a procedure that are aimed to reduce postoperative pain before discharge (American Society of Anesthesiologists Task Force, 2012). The quality of pain management provided during the perioperative period can impact the patient’s recovery experience in either a positive or negative manner and can affect long-term outcomes as well.\textsuperscript{1}

In any post operative unit, pain management interventions are administered by nurses. Therefore, it is imperative that nurses working in the postoperative unit provide the best quality care to patients in terms of pain management. For a nurse to render effective pain management to patients, she needs to be aware of the various pain management modalities, indicators of complications and interventions for complication management.

The following discussion of pain management in the post operative period is drawn heavily from our experience in the Nurse-Based Anaesthetist-Supervised Acute Pain Services, initiated in the Surgical Nursing Department of the Christian Medical College, Vellore and is a practical guideline for doctors and nurses who deal with the problem of pain in post operative patients.

The nurse’s responsibilities can be broadly categorized into three aspects: pain education, pain assessment and pain management.

PAIN EDUCATION
A nurse must primarily understand that patient preparation for postoperative pain management begins in the preoperative period itself when a patient is informed about his surgery and gets admitted to the surgical unit.

Pre-operative education: During the preoperative period, an emphasis must be put on educating the patient about scoring their pain using a simple Numerical Rating Scale. (A simple handmade cardboard scale with a horizontal line drawn on it, with points from 0 to 10 will suffice).

Nurses must also discuss realistic pain expectations during surgery, available pain interventions, anticipated side effects of medications and toxic symptoms that have to be reported immediately (for e.g. shortness of breath, dizziness, persistent headache etc.).

Benefits of pre-operative education: It has been observed that such preoperative education and opportunity for patients to clarify about pain control options reduces their anxiety regarding postoperative pain. It also gives an opportunity for nurses to build a rapport with the patient and family members. The success of a pain management plan often rests on this rapport that nurses develop through daily interaction.

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should be instructed to use analgesics judiciously at home and to manage pain effectively using pharmacological and non-pharmacological methods.

PAIN ASSESSMENT

Ongoing regular and systematic pain assessment is by a surgical nurse is the first step towards effective pain management. Since pain is a subjective phenomenon and only the patient experiences its full impact, it becomes essential that an objective value of pain is obtained to assess the efficacy of the pain interventions.

Figure 1: Objective pain assessment tool

Components of pain assessment

Intensity of pain:
The most important component of pain assessment is the intensity of pain. This is best obtained in the wards by using a Numerical Rating Scale (NRS) or a visual analogue scale (VAS) (Figure 1). VAS is a 10-cm line with anchors at both ends. Common anchors are “no pain” and “worst pain”. Patient is asked to draw a vertical line through the horizontal line to indicate their pain intensity. This line is measured in millimetres, yielding a number between 0 & 100. NRS is a 11-point scale on which patients rate their pain by choosing a number from 0 to 10. This method of scoring pain objectively helps the caregivers to get a baseline preoperative pain score and also helps in deciding the type, dose and efficacy of analgesia postoperatively.

Other characteristics of pain:
The nurse should also assess other characteristics of pain such as location of the pain, onset, aggravating factors (movement, coughing etc.), relieving factors (lying down, splinting, cold application etc.) and radiation of the pain. A brief psychosocial evaluation of the patient including his emotions, coping ability, beliefs about pain and family support, will also help the nurse to render effective pain interventions.

The cornerstone of an effective pain assessment is the acceptance that the pain belongs to the patient and no one else is the authority about the presence and character of the pain.

PAIN MANAGEMENT

The third important responsibility of a surgical nurse is rendering effective and regular pain interventions. Pain in the postoperative period is managed usually by opioid & non-opioid analgesics. These drugs can be administered through various modalities and the modality for a drug is often decided by the surgeon and/or anaesthetist after a careful assessment of the patient's pain.
assessment of the patient’s co-morbid conditions, nature & extent of surgery and pain threshold levels.

The following section describes about the three approaches used for postoperative pain management, namely, opioids, non-opioids and non pharmacological interventions.

1. Opioid Analgesics

Opioid analgesics are considered to be a mainstay in the treatment of moderate to severe postoperative pain because they are effective, easy to titrate and have a favourable risk-to-benefit ratio. They are often combined with non-opioids because this permits using a lower dose of the opioid. Examples of opioids are Morphine, Fentanyl, Codeine, Pethidine, Oxycodeone, Hydromorphone etc.

Routes of administration of opioids

In the postoperative period, opioids can be administered through different routes. The preferred routes are SC and IV, especially in case of continuous infusions. Epidural & intrathecal administration of opioids has also gained widespread use because of its efficacy. The intramuscular route is not advised for opioid analgesia because of increased pain caused by the injection procedure, unreliable absorption and complications like nerve injury and sterile abscess. Irrespective of the route of administration of opioids, the nurse should be aware of her specific responsibilities while using opioids.

Specific nursing responsibilities while administering opioid analgesics

1. Follow the hospital policy for storing, loading, administering and documenting opioids. For e.g. Opioids may be stored in a separate ‘Dangerous Drug’ cupboard that is kept locked and opened only in the presence of a witness.
2. Monitor vital signs regularly. This helps in early detection and intervention in case of complications like hypotension and bradycardia. Morphine requires the respiratory rate to be checked before administering. It is withheld if the respiratory rate is below 12.
3. Regular assessment of the bowel activity. Opioid-related constipation can have a negative effect on the patient’s postoperative recovery. Educate the patient to take increased fluids and fibre-rich diet, if not contraindicated. Bulk laxatives can be administered if needed.

4. Monitor patients for post operative nausea & vomiting. Ensure that an intravenous antiemetic is prescribed along with the opioid. Administering antiemetics half an hour before meals will counteract the side effect of opioid analgesic and also ensure optimal nutritional intake.
5. Monitor the patient’s urinary output regularly. Since Morphine can cause urinary retention, a strict monitoring of the bladder frequency has to be done. If a patient develops urinary retention, subsequent dose of Morphine should be withheld till the problem is resolved.
6. Administer the Opioids on time: Round the clock dosing is effective, missing doses reduce optimal pain relief.
7. Assess for pruritus: If pruritus is severe and does not resolve by antihistamines, it is better to discontinue the opioid and prescribe alternative analgesic for the patient.
8. Reduce analgesic gap: While discontinuing the opioids, ensure that the patient has already been started on an oral NSAID, so that analgesic gap is reduced and effective analgesia is ensured during switch over to non-opioids.

Specific routes of opioid administration and nursing care

a. Epidural analgesia

In the epidural route, the drugs are introduced through a catheter in the epidural space. Common opioids used in epidural infusion are Fentanyl and Morphine along with local anaesthetics like Bupivacaine or Ropivacaine. The epidural catheter is connected via a filter to an intravenous line and syringe (usually 50cc) which is then programmed through a syringe pump to deliver set rates of the opioid drug. An epidural infusion is commonly continued for a period of 48-72 hours postoperatively after which the patient is switched to oral analgesics.

Nursing care for patients on epidural infusion

- Monitor vital signs: Patients on epidural analgesia require regular monitoring of their respiratory rate, blood pressure, pulse rate, sedation score and pain score. The frequency of monitoring should be stipulated by the hospital policy, for e.g., every one hour for the first four hours and thereafter every four hours.
- Evaluation of response: A careful systematic evaluation of patient’s response to epidural
analgesia is needed to ensure safe pain relief for patients.

**Look for and detect complications:** The nurse should be able to detect complications of epidural analgesia that include respiratory depression, hypotension, bradycardia, nausea/vomiting, pruritus, sedation, urinary retention, post-dural puncture headache, motor block (inability to move legs), and peri-catheter site complications (bleeding, inflammation, infection). These should be immediately reported and managed effectively.

**Ensure q2h position changes:** Epidural infusion significantly impairs the sensations over the lower extremities. Therefore, the areas around sacrum, trochanter and heel are prone to develop pressure sores. The nurse should ensure that the patient’s position is changed every two hours to prevent this complication.

**Removal of catheter:** Epidural catheters are usually removed by the surgeons or in some settings, by acute pain nurses. The staff nurse should ensure that all anticoagulants (Heparin, Clexane etc.) should be withheld for at least four hours after removal of epidural catheter.

b. **Patient controlled analgesia (PCA)**
Another modality for many patients who receive IV/SC/epidural narcotics is the patient-controlled analgesia (PCA) pump. The patient, however, has to be carefully selected because he/she must be able to follow directions, have a good hand function and be motivated to take control of pain relief. Drawbacks to PCA use include misunderstandings on the part of the patient, physical or mental inability to use the pump, poor education or preparation for PCA as a pain-relief method, poor IV access, or reluctance on the part of the patient to self-medicate for pain.

Nursing care for patients on PCA
- **Strict patient monitoring.** Since the patient is usually put on opioid PCA, it is imperative that the nurse assesses the patient’s vital signs (BP, respiratory rate, pulse rate), pain score and sedation score every hour.
- The nurse should also watch out for opioid related side effects.
- Especially monitor the catheter insertion site for inflammation or infection.

c. **IV/SC intermittent analgesia**
If the opioids are ordered as intermittent boluses either through IV or SC route, the nurse must ensure that the drugs are administered on time. While administering the dose, strict asepsis must be followed. Although addiction to opioids in postoperative period is very rare, the nurse must carefully evaluate patient responses to the narcotic prescribed. The patient must also be monitored for the side effects of opioids (See box 1).

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<th>Box 1: Complications of Opioid use</th>
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d. **Transdermal patches**
Opioids can be administered through the transdermal route (adhesive patches placed on the skin). These patches deliver a specific dose of medication through the skin into the bloodstream. Commonly used opioid patches are Fentanyl patch (delivers 25 micrograms / hour, used for 72 hours) and Buprenorphine patch (delivers 5-10mcg/hr, used for 7 days). Most of the patches provide controlled release of the medication either through a porous membrane that covers a reservoir of medication or through thin layers of medication embedded in the adhesive that melt due to the body heat.

Nursing care for patients on transdermal patches
- The patch must be applied on clean, nearly hairless skin.
- Care must be taken to ensure that the skin is free of any infection.
- Avoid applying any lotion / oil / powder on the skin that is to be used for transdermal patches.
- All patches have a stipulated time period and should be removed at correct time.
- Avoid exposure to direct heat as the delivery of medications can be affected by heat.

2. **Non- Opioid Analgesics**
After 2-3 postoperative days, patients are usually switched over to non-opioids. The commonest non-
opioids used in postoperative period are acetaminophen (Paracetamol), acetylsalicylic acid (aspirin), NSAIDs and skeletal muscle relaxants. These medications, (some of which also have antipyretic or anti-inflammatory properties) are often the "first-line" analgesics chosen to treat mild to moderate pain associated with tissue injury (also called nociceptive pain).

**Box 2: Commonly used NSAIDs and side effects**

Acetaminophen is rapidly absorbed when taken orally with peak plasma levels reached at 30-60 minutes. Current guidelines suggest a maximum daily dose of less than 3 grams and preferably closer to 2 grams for chronic use. The nurse must be aware of its side effects that include abdominal pain, diarrhea, liver toxicity and renal dysfunction.\(^5\)

Some of the most commonly used NSAIDs are Ibuprofen, Naproxen and Voveran. NSAIDs are limited in that they have upper limits to their doses, beyond which significant toxicity can occur. The most common side effects of NSAIDs include gastrointestinal (GI) side effects (heartburn, nausea, dyspepsia, abdominal pain, ulcers, perforated ulcers, catastrophic GI bleeding), cardiovascular side effects (non-fatal myocardial infarction, non-fatal stroke or vascular death) and renal side effects (electrolyte retention, reduced glomerular filtration, and chronic renal failure).\(^5\)

**Routes of administration of non-opioids**

Non-opioids can be administered through parenteral (IV), enteral (oral, via nasogastric or jejeuostomy tube) or transdermal routes. Intravenous non-opioids are usually used during early post operative period. Once the patient resumes satisfactory oral intake, oral route is preferred. Non-opioid suppositories can also be used, unless contraindicated.

**Specific nursing responsibilities while administering non-opioid analgesics**

- Around-the-clock dosage schedules are more effective than ‘prn’ or ‘sos’ for optimal pain relief.
- Monitor for side effects regularly (see box 2) and report to the physician as per the hospital policy.
- Ensure that patient has had a proper meal before administering NSAIDs.

- Ensure that patients on prolonged use of NSAIDs are being evaluated for liver function & renal function.
- Ensure that the patients are receiving ulceroprotective drugs (proton pump inhibitors like Omeprazole, histamine receptor antagonists like Ranitidine) along with the NSAIDs.
- Use extreme caution while administering NSAIDs to patients with history of peptic ulcer or duodenal perforation. It is better to use alternative analgesics for such patients.

**3. Non pharmacological interventions for post operative pain management**

During the post operative period, certain non pharmacological modalities are usually used in addition to the drugs, to provide pain relief. They work in adjunct with the analgesics to promote comfort and pain relief for patients. These can be divided into physical, psychological and psychosocial modalities. Psychological and psychosocial interventions are usually used for chronic or cancer pain and are rarely used for acute postoperative pain in hospital settings. However, in acute pain management, physical modalities are most frequently used.

**1. Physical modalities**

a. **Therapeutic touch**

Touch can provide reassurance, a sense of contact and involvement, and may facilitate relaxation. Therapeutic forms of touch include effleurage and massage.

**Box 3: Efflurage and massage**

**Efflurage:** Gentle cutaneous stimulation, either at the site of pain or at another site on the body, can have the effect of confounding the pain stimulus, short-circuiting the system and reducing the perceived painful sensations. This light, rhythmic stroking with only a feather-light touch is called efflurage.

**Gentle massage:** Here, the stroking is rhythmic but not as light as efflurage, can reduce pain sensations and also help to reduce muscle tension, promote circulation and improve sleep.\(^2\)
b. Physical manipulation
This includes instructions on repositioning and appropriate ways to rise from bed or chair. The advantages of repositioning are:

i. Changing into a comfortable position facilitates pain reduction by relieving pressure over bony prominences or areas of swelling.

ii. Prevents complications of immobility such as pressure sores, venous stasis in the extremities and impaired breathing.

iii. It can promote increased circulation, muscle relaxation, and general comfort.

The patient in pain may be reluctant to change position, fearing an increase in pain. However, it is important to teach the patient how to change position safely and comfortably. Aids in changing position such as an overhead trapeze or bed rails are helpful. Use of pain medication or other adjuvant therapies prior to position change can further reduce discomfort.

c. Application of Cold
Application of cold therapy is another form of cutaneous or transcutaneous stimulation that may add to pain relief especially in conditions such as postoperative edema or muscle spasms. Decrease in local body temperature results in slight vasoconstriction of the area, reducing local circulation as well as limiting the amount of extracellular fluid leaking into the area (which also reduces or prevents swelling).

Precautions during cold application:
- During cold application, it is important to protect the skin. Ice should not be applied directly; rather, it should be wrapped in a towel or cloth.
- Cold should be applied intermittently. A good rule to remember is 20 minutes on and 20 minutes off. Continuous application of cold could result in tissue damage as the result of continued vasoconstriction.

d. Therapeutic exercise
Therapeutic exercise includes range-of-motion exercises, strength training, stretching and cardiovascular conditioning. Exercise results in the release of endorphins which promote natural pain reduction, as well as feelings of well-being. Exercise is also helpful in changing muscle tension, encouraging repositioning, and promoting increased function, such as when the client ambulates after abdominal surgery, resulting in an increase in intestinal peristalsis.

2. Psychological treatments
Relaxation techniques
Techniques like progressive muscle relaxation and guided imagery can be used in the management of acute pain. Progressive muscle relaxation involves alternate tensing and relaxing of various muscle groups in sequence. This coupled with diaphragmatic breathing is helpful for patients who are unawares of their level of muscle tension.

Conclusion
Optimal pain relief during the post operative period requires a commitment on the part of healthcare team to keep such systems in place, wherein, pain is assessed regularly and managed effectively. Simple policies like sensitising nurses to perform regular pain assessments, tailoring pain interventions based on patient’s report of pain, following scheduled dosing of analgesics rather than ‘prn’ dosing and using multimodal analgesia will go a long way in providing optimal pain relief to postoperative patients.

References: