Oral Opioid for Pain Relief after the Discontinuation of Post-operative Pain Treatment Modalities

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Abstract

Introduction: There is insufficient evidence or recommendation to guide the best approach to convert non-oral post-operative pain management to oral analgesics.

Objective: This study aimed to assessed the use of oral opioids after the discontinuation of non-oral post-operative pain treatments, their effectiveness in post-operative pain relief and the occurrence of opioid related side effects.

Method: This was a retrospective cross-sectional study involving all adult post-operative patients discharged from the operation theatre from January to June 2016 on post-operative pain treatment with epidural infusion of local anaesthesia with or without strong opioid, Patient Controlled Analgesia (PCA) and subcutaneous injection of strong opioids. Information on the type of oral analgesics, pain score on movement and opioid related side effects were collected from patients' medical record. The effectiveness of pain relief was defined as pain score on movement less than 4 at 24 hours after the conversion of non-oral post-operative pain treatments to oral opioids.

Results: Of 677 patients' charts reviewed, 497 patients fulfilled the inclusion criteria. After the discontinuation of non-oral post-operative pain treatments, most patients were prescribed with strong opioids, with 58.1% using Morphine syrups and 7.4% using Oxycodone capsules. Tramadol capsules, a weak opioid, were given to 32.6% of patients while 1.8% of them did not receive any opioid. Pain assessment at 24 hours after the conversion to oral analgesics found that 92.6% of patients were able to maintain pain score on movement below 4 with a mean score of 2.01 (standard deviation 1.15). Minor opioid related side effects were reported in 49 patients (10.0%). The most common side effects were nausea and vomiting (5.9%), dizziness (2.3%) and constipation (1.2%).

Conclusion: The use of oral opioids after discontinuation of post-operative pain treatment was very common and was able to provide adequate pain relief with low occurrence of minor side effects.

Keywords: strong opioid, post-operative pain, safety

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Introduction

Post-operative pain is a common experience in more than 80% of patients who undergo surgical procedure (1). Effective post-operative pain control is an essential component of patient care that can lead to shortened hospital stays, reduced hospital cost, early mobilisation and increased patient satisfaction (2). Inadequate pain control, apart from being inhumane, can affect the quality of life, functional recovery, increase the risk of post-surgical complications such as prolonged rehabilitation and risk of persistent post-surgical pain thus may result in increased morbidity or mortality (1,3,4).

Another important approach to effective acute pain post-operative pain management is to utilise an appropriate assessment tool. Pain assessment and reassessment are required to provide optimal post-operative pain care. Pain score measured at rest and movement will give an indication regarding the effectiveness of analgesics and the need for changes in analgesic dose (1,5). A 10-point Numerical Pain Rating

Scale, where 1 is no pain and 10 is the worst possible pain imaginable, has been used and accepted nationally. The aim for pain score at rest and on movement is 4 or less out of 10 points (5).

Immediate post-operative pain treatments involve a variety of pain relief modalities including the use of Patient Controlled Analgesia (PCA), intrathecal opioid, peripheral nerve block and epidural administration of local anaesthetics with or without strong opioid. The choice of post-operative pain treatment modalities usually depends on the type of operation, type of patients and availability of the machines. Neuraxial analgesia such as epidural and spinal (intrathecal opioid) is recommended in major thoracic and abdominal procedures, particularly in patients at risk for cardiac complications, pulmonary complications, or prolonged ileus. Epidural analgesia is at advantage as it can be performed as a continuous infusion compared to spinal analgesia that is limited to a single dose of administration. PCA is usually offered to patients who require analgesia for a few days and have adequate cognitive function to understand the device and its safety limitations. In normal practice, post-operative pain treatment modalities will be stopped or weaned off when patients can tolerate fluid intake and is able to take oral analgesics (4,5). PCA will be discontinued when patients demonstrate adequate pain control (1,4,5). In patients with epidural analgesics, the removal of epidural usually occurs after 48 to 7op'2 hours after which the risk of infection increases (6).

There is insufficient evidence or recommendation to guide on how best to approach the discontinuation and conversion of post-operative pain treatment modalities to oral analgesic. The common oral analgesic used is Paracetamol and Non-steroidal anti-inflammatory drugs (NSAIDs) regardless of patient's pain score due to the fear of misused, addiction and side effects of opioid (1). When discontinuing patients from the post-operative pain treatment modality, the issue that needs to be addressed is what type of oral analgesics to start on patients. Converting to a wrong type of analgesic during this transition period can be problematic as it can create interruptions in analgesic delivery that contribute to ineffective post-operative pain management and delay patient's rehabilitation.

Oral opioids can be highly effective and can be used to rapidly wean a patient off parenteral therapy once the patient is able to tolerate orally, thereby allowing early rehabilitation and earlier discharge from the hospital. While they are very effective analgesics, opioids are not considered as the ideal drugs in the post-operative setting due to the limitations and concerns about their use (7). The use of opioids may lead to many undesirable side effects such as sedation, respiratory depression, nausea and vomiting, hypotension and bradycardia, pruritus, and inhibition of bowel function. The American Pain Society in its new Guidelines on the Management of Post-operative Pain also encourages the physicians to limit the use of opioid therapy to moderate to severe acute post-operative pain (1). They recommended physicians to provide appropriate monitoring of sedation, respiratory status, and other adverse events in patients who receive systemic opioids for postoperative analgesia (1).

In Sultan Ismail Hospital Johor Bahru, the most common post-operative pain management are PCA of Morphine or Fentanyl, epidural infusion of local anaesthesia with or without strong opioid and subcutaneous injection of Morphine or Oxycodone. When patient can tolerate orally, these post-operative pain treatment modalities will be discontinued by the Acute Pain Service and converted to oral analgesics such as oral weak opioid or strong opioid based on the patient's pain score on movement. The oral opioids available in Sultan Ismail Hospital Johor Bahru include Tramadol, Morphine and Oxycodone. Currently there is no data on the common type of oral opioids prescribed after discontinuation of post-operative pain treatment modality. Therefore, this study was done to assess the use of oral opioids after the discontinuation of non-oral post-operative pain treatment and its effectiveness in achieving the targeted pain score on movement in post-operative patient. The secondary objective was to assess the occurrence of any opioid related side effects in patients prescribed with oral opioids. Findings from this study can assist physicians to prescribe appropriate oral analgesics in order to maintain adequate pain relief in post-operative patients.

Methods

This cross-sectional study involved all adult post-operative patients discharged from the operation theatre with post-operative pain treatment managed by the Acute Pain Service from January 2016 to June 2016. Patients with epidural infusion of local anaesthesia with or without strong opioid, PCA and subcutaneous injection of strong opioids as post-operative pain managements were included in this study. Post-operative patients discharged less than 24 hours after started with oral analgesic were excluded from this study.

A retrospective data collection on patients' demographics, types of oral analgesics prescribed after the discontinuation of non-oral post-operative pain treatments, pain score and any opioid related side effects were done from patient's electronic medical record and recorded into the data collection forms. Information regarding pain score and opioid related side effects recorded by the Acute Pain Service as part of the routine practice was collected. A ten-point pain score, where zero is no pain and ten is the worst possible pain imaginable was used. The pain score collected was the pain score on movement 24 hours after being started with oral analgesics. In this study, the effectiveness of pain relief in post-operative patients was defined as pain score less than 4 on movement as suggested in Pain Management Handbook, Ministry of Health Malaysia published in October 2013 (5). The common opioid-related side effects include nausea, vomiting, constipation, respiratory effects and pruritus.

A descriptive analysis was used in this study. Data were expressed as percentage (%), frequency (n), and mean with standard deviation (SD) where appropriate.

Results

Of 677 patients' charts reviewed, 497 patients fulfilled the inclusion criteria and were eligible for analysis. The mean age of the included patients was 43.94 (SD 16.9) years old with most of them being female (61.6%). Most of the patients were on PCA (57.1%) as post-operative pain treatment followed by epidural Infusion of local anaesthetic with or without strong opioid (35.6%), and regular subcutaneous injection of strong opioid (7.2%). The characteristics of patients included in this study were presented in Table 1.

The mean duration of non-oral post-operative pain treatment used before being converted to oral medications was 2.78 (SD 1.13) days. After the discontinuation of these modalities, most of the patients were prescribed with oral opioids. Morphine syrup (58.1%) was most frequently prescribed followed by Tramadol capsule (32.6%) and Oxycodone capsule (7.4%). This study found that 9 (1.8%) patients were not prescribed with any opioid as shown in Table 2.

Table 1: Patient demographic characteristics (n=497)

Variable	mean (SD) / n (%)
Age, year, mean (SD)	43.94 (16.9)
Gender, n (%)	
Male	191 (38.4%)
Female	306 (61.6%)
Post-operative pain treatment, n (%)	
Patient Controlled Analgesia (PCA)	284 (57.1%)
Epidural Infusion of local anaesthetic ± strong opioid	177 (35.6%)
Subcutaneous of strong opioid	36 (7.2%)

Abbreviation: SD - standard deviation; ± - with or without

Table 2: Oral analgesics used after the discontinuation of post-operative pain treatment modalities in the wards and as discharge medications (n=497)

Type of oral analgesic	Inpatient, n (%)	Discharge, n (%)
Strong Opioid		
Morphine Syrup	289 (58.1)	42 (8.5)
Oxycodone Capsule	37 (7.4)	11 (2.2)
Weak Opioid		
Tramadol Capsule	162 (32.6)	394 (79.3)
Non-opioid	9 (1.8)	50 (10.1)

Despite the high percentage of patients started with strong oral opioid after the discontinuation of post-operative pain management modalities, only 53 (10.7%) patients remained on strong opioid upon discharged from hospital. 394 patients (79.3%) were discharged with weak opioid and 50 patients (10%) were successfully discharged from hospital with no opioid.

Pain assessment 24 hours after the conversion from non-oral post-operative pain treatments to oral analgesics found that 460 patients (92.6%) were able to achieve the targeted pain score of less than 4 on movement with the mean pain score of 2.01 (SD 1.15). Most of the patients reported pain score of 2 on movement (33.4%), followed by pain score of 3 (26.6%), pain score of 1 (22.5%) and zero pain score in 10.1% of the patients as shown in Figure 1.

Among the patients who received oral opioids, minor opioid related side effects were reported in 49 (10.0%) of patients. The side effects were nausea and vomiting (5.9%), dizziness or drowsiness (2.3%), constipation (1.2%), and others (rashes and bronchospasm) in 0.6% patient as shown in Figure 2. Due to the side effects, 24 patients had their medication modified to different medication, and three patients needed dose reduction while other patients continue their medications after successfully managing the side effects with appropriate treatment.

Figure 1: Pain score 24 hours after started with oral analgesics (n=497)

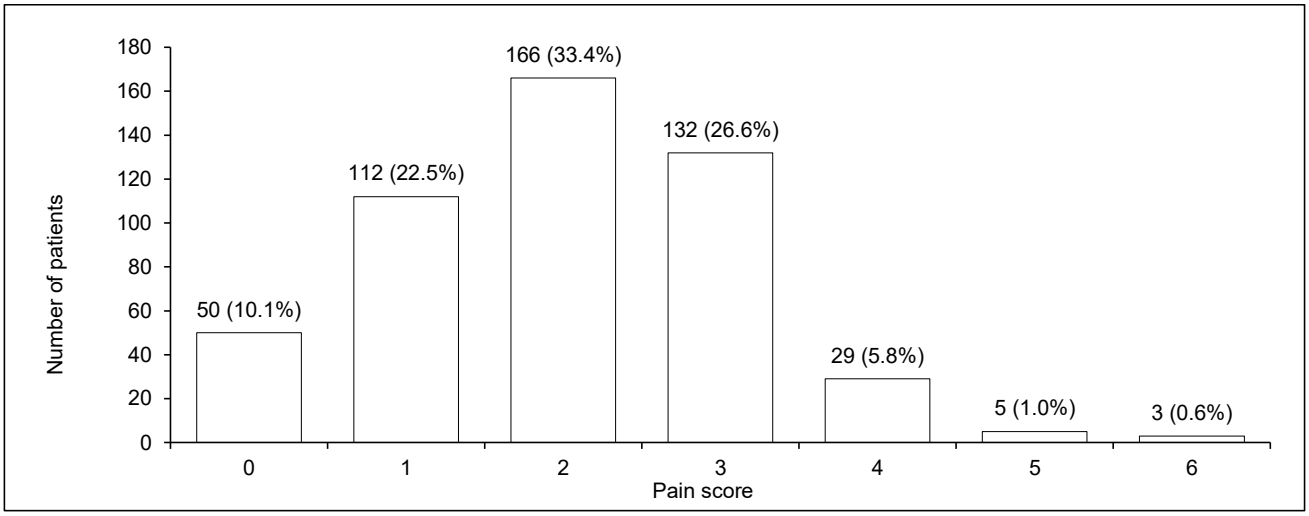
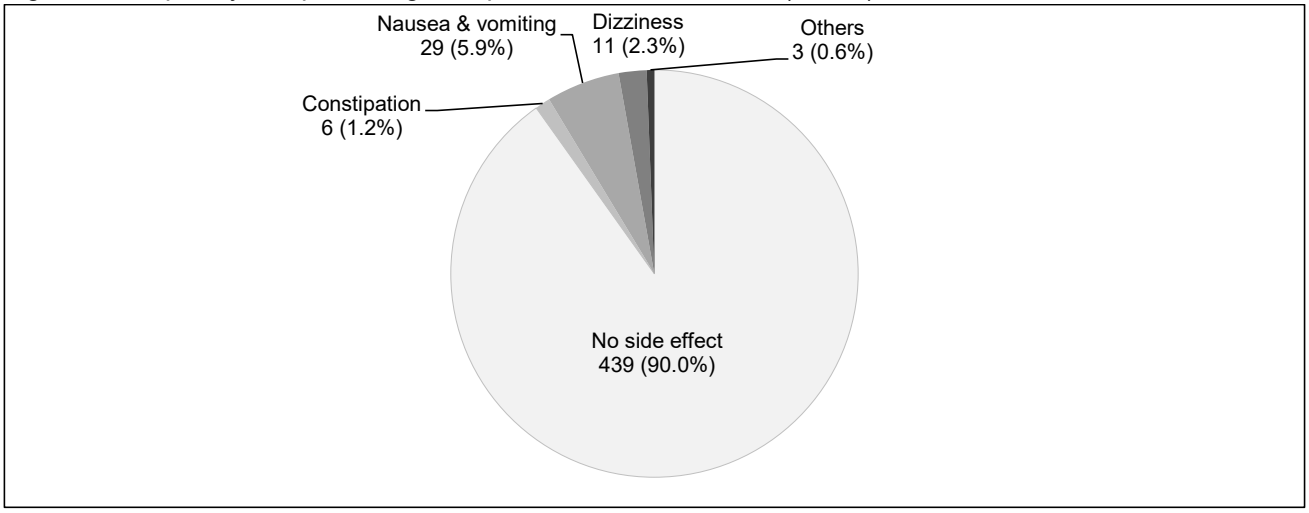


Figure 2: Frequency and percentage of opioid related side effects (n=488)



Discussion

Effective and safe post-operative pain management is very important and is one of the main criteria in the Malaysian Pain Free Program. Some of the reasons for poor pain management include barriers to the use of strong opioid analgesics due to the lack of knowledge among the healthcare providers and controlled substances regulations that govern the prescriptions of opioids (8,9). In Malaysia, as there are few legal issues in the use of strong opioids, the main barriers to effective pain control in Malaysia is related to physicians' and patients' attitudes towards the use of opioids. In a survey of physicians, 46% felt they lacked opioid knowledge, and 64% feared opioid related side effects such as respiratory depression (10).

This study showed that the use of oral opioid is very common in post-operative patients after the discontinuation of non-oral post-operative pain treatment with strong opioids prescribed in 66% of post-operative patients. Most of the patients were started with oral analgesic two days after the procedures. Although intravenous, subcutaneous or epidural routes may be appropriate in the immediate postsurgical period, oral analgesia is usually initiated when feasible and preferred because it is convenient, non-invasive, and cost-effective (1,11).

By using appropriate oral analgesic after the discontinuation of non-oral post-operative pain management, it was shown to be successful in maintaining adequate pain relief as clearly demonstrated in this study. The mean pain score reported 24 hours after initiating oral analgesics was 2.01 (SD 1.15) which was much lower than another study done in developing country that reported a mean pain score of 6.72 (SD 1.44) among their post-operative patients (9). They found that poor post-operative pain management was a consequence of inappropriate pain medications prescribed and the absence of strong opioids in their hospital setting. Other than the type of medications, the timing of oral analgesia administration was also crucial to effective pain management for patients during the transition from non-oral post-operative pain treatment to oral analgesics (12). Following the discontinuation of post-operative pain treatment modalities, patients need to be prescribed with regular oral analgesia to ensure adequate pain relief. As needed (p.r.n.) prescription is not encouraged as this may require patients' participation and some patients are less likely to request pain medication even though they were suffering high levels of pain (9).

At the time of transition to oral route of analgesia, patients' pain score should be re-assessed and analgesic requirement should be reviewed regularly in order to achieve post-operative pain management goal. The goal of post-operative pain management is to relieve pain while keeping the side effects to a minimum with pain score aim less than 4 at rest and on movement (5). Pain control on movement in post-operative patients is important and often more difficult to achieve compared to pain at rest. Pain that is not well controlled with movement or activities has major effects on patient's ability to participate in post-operative rehabilitation and return to normal function (1,13). Many studies demonstrate the health benefit and cost saving of getting patients ambulate soon after their operations. It shows that early mobilisation after operation improved physical, psychological, social and organisational outcomes (14). The physical benefits included less delirium, pain, urinary discomfort, urinary tract infection, fatigue, deep vein thrombosis (DVT) and pneumonia. Patients also experienced less anxiety and depression with early mobilisation. While for the organisation benefit, early mobilisation will cause cost reduction, decreased length of hospital stays and lower mortality rates.

Opioids were still the mainstay of post-operative pain therapy in treating moderate to severe pain after major surgery. In this study, Morphine syrup is the most commonly prescribed strong opioid for post-operative patient required strong opioid for pain management as it is the drug of choice and first line treatment in moderate to severe pain that provides effective pain relief, widely tolerated and cheap. In post-operative pain, short acting opioid such as Morphine syrup, Oxycodone immediate release capsule or Tramadol capsule are preferred over long acting sustained released formulation (1). Short acting opioid are recommended and preferred for easy dose titration according to patients need especially during the first 24 hours after operation. Around the clock oral dosing of short acting or immediate release opioids allows stable opioid plasma effective concentration therefore provide adequate pain relief. The use of long acting strong opioid, although provide more stable plasma concentration, is associated with more adverse effects, such as increased vomiting experienced and increased sedation, with no improvement in pain related interference with activity or walking (15).

All opioids have significant side effects that limit their use with the most important side effect being respiratory depression that could result in hypoxia and respiratory arrest. Nausea, vomiting, pruritus and reduction in bowel motility leading to ileus and constipation are also the common side effects of these

medications. Hence, regular monitoring of patients and then adjustment of medications accordingly is essential in patients on opioids post-operatively in order to optimise pain management and prevent or minimize thr risk of side effects. Another approach to reduce the occurrence of opioid-related side effects is by using multimodal analgesics by combining opioid with nonopioid drugs with different mechanisms of action such as paracetamol and NSAIDS which can produce synergistic effects resulting in maximum pain relief with minimal opioid consumption (16). It is recommended that in post-operative pain management, all patients should receive regular doses of paracetamol and / or NSAIDs as background analgesia unless contraindicated (17).

In this study, it was found that despite the use of strong opioid, only 10% of the patients reported minor opioid related side effects. Other study also showed low incidence of opioid induced side effects with the most frequent side effects being nausea, constipation and somnolence or drowsiness that can be easily managed without requiring the discontinuation of opioid treatment (18).The side effects during short term administration was found to be age and gender related and depended on the type of opioids as certain opioids produced fewer side effects than the others (19). It was also shown in this study that some patients who required strong opioid were prescribed with Oxycodone as an alternative to Morphine. Oxycodone is more expensive than morphine but produce less side effects, and therefore is reserved for patients with the higher risk of morphine-related side effects such as elderly patients and patients with renal impairment. A review of clinical trials that assessed the effectiveness and safety of oral oxycodone showed that patients receiving oxycodone for acute post-operative pain experienced fewer opioid-related side effects than those on other opioids (16).

It was noted in this study that only a small number of patients were discharged from the hospital with strong opioid (10.7%). This percentage was much lower than a study done by Hance *et al.* where they found that almost 50% of patients were discharged from the hospital after major elective surgeries with an opioid prescription and 3% will continue to use strong opioid for more than three months (20). Patients prescribed with strong opioids upon discharge must be followed up properly to taper down and then wean off the strong opioids to avoid prolonged strong opioid use. The prolonged use of strong opioids is associated with the increased risks of injury, cardiac events and addiction (20). The prescribing of strong opioids as discharge medications in high risk patient therefore should be judiciously done to avoid this risk as well as the emergence of opioid addiction and tolerance in post-operative patients especially in previously opioid naive patients.

This study should be interpreted cautiously considering its limitations. Firstly, the findings lacked important clinical details such as type of operation and dose of oral medications used that will have effect in patients' pain experience. We were also not able to discuss if the use of strong opioid in these patients indicate improving in patient early rehabilitation and preventing them from getting chronic pain. To evaluate the appropriateness of oral strong opioid use in post-operative patient, further studies are needed to profile patients' pain experience after discharged home and the ability of patients to wean off from opioid medications.

Conclusion

The use of oral opioids after the discontinuation of non-oral post-operative pain managements was quite common. It was able to provide adequate pain relief and was safe to be used with low occurrence of minor side effects. Nevertheless, oral opioids should still be used judiciously with appropriate monitoring to avoid any undesirable major side effects that can compromise patient safety.

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Conflict of interest statement

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