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Injectable pethidine vs diclofenac as an analgesic for lower limb orthopedic surgeries as postoperative analgesics

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Abstract

Background: Postoperative pain may be a significant reason for delayed discharge from hospital, increased morbidity and reduced patient satisfaction. Nowadays opioids are the mainstay in the treatment of acute postoperative pain. Pethidine is an opioid.But opioids produce side effects like nausea, vomiting, sedation, pruritis, respiratory depression. Diclofenac is a non-selective NSAIDs with good tissue permeability. NSAIDs are particularly Effectiveincasesofsomaticinflammatorypain.

Objectives: We conducted this study to compare the efficacy of Injection pethidine and Injection diclofenac as an analgesic for post-operative patients undergoing Hysterectomy.

Methods: This was an open-label prospective study that included 60 female patients undergoing lower limb orthopedic surgeries aged 20 years and above. Randomly allocated 30 patients were given Pethidine 50 mg IM three times a day and the rest 30 patients were given Diclofenac 75mg IV two times a day. Post-operative pain scores were recorded using the Visual Analog Scale (VAS) at 6,12,24and 48 hrs. Statistical analysis was done using unpaired t-test.

Results: The mean pain score was found less in the diclofenac group compared to the pethidine group at all intervals by VAS (p<0.05). Nausea and dizziness were more commonly reportedinthepethidinegroup.

Conclusion: Diclofenac provides effective and better analgesia in acute post-lowerlimb orthopedic surgery pain than pethidine with fewer adverse effects.

Keywords: Postoperative pain, pethidine, diclofenac, VAS

Introduction

Pain after surgery is the main concern that a patient has to deal with[1].It can lead to high morbidity, delay the discharge from hospital as well as reduced patient satisfaction[2]. Pain can be classified as acute or chronic; it is the acute pain that must be dealt with in the immediate postoperative period[3].Ideally, postoperative pain should be monitored concurrently during rest (important for comfort) and during movement (important for the functioning and postoperative complication), but this is often not done due to lack of time[4,5]. Post-operative pain management is a major concern following surgery. Abdominal hysterectomy is usually producing moderate to severe pain postoperatively[2].The different classes of analgesics are used for pain relief; exert their effect through different mechanisms[6]. Opioids and NSAIDs are used for the management of postoperative pain and both the groups have their own pros and cons. Nowadays opioids are the mainstay for the treatment of postoperative pain but opioids produce side effects like nausea, vomiting, sedation, pruritis and respiratory depression. Pethidine is a centrally acting analgesic that has a moderate affinity for μ receptors and weak kappa and delta-opioid receptors. In addition to

μ receptor agonist, pethidine enhances the function of the spinal descending inhibitory pathway by inhibiting neuronal reuptake of 5-hydroxytryptamine and norepinephrine also inhibits the release of 5 hydroxytryptamine.

On the other hand, non-steroidal anti-inflammatory drugs are alternative to opioids as they are devoid of opioid related side effects, yet provide effective analgesia along with antipyretic and anti-inflammatory action. Diclofenac is a non-selective NSAID belonging to an acetic acid group. NSAIDs inhibit the biosynthesis of prostaglandins by preventing the substrate arachidonic acid from binding to the COX enzyme active site. The COX enzymes are COX-1 and COX-2 isoenzymes. COX-2 expression can be induced by inflammatory mediators in many tissues and has a role in the mediation of pain, inflammationand fever. Peripheral blocking of prostaglandin synthesis and central inhibition of COX-2 plays a very important role in nociception[7].

Pain that accompanies inflammation and tissue injury probably results from local stimulation of pain fibers and enhanced pain sensitivity. NSAIDs are particularly effective when inflammation has caused sensitization of pain. The aim of our study was to compare the efficacy of Injection pethidine and Injection diclofenac as an analgesic for postoperative patients undergoing lowerlimb orthopedic surgeries. We also aimed to assess the costeffectiveness between Injection pethidine and Injection diclofenac.

MaterialsandMethods

This was an open-label prospective, comparative study conducted in orthopedic ward at a tertiary care hospital over a period of one year. 60 female patients aged above 20 undergoing lower limb orthopedic surgeries were included in the study whereas patients who were sensitive to NSAID and opioids, patients who underwent malignancy surgery, patients with a history of chronic pain, peptic ulceration, bleeding disorders, patients with impaired renal or hepatic functions and patients who were not willing to fill consent form were excluded from the study. The Institutional Ethics Committee's permission was obtained.Written informed consent was provided by every participant at the time of recruitment. Each subject was informed in a detailed and comprehensive manner about the pain assessment scale. Patients fulfilling inclusion criteria were divided into two groups by simple convenient randomization.

- **Group P (30 patients):** Pethidine 50mg IM every 8 hours for 72 hours.
- **Group D (30 patients):**Diclofenac 75 mg Intravenous every 12 hours for 72 hours.

All patients were given spinal anesthesia as per standard protocol (bupivacaine 0.5%+ Injection fentanyl 25 mcg) and received diclofenac suppository post-operative immediately followed by Injection pethidine or Injection diclofenac for 2days.

Assessment of pain was done using Visual Analogue Scale (VAS)[8] score, scored 0 to 10 where 0 indicates no pain, whereas 10 indicates ‘Worst pain ever’. The score was assessed postoperatively in the post-operative recovery room at 6, 12, 24 and 48 hours. Any sideeffects were carefully noted.

Statistical analysis

The data thus collected were tabulated and subjected to unpaired student t-test and analysed with Microsoft Excel office. The confidence limit of the study was kept at 95%, hence a "p Valueless than 0.05 indicated a statistically significant association.

Results

Table 1: Represents the VAS score of both the groups at 6 hrs. 12 hrs. 24 hrs. 48 hrs. time intervals. The score was significantly lower in the diclofenac arm up to 24hrs, thereafter scores were comparable between the groups

VAS score	Group P	Group D	P-value
6 hrs.	8.3	7.53	0.008**
12 hrs.	7.33	6.63	0.013*

24 hrs.	5.3	4.7	0.034*
48 hrs.	1.33	0.9	0.079

N=30 each, p<0.05*, p<0.01** when comparison done between groups by Student t-test.

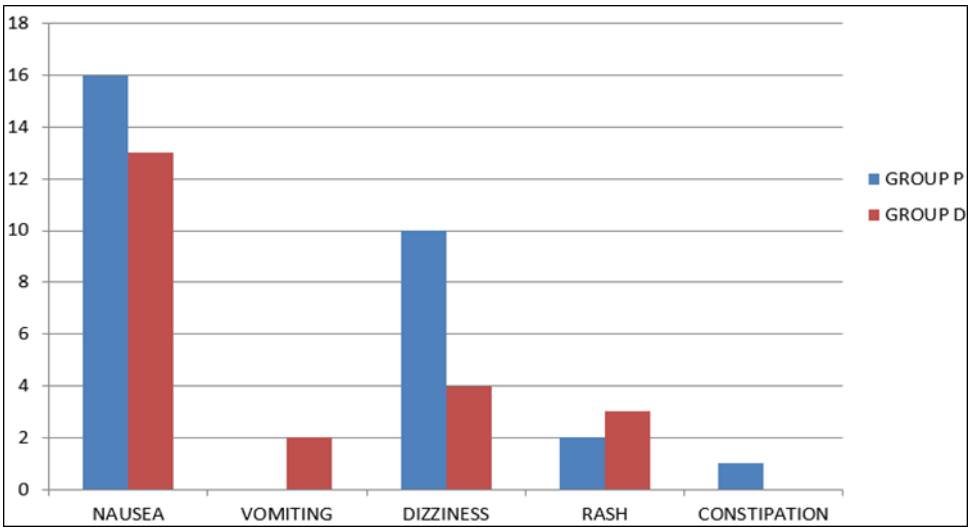

Fig 1: Represents the adverse drug reactions which we came across during our study period. In the pethidine group, 16 patients experienced nausea, 10 patients experienced dizziness, 2 patients experienced rash and 1 patient experienced constipation. While in the diclofenac group, 13 patients experienced nausea, 2 patients experienced vomiting, 4 patients experienced dizziness and 3 patients experiencedrash.

Discussion

Recently the concept of postoperative pain relief is regarded as a time-dependent maximization of patient's comfort with safer and cheaper analgesics.

In our study, we observed, diclofenac was more efficacious up to 24 hrs. postoperatively in both the VAS scale. After 24 hrs. efficacy was almost equivalent in both groups. No patient required rescue medication in either of the groups.

Shukla AK *et al*. in their study observed that the analgesic effect of diclofenac in 1st 24 hrs.is significantly greater than pethidine for postoperative pain [2].

Merrikhihaghi S *et al.*, in their study, has demonstrated the analgesic effect of diclofenac is 3.21 times more cost-effective than pethidine with the same efficiency and for post-cesarean pain[11].Sahil S *et al*. concluded that the diclofenac suppository provides a better quality of postoperative analgesia as compared to pethidine when used as pre-emptive analgesia[12].

Joshi V *et al*. in their study concluded that diclofenac suppository is a better alternative to pethidine because it has shown a better analgesic effect on postoperative pain[13]. The surgical procedure causes local tissue damage, resulting in the release of inflammatory mediators like prostaglandins, histamine, serotonin, bradykinin, substance P and other mediators, production of noxious stimuli, and irritation of free nerve endings and nociceptors (nociceptive pain). Diclofenac being an NSAIDS causes inhibition of cyclooxygenase(COX), which catalyzes the formation of prostaglandins from arachidonic acid, this justifies that in postoperative inflammatory conditions diclofenac affords quick relief of pain and wound oedema[14].

There were a few limitations to the study. The sample size we considered was small. This was a short term study so we were unable to assess long term adverse reactions. Also, drugs were given by the same investigator, so blinding was not done. Diclofenac is a peripherally acting analgesic agent, so the adverse effects were also relatively fewer as compared to pethidine which is a centrally acting agent.

Conclusion

Diclofenac provides effective and better analgesia in the post-hysterectomy pain than pethidine with fewer adverse effects. Also, Diclofenac requires less frequent administration. Though in the majority of hospital setups pethidine is preferred for postoperative pain management, in view of this study results we recommend that, pethidine should be replacedby a cost efficacious diclofenac therapy for post-operative pain management.

References

1. Farzi F, NaderiNabi B, Mirmansouri A, *et al*. Postoperative Pain After Abdominal Hysterectomy: A Randomized, Double-Blind, Controlled Trial Comparing the Effects of Pethidine and Gabapentin as Premedication. Anesth Pain Med.2016;6(1):e32-360.Published 2016 Jan 17.doi:10.5812/aapm.32360
2. Shukla AK, Srivastav AK. Comparative study of pethidine and diclofenac as analgesic for postoperative pain. Int J Med Res Rev.2015;3(11):1311-1316.Doi:10.17511/ijmrr.2015.i11.238.
3. Khobragade SM. Comparison of intramuscular diclofenac sodium, diclofenac sodium suppository and intravenous pethidine for postoperative analgesia in gynaecological surgeries done under spinal anaesthesia. Int J Res Med Sci. 2018;6:3034-41.
4. Ryhänen P, Adamski J, Puhakka K, Leppäluoto J, Vuolteenaho O, Ryhänen J. Postoperative painreliefin children. A comparison between caudal bupivacaine and intramuscular diclofenacsodium.Anaesthesia, 1994 Jan;49(1):57-61.
5. Rahman MH, Beattie J. Managing postoperative pain. Pharmaceutical Journal.2005 July;275:145-8.
6. Pal A, Biswas J, Mukhopadhyay P, Sanyal P, Dasgupta S, Das S. Diclofenac is more effective for post-operative analgesia in patients undergoing lower abdominal gynecological surgeries: A comparative study. Anesth Essays Res. 2014;8(2):192-196.Doi:10.4103/0259-1162.134502.
7. Cummings K, Naguib Mohamed A. Stoelting's textbook of pharmacology and physiology in anaesthetic practice: 5th edition; Opioid agonists and antagonists, 2015, 217-241.
8. Hawker GA,MianS,KendzerskaT, FrenchM. Measures of adult pain:Visual Analog Scale for pain,McGill Pain Questionnaire,Short-Form McGill pain questionnaire, Chronic Pain Grade Scale, ShortForm-36 Bodily pain scale and Measure of Intermittent and Constant Osteoarthritis Pain.Arthritis care Res. 2011;63:S240-S252.
9. Praveen Kumar, LaxmiTripathi. Challenges in pain assessment:Pain Intensity Scales. 2014;28(2):61-70.
10. Subramanian B, Shastri N, Aziz L, *et al*. ASSIST-Patient satisfaction survey in postoperative pain management from Indian subcontinent. J Anaesthesiol ClinPharmacol. 2017;33(1):40-47.
11. Merrikhihaji S, Farshchi A, Farshchi B, Farshchi S, Dorkoosh FA. Pethidine versus diclofenac in pain management after cesarean section: a cost nalysis study. J pharmacoeconomics and pharmaceutical management. 2015;1(1):22-4.
12. Sahil S, Mane M, Paranjape J. Comparison of diclofenac suppository with pethidine suppository for postoperative analgesia in abdominal hysterectomy patients. Medpulse-International medical J. 2017;4(5):606-9.
13. Joshi VS, Vyavahare RD, Khade G, Shiledar V, Jamadar NP. Comparative study ofanalgesic efficacy ofrectal suppository of Pethidine versus diclofenac insuppressing postoperative pain after Cesarean section,International J of Healthcare and Biomedical Research. 2013;1(2):32-37.
14. Málek J, Ševčík P, Bejšovec D. Postoperative pain management.Chapter-2 Pathophysiology of acute postoperative pain:10-11Third updated edition Published by: Mladáfronta a. s., MeziVodami, 1952/9 143 00 Praha 4.