

A COMPARATIVE STUDY OF THE EFFICACY OF INTERMITTENT BOLUSES OF NALBUPHINE AND DICLOFENAC SODIUM INFUSION ON POST-OPERATIVE PAIN

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ABSTRACT

OBJECTIVE: This prospective randomized single blind trial was designed to compare and evaluate the efficacy of intravenous diclofenac sodium with narcotic analgesics, for post operative pain management, and establish the safety of use of intravenous diclofenac sodium.

SETTINGS: Department of Anaesthesiology, Pain & Intensive Cares, Combined Military Hospital, Hyderabad.

METHODOLOGY: Hundred patients undergoing different types of surgeries were studied. All the patients were followed for 48 hours post operatively. The patients were American Society for Anaesthesiologist Physical Status of I and II, and aged more than 15 years. A standardized anaesthetic technique consisting of thiopentone-suxamethonium for induction; and oxygen, nitrous oxide, halothane, with or without pancuronium for maintenance of anaesthesia was used. First group of 50 patients received inj. Nalbuphine 5 mg IV, which was continued in doses of 2-3 mg intermittently, post-operatively. The second groups of 50 patients were administered 75 mg of diclofenac intramuscularly just after induction. This group also received a continuous infusion of diclofenac at a rate of 75 mg per 6 hours postoperatively. The duration of 75 mg infusion was increased after 12 hours, according to the response of the patient. In spite of the continuous infusion, if pain persistently remained above

5 on VAS, rescue analgesia was provided with 2-3 mg nalbuphine IV to these patients. 98% of patients remained almost pain free on IV infusion of diclofenac sodium and rescue analgesia was never required in them. The effect of intravenous water based diclofenac sodium on vital signs, laboratory values regarding coagulation, hepatotoxicity, nephrotoxicity and clinical side effects were monitored throughout the study period. No significant adverse effects were noted, whereas the incidence of nausea/vomiting and urinary retention was higher with nalbuphine.

RESULTS: Intravenous diclofenac was found effective in controlling postoperative pain if given via continued infusion after a bolus dose. Its analgesic efficacy to control post-op pain was comparable to nalbuphine, but the incidence of adverse effects was low
key words: diclofenac sodium, nalbuphine.

INCLUSION CRITERIA:

- ASA I, II
- Elective surgeries
- Types of surgery;
 - a. General surgery
 - b. Gynaecological & Obstetric surgery
 - c. Orthopedic surgery
 - d. Urological surgery

EXCLUSION CRITERIA

- Ulceration of Gastrointestinal tract
- Allergy to NSAID's
- Bleeding disorders
- Renal insufficiency
- Bronchial asthma
- ASA III, IV and V patients

STUDY

Informed consent was taken. A standardized anaesthetic technique consisting of thiopentone 3-5 mg/kg intravenously and suxamethonium 1-1.5 mg / kg intravenously was used for induction and intubation. Halothane 1-2% in nitrous oxide 50% and

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oxygen 50% was used for maintenance of anaesthesia with or without pancuronium 0.04mg/kg. The patients in group A received 5 mg nalbuphine IV on a 4-5 sec period during induction. Whereas 75 mg of diclofenac sodium was given intramuscularly to patients of Group B, and an infusion of 75 mg diclofenac sodium in 1000 ml 5% D/W or 0.9% saline solution for 48 hours was given in the post-operative ITC.

Patients were brought to surgical ICU post operatively. Blood pressure, pulse and respiratory rate were continually monitored and recorded for 48 hours of postoperative period. Analgesic effect was assessed by quantification of pain (pain scoring) by visual analogue scale, a '0' score meaning no pain and '10' meaning the most severe pain imaginable.

Rescue analgesia (2-3 mg nalbuphine) was given if the pain control at any time was judged inadequate by the staff or the patient regardless of the group to which the patients belonged.

During the whole period drug tolerance as well as any evidence of adverse effects was also assessed clinically to establish safety. Blood samples for PT and APTT were taken twice, before surgery and the second one at the end of trial.

RESULTS

The results of this clinical trial are very encouraging regarding efficacy and safety of intravenous diclofenac sodium in postoperative pain management. Total number of cases selected randomly was hundred, out of them 69 were male and 31 were female. The largest group belonged to the third decade (48%). Patients underwent a variety of surgical procedures. Table 1 summarizes the type of surgical procedures.

TYPE OF SURGERY	GROUP-1	GROUP-2
General Surgery	29	21
Orthopedic Surgery	7	5
Urological Surgery	5	2
Gyne & Obs	9	12
Total	50	50

Table 1: Type of surgical procedures
Majority of the cases was of general surgery, orthopaedic, and gyne-obs in both groups

(82% in Group-1, and 76% in Group-2).

Duration of surgery was between 30 to 180 minutes, which clearly depicts the degree of surgical trauma that the patients had to sustain. (Table 2)

	15-20 min	21-30 min	31-40 min	41-60 min	61-90 min	90 min
Group-1	5	7	19	21	8	0
Group-2	3	9	24	13	9	2

Table 2: Duration of surgery

Quantification of pain was done according to visual analogue scoring, ranging from 0 to 10, where 0 meant no pain, while 10 signified the most severe pain. In the immediate postoperative phase most of the patients were under the influence of intra operative analgesia. By supplementing bolus dose with intravenous diclofenac infusion in the postoperative period in group B, their pain status remained well under control. In almost all of cases, pain was effectively abated by diclofenac infusion in this group except 3 patients, who were injected inj. Nalbuphine 3-4 mg as rescue analgesia. While 52% of cases required rescue analgesia with additional narcotics in Group A. The demand for additional analgesic doses in this group was greater, and the patient satisfaction was lower as compared to Group-2 (68% vs 84%). This shows intravenous use of diclofenac sodium for post operative pain management is very efficacious.

Regarding safety, in Group-2 increases in prothrombin time of more than 3 seconds was noted in 8 cases. APTT increased in 7 cases. There was no clinical problem requiring active intervention, like oozing from surgical wound or bleeding in patients with raised PT and APTT.^{1,2} They were observed and monitored throughout their stay in the hospital. Patients were safely discharged from their wards without any intervention. Increase in SGPT and serum creatinine was minor,^{2,4} not causing any clinical problem.

The number of patients rating analgesia as excellent was 2 (2%) in Group-1, and 8 (16%) in Group-2, those rating it as good was 17 (34%) vs 22 (44%), satisfactory 24 (48%) vs. 17 (34%), and inadequate 7 (14%) vs. 3 (6%). The continued infusion clearly

demonstrated better and more agreeable analgesia for the patients.

Complication/Adverse Effect	GROUP-1	GROUP-2
Bradycardia	0	3 (6%)
Hypotension	2	0
Phlebitis	13	3
Epigastric pain	2	5
PONV	17	4
Urinary retention	4	2

Table3: Comparative incidence of complications

Regarding the vital signs, there was no abnormal variation noted except relative bradycardia (less than 10% decrease in resting pre-operative heart rate) in 3 cases (6%), which neither caused any haemodynamic instability nor required any medical intervention. The incidence in group-1 was zero.

Phlebitis was noted in 3(6%) cases in group-2 vs. 13 in Group-1, nausea and or vomiting in 4 (8%) cases (vs.17). Epigastric pain in 5 (10%) vs.2 (4s%) cases. Over all adverse effects were few, which mandates continuous monitoring.

DISCUSSION

The results of this prospective, randomized, single blind study prove the efficacy and safety of intravenous diclofenac sodium infusion as compared to intermittent boluses of narcotic analgesics. The patients were pain free throughout the post operative period as assessed by pain scoring by means of visual analogue scale.

Initial scoring of pain was low because patients were already under the effect of intraoperative analgesics. The patients in group-2 were given bolus dose of diclofenac sodium and then an infusion of diclofenac 75 mg / 6 hours started. Mean pain scoring immediately after surgery was 2.4 and then was below 1 in the next 48 hours.

Patients remained pain free in 25 cases (50%) without any rescue analgesia. Prothrombin time was raised in 8 cases (16%) and APTT was raised in 7 cases (14%). These patients were monitored in the ward throughout their stay in hospital but there were no clinical problems like oozing from surgical wound, which is known to be due to NSAID induced platelet dysfunction,⁵

which is reversible, and lasts about its elimination half life (24-46 hours.) This anti platelet effect does not appear to increase the incidence of postoperative hemorrhage appreciably. These findings were not noted in patients of group-1.

Regarding drug tolerance fewer adverse reactions were noted with diclofenac as compared to nalbuphine. Phlebitis was noted in three cases with diclofenac (13 in group-1), nausea / vomiting in four cases (17 in group-1), relative bradycardia in three cases (none in group-2), urinary retention in 4 vs. 2, and epigastric pain in two cases vs. five in group-2. The symptoms did not worsen with the continued usage of the diclofenac sodium infusion. Thus, the incidence of phlebitis, nausea / vomiting, and urinary retention was significantly higher in group A, receiving narcotics alone.⁵⁻⁶

CONCLUSION

It can be concluded that intravenous diclofenac sodium can be safely used for effective postoperative pain management without side effects of any serious concern and merits high in this regard.

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