

# Current Practice of Pre-emptive Analgesic and its Effects on Postoperative Pain Control

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## Abstract:

*Pre-emptive analgesic is regularly practiced as a part of well defined protocol in most of the tertiary hospitals in developed countries. In our country most of the hospitals do not practice this. But few centers practice it irregularly without following any defined protocol. Keeping this in mind our present study was carried out to find the current practice of pre-emptive analgesic and its effects on postoperative pain control. It was a cross-sectional study for 2 years. Sample size was 90; with a mean age of 8.7 years. Patients were selected from the department of paediatric surgery of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh Institute of Child Health, Dhaka and Dhaka Medical College Hospital, Dhaka. Observation were made on pre-emptive analgesic practice regarding the agents used for analgesia, route of administration and time of administration in relation to surgery. Postoperative pain was measured on the first postoperative day by Visual Analogue Scale and was graded. Only 17 (18.9%) patients received pre-emptive analgesic and others 73 (81.1%) did not receive any pre-emptive analgesic. Among them 12 patients received local infiltration and 5 patients received caudal block.*

*Mean value of pain score who received pre-emptive analgesic was 49.7mm on the first postoperative day and which was "moderate" grade of pain. Mean value of pain score who did not receive pre-emptive analgesic was 67.0 mm on the first postoperative day and which was "moderate" grade of pain.*

*Postoperative pain control was relatively better in those patients who received pre-emptive analgesic. But further study should be carried out with large number of patients in different centers by using different drugs to develop a protocol for effective postoperative analgesia.*

*Key words: Present, Pre-emptive analgesic, Postoperative pain control.*

## Introduction:

Post-operative pain is an acute pain. In addition to human sufferings associated with pain, there is now convincing evidence that unrelieved postoperative pain may result in harmful physiological and psychological effects which may cause significant morbidity and even mortality.

Before 1980, Analgesic drugs were used during postoperative period only with the idea that analgesic

treatment is required when pain starts after operation. Improved understanding of peripheral and central mechanism of pain pathway, offers new treatment option. Depending on this concept, the most effective analgesia is achieved by use of pre-emptive analgesic which is initiated before surgery and continued throughout the postoperative period<sup>2</sup>.

Effects of pre-emptive analgesics on postoperative pain control is well established by several studies<sup>3,4,5</sup>. Pre-emptive analgesic is regularly practiced as a part of well defined protocol in most of the tertiary hospitals in developed countries. In our country most of the hospitals do not practice this. But few centers practice it irregularly without following any defined protocol. Keeping this in mind our present study was carried

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out to find the current practice of pre-emptive analgesic and its effects on postoperative pain control.

### Patients and Methods:

This cross-sectional study was conducted from July 2003 to June 2005. Ninety admitted patients (30 from each hospital) were included in this study with the mean age of 8.7 years from the department of paediatric surgery of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh Institute of Child Health, Dhaka and Dhaka Medical College Hospital, Dhaka.

Observations were made on pre-emptive analgesic practice regarding the agents used for analgesia, route of administration and time of administration in relation to surgery. Postoperative pain was measured on the first postoperative day by Visual Analogue Scale (mm). Measured pain score was graded into different severities: 1. Little pain ( $13.9 \pm 6.4$ ), 2. Some pain ( $19.0 \pm 10.2$ ), 3. Mild pain ( $19.6 \pm 10.4$ ), 4. Moderate pain ( $42.8 \pm 10.7$ ), 5. Severe pain ( $82.9 \pm 9.6$ ), 6. Agonizing pain ( $41.2 \pm 8.0$ )<sup>6</sup>.

Statistical analysis was done by Chi-Square and Unpaired 't' tests.

Adequate postoperative control: Adequate postoperative pain control was defined as the pain

score below 13 mm in the Visual Analogue Scale on the first postoperative day<sup>7</sup>.

### Pre-emptive Analgesic:

Initiating an analgesic regimen before the onset of the noxious stimulus to prevent central as well as peripheral sensitization and limit the subsequent pain experience is called pre-emptive analgesic<sup>9</sup>.

The pre-emptive analgesia could be achieved by using different analgesic drugs that work at different sites (Figure - 1) or by using a combination of drugs which would provide a positive synergistic action<sup>9</sup>.

Pre-emptive analgesic agents, its route of administration and its dose in current practice<sup>10</sup>:

A) Local Anaesthetic: Commonly practiced agents are lidocaine and bupivacaine with or without epinephrine (1:200,000 or 5 ug/ml). Both agents can be given local infiltration, intrathecal, caudal or epidural and peripheral nerve block (Ilioinguinal and iliohypogastric nerve block, penile nerve block, intercostal nerve block, brachial plexus block etc.).

Dose of lidocaine: 1% of lidocaine 1.5 mg/kg.

Dose of bupivacaine: 0.125% or 0.25% of bupivacaine 0.8 to 1 mUkg (maximum 30m1). But in epidural infusion bolus dose - 1.5 to 2.5 mg/kg (infusion rate: 0.2mg/kg/hr)

### B) Opioids:

Route	Drug	Dose regimen
1) Intermittent interavenous	Morphine	0.05 - 0.1 mg/kg every 2 hours
	Meperidine (Pethidine)	0.8 - 1 mg/kg every 2 hours
	Methadone	Loading: 0.1 mg/kg every 2 hours x 2 Maintenance: 0.04 - 0.09 mg/kg every 4 - 8 hours.
2) Continuous intravenous	Morphine	0.020 - 0.05 mg/kg/hr
	Fentanyl	0.3 - 2 ug/kg/hr
3) Oral	Morphine	0.3 mg/kg every 4 hours
	Codeine	0.5 - 1 mg/kg every 4 hours
	Methadone	0.1 - 0.15 mg/kg every 4- 8 hours
4) Intramuscular	Morphine	0.1 - 0.15 mg/kg every 3- 4 hours
	Meperidine (Pethidine)	1- 1.5 mg/kg every 3 -4 hours

B) Nonsteroidal antiinflammatory drugs: Commonly used agents are diclofen, paracetamol, tramadol and ketorolac.

1. Diclofen - used in orally, per-rectally, intramuscularly and continuous infusion.

Single dose: LO - 2.0 mg/kg; maximum dose; 3 mg /kg /day. Interval: 6- 8 hours.

2. Paracetamol - can be administered in orally and per-rectally.

Single dose: 10 - 15 mg/kg; maximum dose: 60 mg/kg/day. Interval: 4- 6 hours.

3. Ketorolac: used in orally and intravenously.

Intravenous dose: 0.5 to 0.8 mg/kg every 6 hrs. Oral dose: 1 mg/kg.

4. Tramadol: used in intramuscularly and intravenously.

Dose: 1 to 5 mg/kg. Interval: 12 hourly or 6 hourly.

**Results:**

Total 90 admitted patients underwent major elective surgery were enrolled in this study. Mean age of the study population was 8.7 years (range 5-12 years).

All of the pre-emptive analgesics were given immediately before incision. Local anaesthetic drugs ( Lidocaine with Bupivacaine) were used as pre-emptive analgesic. In Table-I, shows that only 17 (18.9%) patients received pre-emptive analgesic and others 73 (81.1%) did not receive pre-emptive analgesic. The difference is statistically significant (P<.05\*) with respect to the number of study population.

**Table I**

*Frequency of pre-emptive analgesics administration*

	No of patient (N=90)	Percentage (%)	P value
Pre-emptive analgesic received	17	18.9	P<.05*
Pre-emptive analgesic not received	73	81.1	

Chi-Square test was done to measure the significant difference.

\* = Significant difference.

Among them 12 patients received local infiltration and 5 patients received caudal block (Table-II).

**Table II**

*Route of Pre-emptive Analgesic Administration.*

Route	No of patient (N = 17)	Percentage (%)
Local Infiltration	12	70.6
Caudal Block	5	29.4

Mean value of pain score who received pre-emptive analgesic was 49.7mm on the first postoperative day and which was found to be “moderate” grade of pain. Mean value of pain score who did not receive pre-emptive analgesic was 67.0mm on the first postoperative day and which was found to be “moderate” grade of pain. Unpaired ‘t’ test showed that there was significant (P<.05\*) difference in the pain score between recipient and non-recipients of pre-emptive analgesic (Table-III ).

**Table III**

*Comparison of mean value of pain score by visual Analogue Scale (VAS in mm) and their grading between the recipient and non recipient of pre-emptive analgesics on the first postoperative day.*

	No of Patients (N=90)	VAS in mm (Mean ± SD)	Pain Grading	P value
Patients with Pre-emptive Analgesic	17	49.7+2.95	moderate	
Patients without Pre-emptive Analgesic	73	67.0+3.48	moderate	P<.05*

**Discussion:**

Effective postoperative pain control remains a concern in our country even in an era when various effective pain control mechanisms are claimed to have been available. In quest of effective pain control, the practice of postoperative analgesia in developed countries is changing fast. However, traditional practice of pain control in our country has remained same. From this stand point it was relevant to study the present status of pre-emptive analgesic and its effects on postoperative pain control in paediatric patients of our country.

In this study, it was found that twenty-four hours after surgery, postoperative pain was significantly lower ( $P < .05^*$ ) in those receiving local infiltration and caudal blockade as compared to patients who received only general anesthesia. This observation is similar to the observation made by Alsaif et al who found that pre-incisional blockade has a recognized benefit on postoperative pain control.

It was found that 17 (18.9%) patients received pre-emptive analgesic and 73 (81.1%) patients did not receive any pre-emptive analgesic, which means significant ( $P < .05^*$ ) paediatric surgical patients were not treated by pre-emptive analgesic. This may be due to lack of universally recommended pre-emptive analgesic practice in our setting. Inadequate and improper application of knowledge regarding postoperative pain control may be one of the important factors behind it. So, many surgical teams do not consider pre-emptive analgesia on priority basis for postoperative pain control. It has been suggested by Coderre<sup>12</sup> that all the patients should received pre-emptive analgesics in order to achieve adequate postoperative pain control.

Even this 17 patients receiving pre-incisional block for pre-emptive analgesia, did not continue same block postoperatively. As a result they experienced "moderate pain" (pain score =  $49.7 + 2.95$ ) on the first postoperative day.

Recent pain study suggests that pre-incisional block only prevents initial nociceptive input from surgical incision but cannot modulate the continued central pain sensitization initiated by inflammatory mediators after surgery. Also pre-incisional block alone fails to control the primary and secondary hyperalgesia which responsible for "pain memory" through "wind up" mechanism. Probably this is the cause of inadequate postoperative pain control in our setting inspite of pre-emptive analgesic. Woolf and Chong<sup>2</sup> suggest that the pre-emptive analgesic regimen should be initiated before surgery and continued throughout the postoperative day for adequate pain control.

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