

Comparison of caudal ropivacaine and morphine for postoperative analgesia in children

Tanvir Samra¹, Saidingpui Sailo², Ranvinder Kaur²

Department of Anesthesia and Intensive Care, ¹Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India, ²Lady Hardinge Medical College, New Delhi, India



Introduction

- Morphine used as an adjuvant with a local anesthetic agent prolongs duration of single shot caudal epidural block
- Mayhew et al¹ demonstrated effectiveness and safety of administration of low dose morphine (30µg/kg) in caudal epidural space.

Aims & Objective

- Primary:** To compare the mean duration of analgesia in patients administered three different drug combinations in caudal epidural space;
 - Ropivacaine (Group I)
 - Very low dose of morphine(15µg/kg) with ropivacaine (Group II)
 - Low dose of morphine(30 µg/kg) with ropivacaine (Group III)
- Secondary:** To compare FLACC score, cardio-respiratory stability, sedation level and incidence of side effects

Material and Method

- After approval of institutional ethics committee and written informed consent a double blind randomised control trial was conducted on 90 patients scheduled for elective infraumbilical surgeries and belonging to ASA I/II and aged 1-7 years (upto 20 kg)
- Children were administered caudal block after intravenous induction of anesthesia (thiopentone and rocuronium) and endotracheal intubation.
- Study drug was administered as per group allocation
 - Group I: 1 ml/kg of 0.2% of ropivacaine
 - Group II: 1 ml/kg of 0.2% of ropivacaine with 15µg/kg of morphine
 - Group III: 1 ml/kg of 0.2% of ropivacaine with 30 µg/kg of morphine

Exclusion criteria:

- Allergic reactions to local anesthetic
- Infection at local site
- Spinal deformity
- Coagulopathy
- Duration of surgery more than 120 minutes

After completion of surgery and return of spontaneous respiratory efforts patients were reversed, extubated and shifted to PACU.

Time to first rescue analgesia, FLACC scores, side effects and vital signs were monitored. FLACC score of >4 marked end of study period and post operative pain was subsequently managed using paracetamol suppository

Statistical analysis

- Continuous variables across the three groups were assessed using ANOVA/Tukey's test
- Categorical variables were assessed using Chi-square/ Fischer's exact test
- P < 0.05 was considered statistically significant

Results

- Demographic data is summarised in Table 1
- 100%,96.67% and 66.67% of patients were males in group I,II and III respectively
- Mean duration of analgesia was 3.93±.83, 7.30±1.78 and 8.03±1.81 hours in group I, II and III respectively but the difference was not statistically significant in groups II and III
- Statistically significant difference (p < 0.05) was present in the mean values of the FLACC scores at all time intervals in the three groups (Figure 1)
- Mean sedation score was lowest in patients belonging to group III (Figure 2)
- Results of the vital sign monitoring are summarised in Figure 3(a,b,c and d). Cardiorespiratory stability was maintained in all patients and no adverse event was reported
- Incidence of post operative nausea and vomiting was highest in group III (16.67%)

Table 1:Demographic data

Demographic variable	Group I	Group II	Group III	P values		
				I vs II	I vs III	II vs III
Age (years)	3.75±2.08	4.52±1.90	5.70±1.60	0.071	0.000	0.006
Weight (kg)	13.63±3.77	13.77±3.59	16.57±3.21	0.444	0.001	0.001
Duration of surgery (hours)	0.78±0.50	0.84±0.47	1.00±0.49	0.318	0.046	0.103

Figure 1: Assessment of pain using FLACC Scale

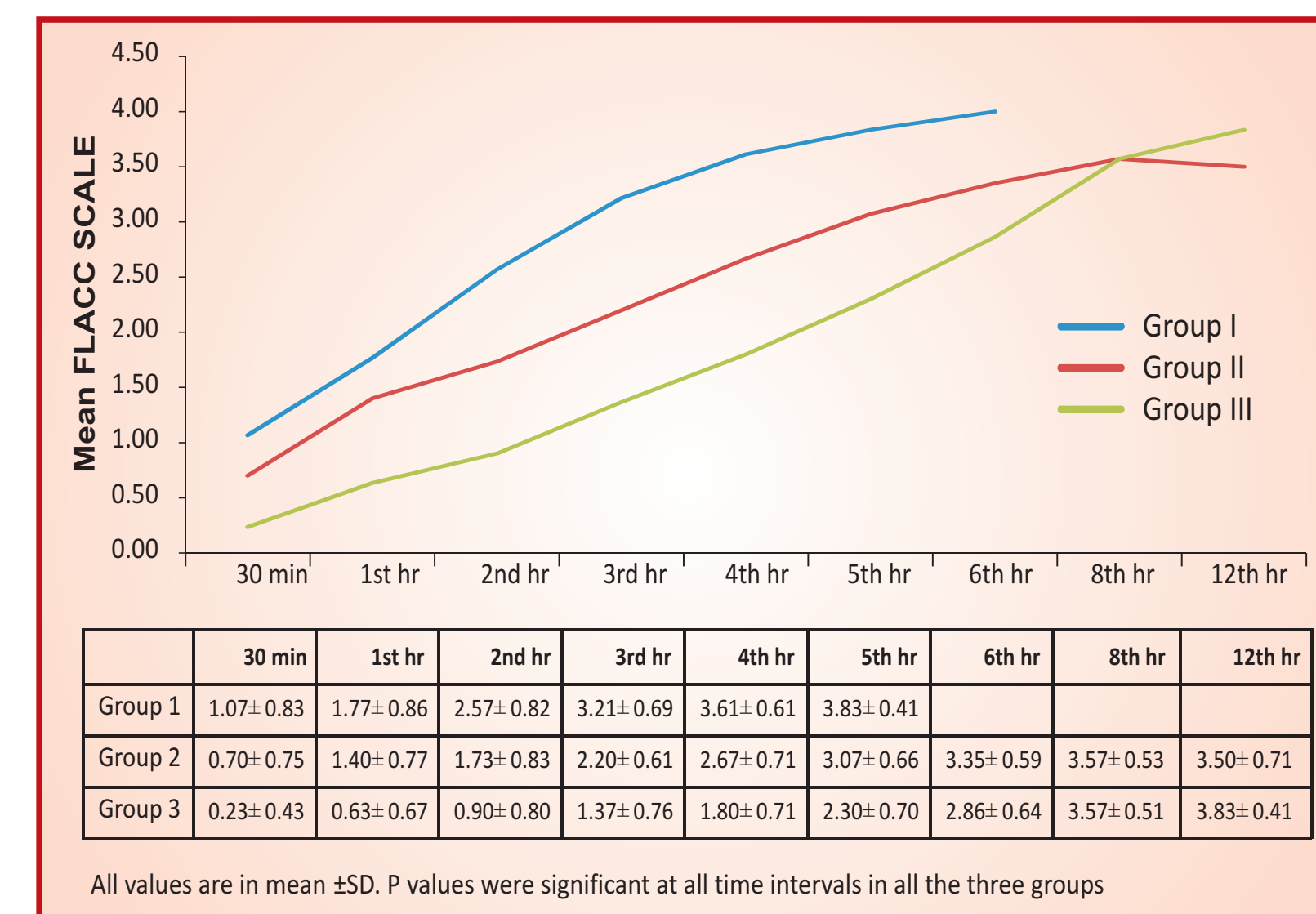
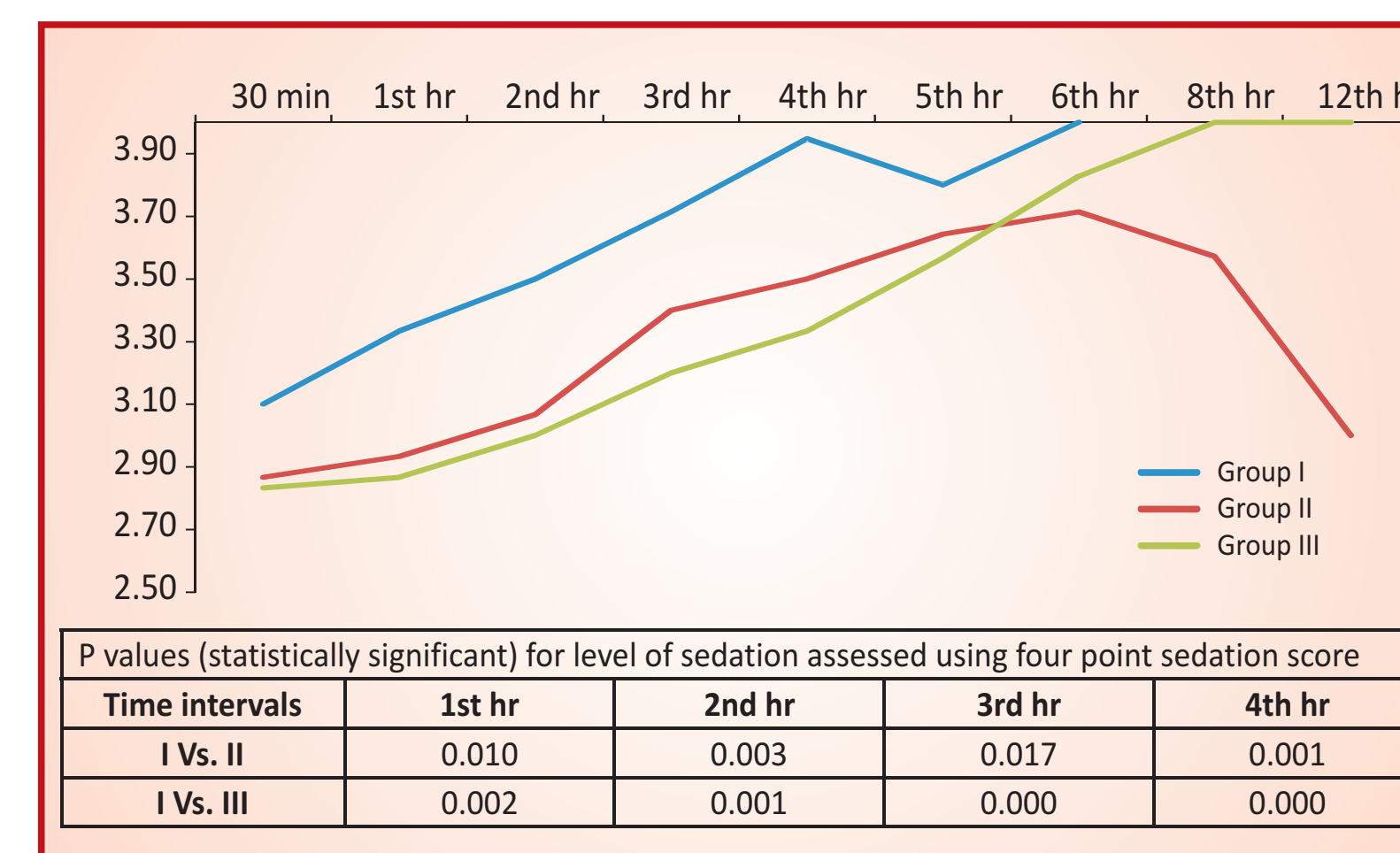


Figure 2: Level of sedation (Four point sedation score)



Four point sedation score

- Asleep, not arousable by verbal commands
- Asleep, arousable by verbal commands
- Drowsy, not sleeping
- Alert/ awake

Figure 3(a) : Comparison of the mean heart rate

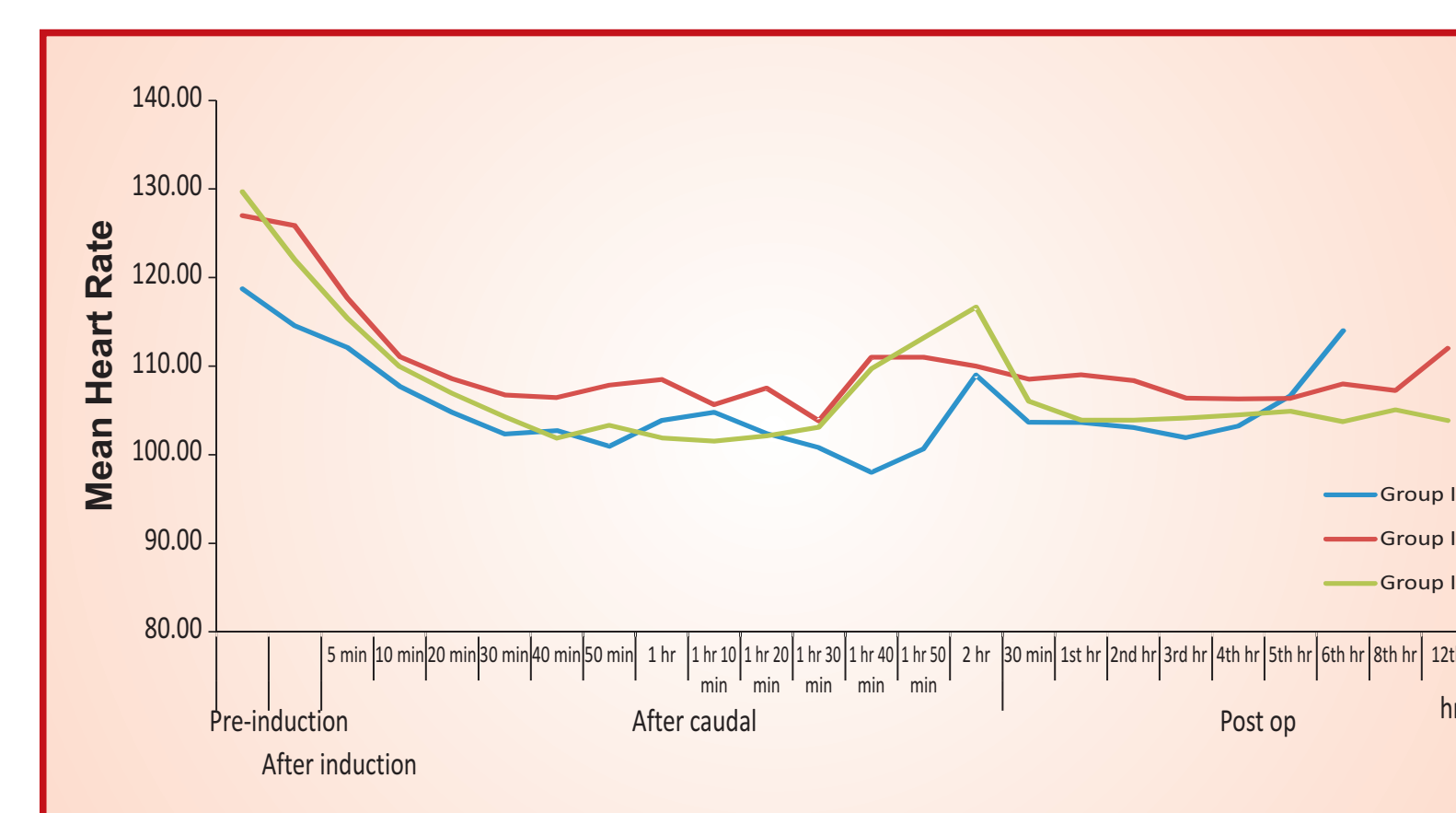


Figure 3(b):Comparison of respiratory rate

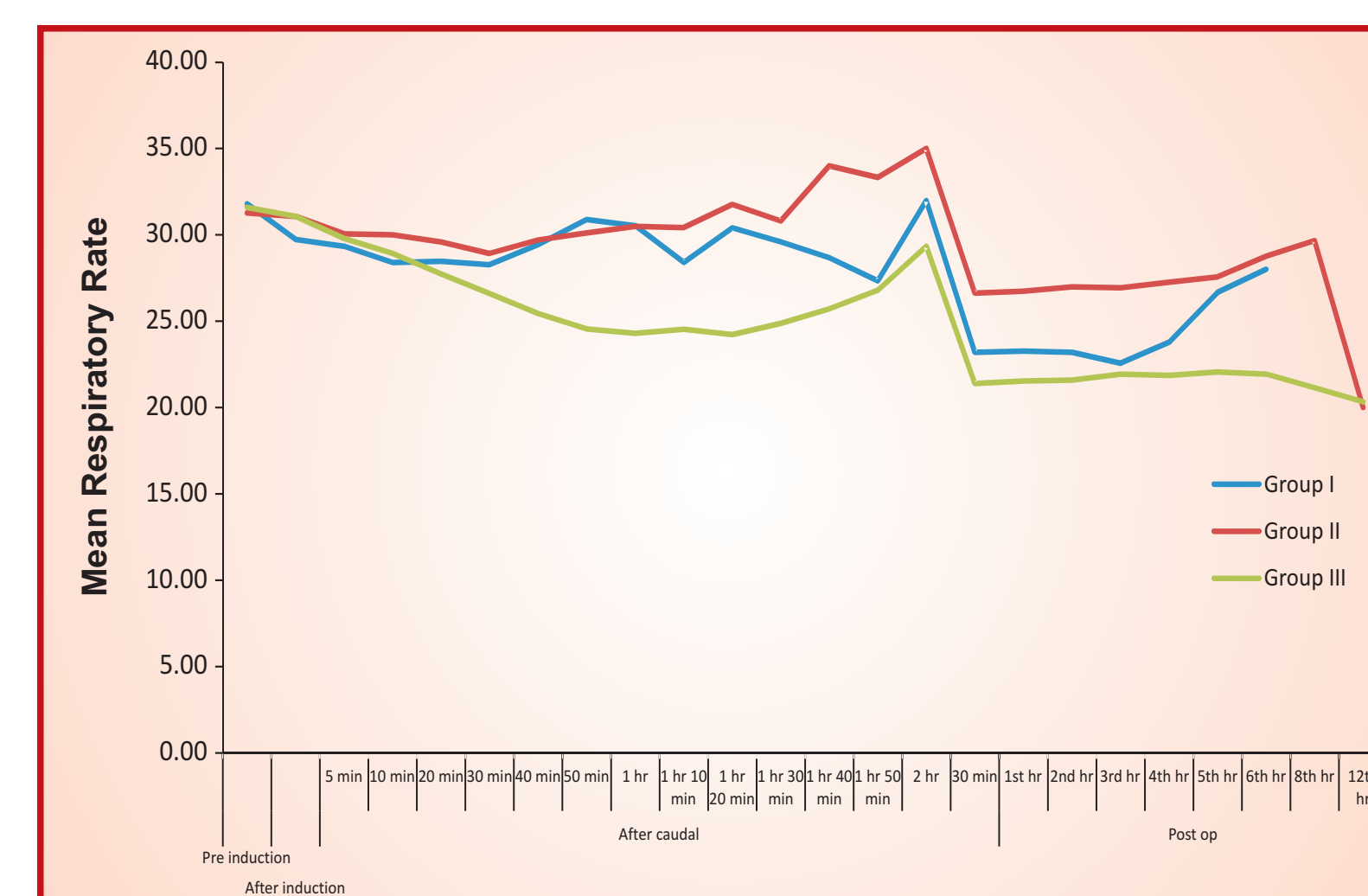


Figure 3(c):Comparison of the mean value of SpO2

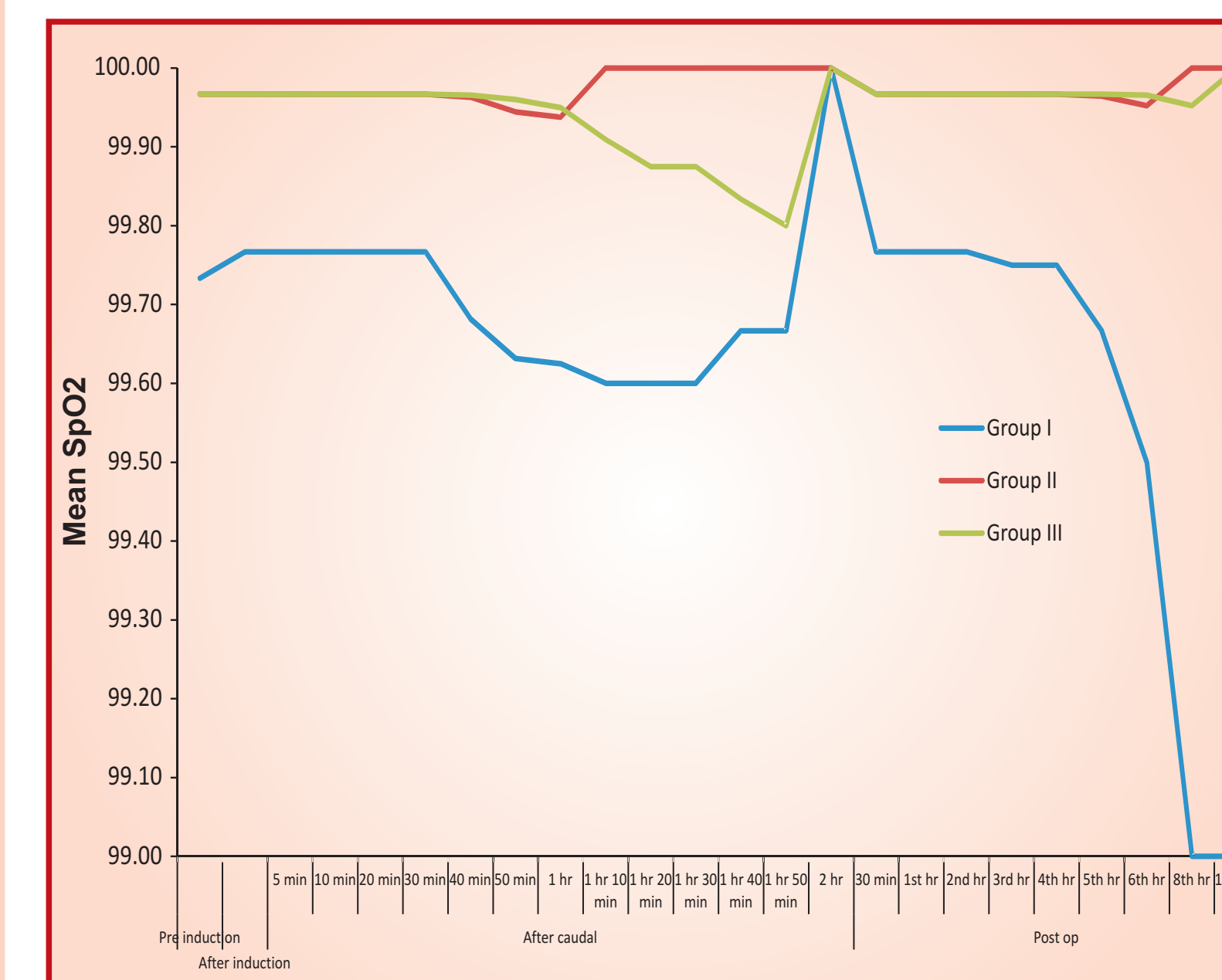
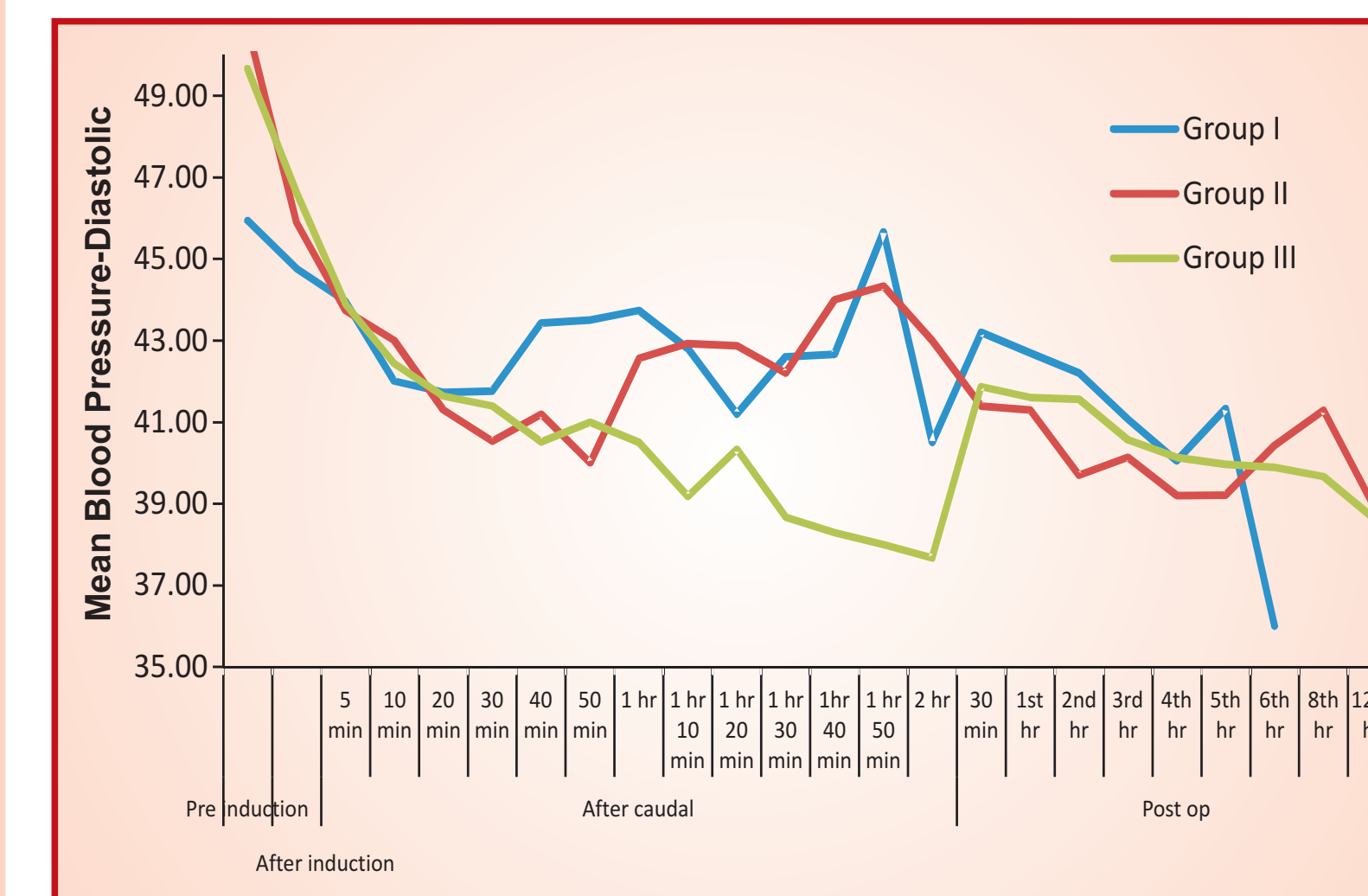
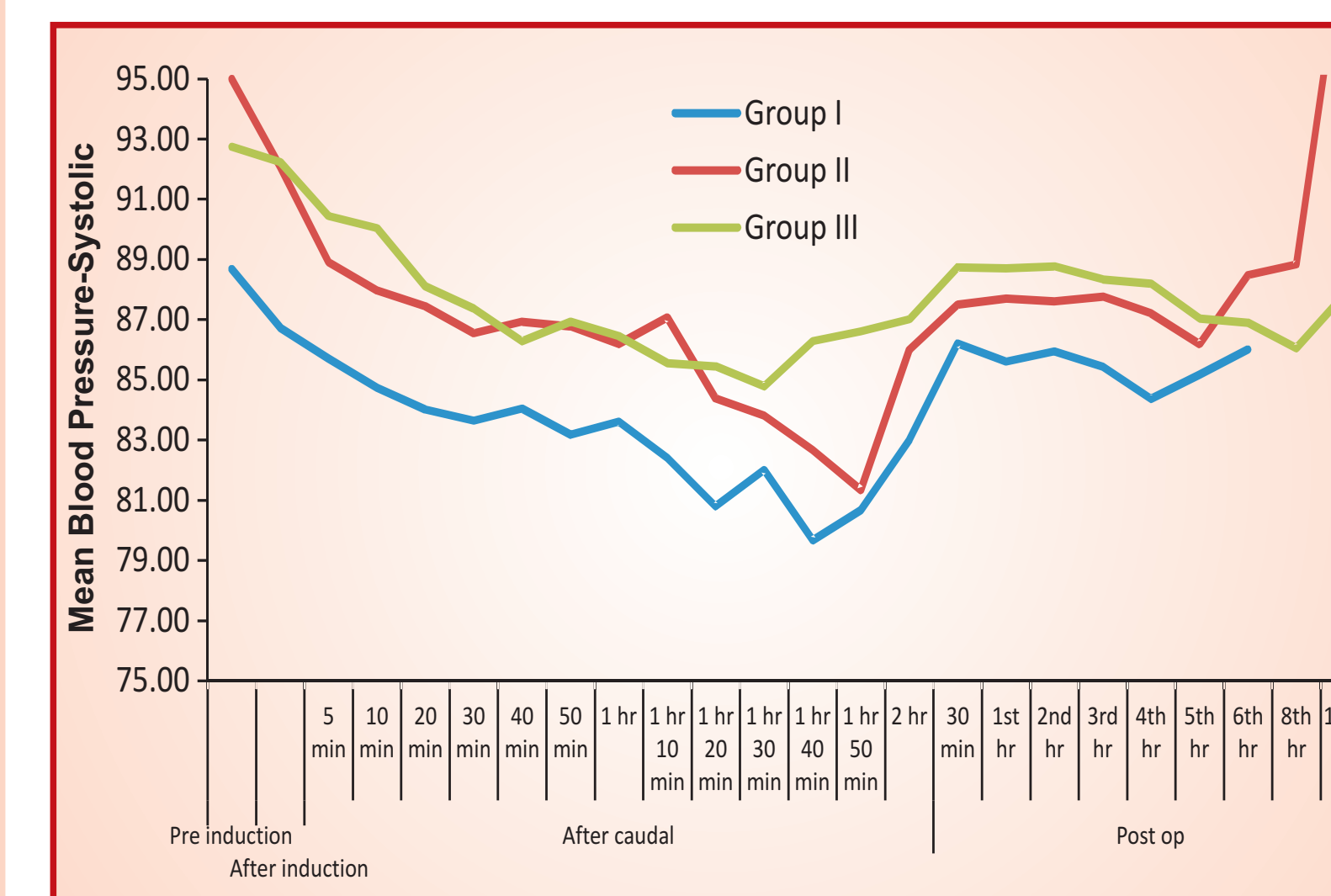


Figure 3(c):Comparison of the mean value of blood pressure



Discussion

- In our study mean duration of analgesia was significantly prolonged in the patients administered opioid in the caudal epidural space but the difference was not statistically significant between groups administered low dose (30 µg/kg) versus very low dose (15µg/kg) of morphine.
- Children administered opioids were sedated (assessed using four point sedation score) but the difference between group II and III was not statistically significant.
- The value of FLACC score was highest in group I and lowest in group III and the difference was statistically significant at most of the time intervals in the post operative period in all the three groups.
- Epidural morphine at a dose of 11.2µg/kg administered immediately after completion of the procedure in children undergoing hip surgery under regional anesthesia with bupivacaine has also shown to provide adequate pain relief for more than 12 h in a previous study.²
- Ivani et al³ have reported 4.5hours as the mean time to rescue analgesia in children administered 1ml/kg of 0.2% ropivacaine for elective minor surgeries.

Conclusion

- Opioids are considered a "gold standard" in clinical practice for the treatment of postoperative pain .The optimal neuraxial opioid dose is a balance between the conflicting demands of providing optimal analgesia while minimizing dose-related adverse effects.
- We recommend the administration of very low dose of morphine (15µg/kg) as an adjuvant with 0.2% ropivacaine (1 ml/kg) for management of post operative pain in children undergoing elective infraumbilical surgeries.

References

- Mayhew JF, Brodsky RC, Blakey D, Petersen W. Low-dose caudal morphine for postoperative analgesia in infants and children: a report of 500 cases. J Clin Anesth. 1995;7:640-2
- Castillo-Zamora C, Castillo-Peralta LA, Nava-Ocampo AA. Dose minimization study of single-dose epidural morphine in patients undergoing hip surgery under regional anesthesia with bupivacaine. Paediatr Anaesth. 2005;15:29-36.
- Ivani G, Lampugnani E, Torre M, Calevo Maria G, DeNegri P, Borrometi F, et al. Comparison of ropivacaine with bupivacaine for paediatric caudal block. Br J Anaesth. 1998 ;81:247-8.