

Title : MEASUREMENT OF POSTOPERATIVE PAIN AND NARCOTIC ADMINISTRATION IN INFANTS USING A NEW CLINICAL SCORING SYSTEM.

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Introduction The necessity and safety of postoperative pain relief in infants are not well established. Many believe that small infants do not suffer significant post operative pain and fear that narcotic administration is hazardous, leading to respiratory depression. The aim of this present research was to measure the effects and impact of pain and analgesia in the immediate post-operative period in children under one year of age.

Methods We have studied a group of infants ranging from 1 to 7 months, operated on for minor surgery (hernia, phimosis...). After institutional approval and parental consent, unpremedicated infants ASA 1 were scheduled for elective surgery. Induction was performed with oxygen and halothane 2.5% and maintained with N₂O/oxygen 50%. Infants were randomly assigned to 2 groups: Group I (n = 10) received fentanyl in a dose of 3 µg/kg as an intravenous bolus prior to the operation; Group II (n = 13) received a placebo. After surgery, infants were studied on entry to the recovery room (time zero) and at 30, 60, 90 and 120 minutes. In order to measure pain in infants it was necessary to develop a clinical neurologic and behavioral scoring system which is described in the table below. Using the pain score, we were able to correlate pain and narcotic analgesia with the infant's postoperative respiratory and circulatory status.

A - Postoperative pain score: the infant was observed by an investigator unaware of the anesthetic regimen and 10 criteria were used (Table). Each item was scored, 2: satisfactory, 1: mediocre, or 0: poor. A baby who was very comfortable and pain-free would have a score of 20, and a baby with severe pain would score zero. Of course we expected a wide range of postoperative pain and have arbitrarily considered infants who scored 15 to 20 as having satisfactory post-operative analgesia.

B - Respiratory Function: we measured at times zero and at 30 minute intervals for two hours 1) respiratory frequency, 2) transcutaneous pO₂, 3) transcutaneous pCO₂, and 4) oxygen saturation measured with the Nellcor Pulse Oximeter.

C - Cardiovascular Function: we measured arterial blood pressure and heart rate. Evaluation of peripheral circulation was performed by an assessment of capillary refill.

D - Temperature: we measured the infant's temperature at each experimental interval and watched for possible shivering.

Results Infants who received intra-operative fentanyl (Group I) had significantly better postoperative analgesia than infants not receiving the narcotic (Group II) (Figure). Over the entire observation period 54% of infants in Group I had satisfactory analgesia compared to 18% in Group II (p < 0.05). Chi square test. There were no significant differences in Groups I and II in TcpO₂, TcpCO₂, oxygen saturation, blood pressure, heart rate or temperature at any experimental interval. Infants in Group II had a significantly faster respiratory rate, likely due to pain but the TcpCO₂ was not significantly lower in this group.

Conclusion Using a new clinical post-operative pain scoring system we have demonstrated that relatively small doses of intra-operative narcotic administration reduces postoperative pain in the infant and this does not result in respiratory depression or hypoxemia.

Table: POST OPERATIVE PAIN SCORE

| | 0 | 1 | 2 |
|--|--|---|--|
| 1. Sleep during preceding hour | none | short naps: between 3 and 30 minutes | longer naps: > 30 minutes |
| 2. Facial expression of pain | watched, constant | less watched, intermittent | calm, relaxed |
| 3. Quality of cry | screaming, painful, high pitched | modulated, low, can be distracted by normal sound | no cry |
| 4. Spontaneous motor activity | thrashing around, incessant agitation | moderate agitation | normal |
| 5. Spontaneous excitability and responsiveness to ambient stimulation | tremulous, clonic movements, spontaneous Moro reflexes | excessive reactivity (to any stimulation) | quiet |
| 6. Constant and excessive flexion of fingers and toes | very pronounced, marked and constant | less marked, intermittent | absent |
| 7. Sucking | absent or disorganized sucking | intermittent (3 or 4) and stops with crying | strong, rhythmic with pacifying effect |
| 8. Global evaluation of tone | strong hypertonicity | moderate hypertonicity | normal for the age |
| 9. Consoleability | none after 2 minutes | quiet after 1 minute of effort | calm before 1 minute |
| 10. Sociability (eye contact); Response to voice, smile, Real interest in face | absent | difficult to obtain | easy and prolonged |

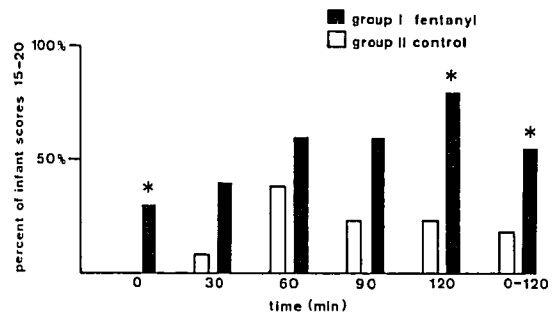


Figure: PERCENT OF INFANTS WITH SATISFACTORY POSTOPERATIVE ANALGESIA. * p < 0.05 CHI SQUARE TEST