# "NON-OPIOID STRATEGIES FOR POSTOPERATIVE PAIN RELIEF IN NEONATES WITH CONGENITAL ANOMALIES"

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**Abstract**

The study investigated the effectiveness of non-opioid analgesics in 62 newborns undergoing surgery for congenital anomalies. Pain assessment was performed using DAN and COMFORTneo scales. Ibuprofen (IV infusion, 5–10 mg/kg/day) and paracetamol (rectal, 15 mg/kg/6h) were compared with standard morphine therapy (0.05–0.1 mg/kg). Non-opioid regimens significantly reduced behavioral pain scores, stabilized hemodynamic parameters, and lowered cortisol levels. Opioid requirement was reduced by 45–50%, while the incidence of adverse reactions was minimal. Non-opioid therapy demonstrated superior safety, clinical effectiveness, and economic efficiency, supporting its integration into neonatal postoperative pain management protocols.

**Keywords**

non-opioid analgesia, neonates, congenital anomalies, ibuprofen, paracetamol, DAN, COMFORTneo, postoperative pain

**Relevance**

Effective pain control in neonates remains a major issue in neonatal intensive care. Opioid-based protocols, though widely used, carry risks of respiratory depression, tolerance, withdrawal, and possible neurodevelopmental harm. Infants with congenital anomalies often require early surgical correction, which increases the demand for safe, repeatable analgesic strategies. Recent advances have suggested that drugs like ibuprofen and paracetamol, widely used in pediatric practice, can provide adequate analgesia in neonates when applied through controlled regimens. The shift to non-opioid protocols could reduce opioid-related complications, improve recovery dynamics, and enhance long-term neurological safety. Furthermore, reducing opioid consumption by nearly 50% has a strong pharmacoeconomic effect, lowering costs of prolonged intensive care monitoring and treatment of side effects. Therefore, non-opioid postoperative analgesia represents a promising and clinically relevant direction in modern neonatal anesthesiology and surgery.

**Aim**

To assess the clinical effectiveness and safety of ibuprofen and paracetamol as postoperative analgesics in newborns with congenital anomalies.

**Materials and Methods**

A prospective controlled study included 62 neonates with congenital anomalies undergoing surgery. Group A (21 infants) received continuous intravenous ibuprofen, Group B (21 infants) received rectal paracetamol, Group C (20 infants) received standard morphine-based therapy. Pain intensity was evaluated at 2, 6, 12, 24, and 48 hours postoperatively using the DAN and COMFORTneo scales. Physiological stress indicators (heart rate, oxygen saturation, mean arterial pressure) and serum cortisol levels were monitored. Statistical analysis employed Student's t-test and ANOVA with significance set at $p < 0.05$. Adverse events were recorded to assess safety profiles.

**Results**

Infants in the ibuprofen and paracetamol groups showed significantly lower pain scores (DAN 2.3 ± 0.5 vs 4.7 ± 0.8, $p < 0.01$; COMFORTneo 11.1 ± 1.5 vs 17.2 ± 1.8, $p < 0.01$) compared with morphine. Stress markers improved: mean arterial pressure stabilized, heart rate decreased by 18–22%, and cortisol fell by 28%. Only 12% of newborns in Groups A and B required additional opioid rescue therapy, versus 58% in Group C. The incidence of adverse reactions (desaturation, nausea) was lower in non-opioid regimens.

**Conclusion**

The use of continuous intravenous ibuprofen and rectal paracetamol provides effective postoperative pain relief in neonates with congenital anomalies. Compared to morphine, these regimens ensured more stable analgesia, reduced physiological stress, and minimized the need for additional opioid administration. Non-opioid therapy reduced opioid use by approximately 45–50%, decreased adverse effects, and improved pharmacoeconomic efficiency. These findings indicate that non-opioid protocols can be safely integrated into standard neonatal surgical practice as a reliable component of multimodal pain management. Broader implementation could optimize postoperative outcomes and reduce the risks associated with long-term opioid exposure in newborns.

## Literature

1. Anand K.J.S., Hall R.W. Pharmacological therapy for analgesia and sedation in the newborn. Arch Dis Child Fetal Neonatal Ed. 2006;91(6):F448–F453. doi:10.1136/adc.2005.086454.

2. Ceelie I., de Wildt S.N., van Dijk M., Tibboel D. Analgesic efficacy of rectal versus oral acetaminophen in children after major craniofacial surgery. Clin Pharmacol Ther. 2008;83(6):994–1001. doi:10.1038/sj.clpt.6100393.
3. Krekels E.H.J., van Ham S., van den Anker J.N., Allegaert K., Tibboel D., Knibbe C.A.J. Pharmacokinetics of ibuprofen in preterm and term neonates. Clin Pharmacokinet. 2015;54(9):865–875. doi:10.1007/s40262-015-0260-6.