SÃO PAULO MEDICAL JOURNAL

ORIGINAL ARTICLE

José Antonio do Amaral Leite

Caudal epidural anesthesia in awake premature neonates for inguinal herniorrhaphy

Santa Joana Hospital and Maternity Ward, São Paulo

Postoperative apnea (PA) occurs between 12 and 40% in premature infants, varying inversely in postconceptual age (risk is greater if age is less than 44 weeks).
It can appear as late as 12 hours after the end of the surgical anesthesia (7).
In a recent article (1), the author related the occurrence of PA in an ex-premature infant submitted to inhalation anesthesia
The use of regional blockings is pointed out as one of the solutions for the problem (9,5).
This paper is about the use of caudal epidural anesthesia in a premature neonate, submitted to bilateral inguinal herniorrhaphy

UNITERMS: Regional anesthetic techniques, caudal epidural anesthesia, inguinal herniorrhaphy.

CASE REPORT

A male infant, by caesarian birth due to fetal suffering, 29 days of postnatal life, 34 weeks and 2 days of postconceptual age, weighing 1.300 g, was born in good condition (Apgar index of 9/10 at 1st. and 5th. minutes), weighing 1.000 g. He was classified as a premature newborn (gestational age of 30 weeks and 1 day at birth), small for gestational age and very little weight.

In the nursery he had jaundice, but reacted well to the treatment.

On the operation day, the pre-anesthetic evaluation showed that it was an infant in good, overall condition, rosy, with eupnea and without jaundice.

Laboratory examinations, carried out 13 days before, showed: Hb = 12.5 g dl^{-1} and Ht = 35% .

Address for correspondence: *Dr. José A. do Amaral Leite - Rua do Paraíso, 432 CEP 04103-080, São Paulo, SP, Brasil*

After monitoring with a precordial stethoscope and pulse oximeter, caudal epidural anesthesia was administered, using 3 ml bupivacaine solution at 0.15% with adrenaline at 1:666 000. A hypodermic needle, 24 G (0.55 x 20 mm) was used to carry out the anesthetic technique. After 5 minutes, the rectal temperature was gauged to complete the monitoring.

A thermal mattress was used, limbs were bound with cotton wool and the operating room was heated, in order to prevent hypothermia.

The operation (bilateral inguinal herniorrhaphy), which lasted 35 minutes, began 10 minutes after the anesthetic blocking had taken place.

During the traction of the herniary sac, a drop of the $Sp0_2$ was registered (minimum level = 88%) and increase of cardiac frequency in ± 10 bpm. This intercurrence lasted a short time and did not require treatment.

During the surgery-anesthesia, the Sp02 varied from 88 to 97% , average cardiac frequency and the rectal temperature registered were 134 bpm and 36.4° C respectively.

At the end of the operation, the patient was sent to the ICU, where he was monitored with a pulse oximeter during 12 hours. During this interval, no intercurrence whatsoever was observed and the $Sp0_2$ varied from 92 to 97%.

DISCUSSION

Regional anesthesia is considered a favorable choice for a premature patient when PA is anticipated: the lack of exposure to volatile agents, omission of use of opiates in the postoperative period, uncomplicated execution and guarantee of excellent surgical conditions are advantages for this treatment (2).

Caudal epidural anesthesia was used with a sole doses (7) or in the continuous form, via catheter (5). In both cases, safety and efficiency were confirmed.

In this case, conditions were not ideal during the traction of the herniary sac. This procedure caused discomfort; however, its repercussions were not severe enough to require treatment. In view of this intercurrence, infiltration of the herniary sac or of the spermatic cord is mentioned as an efficient measure for its treatment (9).

No form of sedation was used; for Spear (6), no sedative can be considered free of risk in premature patients.

In relation to the use of local anesthetic solution, it was confirmed that concentration to 0.15% provided satisfactory surgical conditions, with exception of the maneuver of traction of the herniary sac.

Gunter et al. (4) evaluated the efficiency of several concentrations of bupivacaine (0.125 to 0.25%) in patients between 1 and 8 years of age, submitted to inguinal herniorrhaphy. In this study, all the concentrations proved to be efficient when associated with general inhalation anesthesia with halothane and nitrous oxide. In this case report, the patient is completely different from the ones in Gunter's study and the inhalation anesthesia was considered undesirable because it caused PA (1,9).

In relation to the mass and volume of regional anesthesia used, it was confirmed that the first of 3.46 $mg.kg^{-1}$ was superior to the maximum usually recommended(3 $mg.kg^{-1}$) (10).

Watcha used 3.75 $mg.kg^{-1}$ bupivacaine in an ex-premature patient without intercurrence, and states that the largest volume of distribution of the drug in these patients is responsible for the lower serum level.

As to the volume of 3 ml employed, it is possible to consider that it was excessive; Furman (3), in applying Takasaki's formula (0.056 x kg x nº of segments), used 1.5 ml of anesthetic solution via caudal epidural to obtain a metameric level of T4. Using the same formula, 1.33 ml would be sufficient to obtain the same metameric level.

In conclusion, caudal epidural anesthesia, without sedative association, proved to be efficient in the prevention of PA in premature patients.

It was emphasized that monitoring of the postoperative period is mandatory because the PA pathogeny in premature infants is multifactorial (2,8).

REFERENCES

1. AMARAL LEITE, J.A. & LIMA, E.V. - Apnéia pós-operatória em crianças ex-prematura. Discussão de um caso. **Rev Bras Anest. 43:3: 203-205, 1993.**
2. COS. R.G. & GORESKY, G.V. - Life-threatening apnea following spinal anesthesia in former premature infants. **Anesthesiology 73:345347, 1990.**
3. FURMAN. J.R. & SMITH, M.D. - Caudal anesthesia and intravenous sedation for repair or giant bilateral inguinal hernias in a ventilator-dependent premature infant. **Anesthesiology 72:573-575, 1990.**
4. GUNTER. J.B.; DUNN, C.M.; BENNIE, J.B.; PENTECOST, D.L.; BOWER, R.J. & TERNEBERG, J.L. - Optimum concentration of bupivacaine for combined caudal-general anesthesia in children. **Anesthesiology 75:57-61, 1991.**
5. PEUTRELL, J.M. & HUGHES, D.G. - Epidural anaesthesia through caudal catheters for inguinal hemiotomies in awake ex-premature babies. **Anesthesia 47:128-131, 1993.**
6. SPEAR. R.M. - Anesthesia for premature and teem infants: Perioperative implications. **The Journal of Pediatrics 120:2, part 1, 1992.**
7. WATCHA, M.F.; THACH. B.T. & GUNTER. J.B. - Postoperative apnea after anesthesia in a ex-premature infant. **Anesthesiology 71:613-615. 1989.**
8. WELBORN, L.G.; HANNALLAH, R.S.; LUBAN. N.L.C.; FINK, R. & RUTTIMANN, U.E. - **Anesthesiology 74:1003-1006. 1991.**
9. WELBORN, L.G.; RICE. L.J.; HANNALLAH, R.S.; BROADMAN, L.M.; RUTTIMANN, U.E. & FINK, R. - Postoperative apnea in former preterm infants: Prospective comparison of spinal and general anesthesia. **Anesthesiology 72:838-842, 1990.**
10. YASTER, M.; MAXWELL, L.G. - Pediatric regional anesthesia. **Anesthesiology 70:324-338. 1989.**

RESUMO

No manuseio anestésico da criança prematura, a utilização da anestesia peridural em substituição ao anestésico volátil constitui alternativa quando a apnéia pós-operatória é antecipada.

Neste artigo o autor relata o emprego desta forma de anestesia em criança de idade pós-conceptual de 34 semanas e 2 dias para herniorrafia inguinal bilateral.

Ressaturação de curta duração (SPO2=88%) for registrada na manobra de tração do saco herniário.

No período pós-operatório não foi registrado níveis de SPO2 inferiores a 92% durante as primeiras 12 horas.