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EDITORIAL

Ropivacaine: the newest anesthetic agent celebrates 20 years

Ropivacaína: o mais novo anestésico local completa 20 anos

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On February 22, 1997, the first European Symposium on Ropivacaine was held in Stockholm, Sweden, with the participation of 554 anesthesiologists from 22 countries, including 11 from Brazil. In the same year, Astra Laboratory launched a new local anesthetic for clinical use in 14 countries: United Kingdom, Ireland, Germany, Austria, Canada, Italy, France, Belgium, Norway, Switzerland, South Africa, BRAZIL, Argentina, and Portugal.

Ropivacaine's development was part of an effort to increase safety in the use of local anesthetics with regard to systemic toxicity without changing the nerve blockage quality.

Local anesthetics can be administered by several routes: neuroaxial (epidural and subarachnoid), nervous plexuses, large and small nerves, infiltration and venous. The injection site determines the blockage distribution, but several other factors influence the degree and its quality. On the other hand, the injection site influences the speed with which the drug penetrates the nerve and especially how it is removed to the systemic circulation.

Local anesthetics may cause systemic toxic reactions due to two basic mechanisms: overdose or accidental intravascular injection with the massive absorption of large amounts of the drug. In both cases, high blood concentrations are established, which trigger undesirable effects on the cardiovascular system and the central nervous system.

These dose-dependent drugs delay the impulses transmission, through the cardiac conduction system, due to its action on the sodium channels. The blockage of these channels develops during systole and dissipates during diastole. This dissociation is slow with bupivacaine, such that recovery during diastole at physiological frequencies is insufficient for the recovery of all sodium channels, leading to blockage accumulation. The clinical result is the development of dysrhythmia, bradycardia and even cardiac arrest, difficult to recover. Several studies have demonstrated a faster dissociation of sodium channels with ropivacaine in relation to bupivacaine, resulting in a lower blockade accumulation of these channels at physiological frequencies and, therefore, lower cardiotoxicity[1,2].

It is known that the systemic toxicity is more related to the dextrorotatory isomer of the local anesthetic, being smaller with the levorotatory, hence the attempt to decrease the toxicity of racemic bupivacaine by replacing it with levobupivacaine. Ropivacaine is prepared in the levorotatory form: would this be the only explanation for its lower cardiotoxicity? Experimental studies have shown that no: the lower cardiodepressor effect of ropivacaine over bupivacaine is not due solely to a greater levorotatory stereoselectivity than dextrorotatory but to a change in its chemical formula with the replacement of the butyl radical (bupivacaine) by propyl (ropivacaine) on the aromatic ring[3].

Corroborating these results, other studies have demonstrated that the three local anesthetics should thus be grouped in decreasing order of cardiotoxicity: bupivacaine - levobupivacaine - ropivacaine[4].

Similarly to cardiotoxicity, toxicity to the central nervous system (manifested by dizziness, drowsiness, hearing tinnitus, slurred speech, inability to articulate words, and finally seizures) is greater with bupivacaine than with ropivacaine[5,6]. When systemic reactions occur with ropivacaine, seizures precede cardiac events and are a warning sign, unlike bupivacaine, with which cardiac events develop without premonitory signals to the central nervous system side, and with which cardiac arrest is difficult to recover and often irreversible[4].

Concern over quality and safety has made ropivacaine in these 20 years a local anesthetic widely used in the most varied techniques of anesthesia and local analgesia, epidural, plexus blockage, nerve blockage, ophthalmic blockage, surgical wound infiltration, regional venous (Bier), spinal anesthesia. By the results in all these areas, its long life can be foreseen.

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