LOCAL ANESTHETICS – MORE THAN JUST Na+ CHANNEL BLOCKERS?

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Blockade of voltage-gated sodium channels, leading to inhibition of nerve impulse conduction, is probably the most important effect of local anesthetics (LA) and is the major mechanism underlying their well-known antinociceptive and antiarrhythmic effects. However, LA affect other cellular systems as well. These interactions may contribute to antinociception and antiarrhythmic actions, but could also explain some other LA effects and side effects. Interestingly, several of these alternative target sites, for example muscarinic receptors are known to be much more sensitive to LA than are voltage-gated sodium channels.

In this presentation I will highlight some actions of LA that are less well known to most anesthesiologists. Most important, I want to focus on LA effects on inflammation and coagulation in vitro as well as in vivo. The most remarkable observation is that LA are able to prevent pathological changes such as hypercoagulability or excessive stimulation of the inflammatory system, without inducing increased bleeding or impairment of host defense. This sets them apart from drugs currently in use for treatment of such disorders, and points the way to potential therapeutic application. However, much more research is needed on basic mechanisms. What does seem clear is that Na channel blockade plays only a limited, if any, role in these effects. Moreover I would like to discuss LA’s general anesthetic activity; local anesthetics exert cerebroprotective effects and are furthermore, in consideration of their cardiovascular stability, of interest during neuroanesthetic procedures.
In addition, local anesthetics are known for their potency to minimize bronchial hyperreactivity, although the underlying mechanisms are not yet elucidated.

These effects of local anesthetics may represent interesting prospects, for which their relevance has to be determined.