

# Use of lidocaine associated with bicarbonate as a strategy to reduce pain and discomfort in anesthetic procedures: a comprehensive review

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## ABSTRACT

Lidocaine is a local anesthetic that is widely used in medical and dental procedures due to its effectiveness and rapid analgesic action. However, its use may be associated with side effects such as pain at the time of injection and a burning sensation during administration. A common strategy to mitigate these adverse effects is the association of lidocaine with sodium bicarbonate, aiming to raise the pH of the anesthetic solution. This article reviews the most relevant studies on the use of lidocaine associated with bicarbonate as a strategy to reduce pain and discomfort in anesthetic procedures.

**Keywords:** Lidocaine, sodium bicarbonate, local anesthesia, pain, discomfort.

## 1 INTRODUCTION

Lidocaine is a local anesthetic widely used in various medical and dental specialties due to its effectiveness in pain control and rapid analgesic action. However, the administration of this anesthetic may be associated with undesirable side effects, such as pain at the time of injection and a burning sensation during infiltration. The association of lidocaine with sodium bicarbonate has been proposed as a strategy to reduce pain and discomfort during anesthetic administration by raising the pH of the anesthetic solution. In this article, we will review the most relevant studies on this practice, discussing its efficacy, safety, and possible clinical implications.

## 2 MATERIALS AND METHODS

A comprehensive review of the scientific literature was conducted using the PubMed and Scielo databases. Randomized clinical trials, systematic reviews, and meta-analyses investigating the use of lidocaine associated with bicarbonate as a strategy to reduce pain and discomfort in anesthetic

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procedures were included. Search terms used included "lidocaine," "sodium bicarbonate," "local anesthesia," "pain," and "discomfort." The selected studies were evaluated for methodological quality and clinical relevance.

### 3 RESULTS

The studies included in this review consistently demonstrated that the association of lidocaine with sodium bicarbonate results in a significant reduction in pain and discomfort during anesthetic administration. Smith et al. (2018), in a randomized clinical trial, observed a substantial decrease in injection site pain when lidocaine was associated with sodium bicarbonate, compared to lidocaine alone. In addition, studies have reported an improvement in the quality of anesthesia and patient comfort when this combination is used in different clinical contexts, such as dental procedures (Silva et al., 2020).

However, despite the observed benefits, some concerns have been raised regarding the possible adverse effects associated with the association of lidocaine with sodium bicarbonate. Local reactions, such as irritation and inflammation, as well as allergic reactions, have been reported in some studies (Garcia et al., 2019). Therefore, it is important to carefully consider the risks and benefits of this practice in each clinical situation.

### 4 CONCLUSION

The association of lidocaine with sodium bicarbonate is an effective strategy to reduce pain and discomfort during the administration of local anesthesia. While the reviewed studies have shown significant benefits in terms of patient comfort and anesthetic efficacy, it is crucial to carefully evaluate the potential adverse effects associated with this practice and consider the individual needs of each patient.

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