

## Chapter 9

# Comparing Nalbuphine Alone to Dexmedetomidine–Nalbuphine for Intraoperative Shivering Control Under Spinal Anesthesia

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### **ABSTRACT**

*Intraoperative shivering under spinal anaesthesia might induce discomfort and perioperative problems. Drugs like dexmedetomidine and nalbuphine have been explored for shivering prevention and treatment. Nalbuphine alone and in combination with dexmedetomidine were tested for intraoperative shivering prevention and treatment. In a prospective, randomised controlled trial, 120 adult elective spinal anaesthesia patients participated. Two groups were randomly assigned: Group B received nalbuphine and dexmedetomidine, while Group A received nalbuphine alone. Shivering, hemodynamic stability, postoperative pain, and patient satisfaction were compared between groups. Group B had substantially less intraoperative shivering than Group A. Dexmedetomidine and nalbuphine were given to Group B. Group B had improved hemodynamic stability. No differences in postoperative pain levels were seen between groups.*

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## **INTRODUCTION**

Within the field of surgical anaesthesia, intraoperative shivering, also referred to as anaesthesia-induced shivering, continues to be a prevalent and confusing phenomenon (Houde et al., 1976). Shivering is characterized by rhythmic, involuntary muscle spasms that can interfere with surgical procedures, cause discomfort to patients, and provide problems for clinicians. Furthermore, shivering may result in adverse events like longer postoperative recovery, surgical difficulties, and intraoperative hemodynamic instability (Jasinsky & Mansky, 1972).

Patients are susceptible to perioperative hypothermia due to the dramatic alteration of the body's thermoregulatory processes caused by anaesthesia, especially spinal anaesthesia. One well-known cause of shivering is hypothermia, which is defined as a core body temperature below 36°C. Unwanted patient reactions, such as elevated oxygen consumption, elevated sympathetic nervous system activity, and possible surgical problems, may be caused by inadequate management of hypothermia (Lee et al., 1981). Therefore, it is imperative to comprehend and manage intraoperative shivering in order to enhance patient outcomes and surgical success (Sun et al., 2019).

Intraoperative shivering is a multifactorial phenomenon due to its complex underlying aetiology. The main causes can be roughly divided into three groups: the effects of spinal anaesthesia, the inhibition of central thermoregulatory control, and altered thermoregulation brought on by anaesthetics (Sohair et al., 2017). Anaesthesia-causing substances, including arbiturates, opioids, and volatile anaesthetics, are known to interfere with thermoregulatory processes and cause shivering (Dhulkhed & Khyadi, 2019). The issue is made worse by spinal anaesthesia, a commonly used procedure for lower limb and abdomen procedures, which inhibits sympathetic output and causes peripheral vasodilation and heat loss (Botros et al., 2018).

Pharmacological medications with thermoregulatory qualities are one of the treatment techniques used to counteract intraoperative shivering. Of the agents whose efficacy has been assessed, dexmedetomidine and nalbuphine have demonstrated potential. The synthetic opioid nalbuphine, which possesses both antagonistic and agonistic qualities, has drawn interest due to its capacity to suppress thermoregulatory reactions (Kundra & Kaur, 2017). Alpha-2 adrenergic agonist dexmedetomidine is well-known for its calming and analgesic effects. It is also thought to lessen shivering by lowering the sympathetic outflow. Determining the relative efficacy of these medicines in preventing intraoperative shivering is crucial for improving patient outcomes and care (Yang et al., 2018).

It is vital to comprehend the mechanisms and elements that contribute to intraoperative shivering in order to develop and execute efficacious management measures (Kyokong et al., 2007). It is clear that a variety of patient-specific factors, both internal and external, influence the onset of shivering (Götz et al., 1995). The frequency and intensity of shivering depend on a number of factors, including patient age, surgical kind, surgical duration, and individual diversity in sensitivity to shivering. As a result, the area of anaesthesia is constantly searching for the best ways to stop and treat shivering (Wang et al., 1999).

### **The Pathophysiology of Shivering During Surgery**

Understanding the complex pathophysiological pathways underlying intraoperative shivering is a prerequisite to understanding the condition itself. When exposed to cold or other stimuli, the body tries to produce heat by causing involuntary muscular contractions, which leads to the complicated reflex

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