

Analgesia monitoring using ANI: A next step towards individualized administration?

Dr Emmanuel Boselli

MD, PhD

Lyon, France

General anesthesia has three partially independent components: hypnosis, paralysis, and analgesia. During general anesthesia, the conscious experience of pain disappears due to hypnosis, and surgical stimulus with its immediate consequences on system function is recognized as nociception. As contrast to depth of hypnosis (e.g. with bispectral index (BIS) or spectral entropy) or level of paralysis (e.g. train-of-four) monitoring, which are monotonically dependent on the corresponding drug effects, the depth of analgesia monitoring is dependent on the balance between the input (noxious stimulus) and the output (the nociceptive response). Autonomic reactions, such as tachycardia, hypertension, sweating and lacrimation, although non-specific, are always regarded as signs of nociception or inadequate analgesia. A more reliable quantification of the nociceptive - anti-nociception balance has been attempted by analyzing reflex pathways, skin vasomotor reflexes, pulse plethysmographic signal, pupillometry, and heart rate variability (HRV).¹ More recently, a new parameter called Analgesia/Nociception Index (ANI) based on HRV was developed. The ANI represents the relative parasympathetic tone. An ANI value close to 100 corresponds to prominent parasympathetic tone (low stress level, analgesia) and a value close to 0 corresponds to prominent sympathetic tone (high stress level, nociception). The purpose of this presentation is to describe the principles of ANI calculation and to present the results of clinical studies performed in both awake and anesthetized patients aiming at optimizing comfort and analgesia.

