Effect of sedation on subjective perception of pain: intensity and autonomic nervous responses to painful stimuli

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Pain is subjective and it is an unpleasant sensation which exists only when the subject is conscious. International Association for the Study of Pain defined the term “analgesia” as follows; Absence of pain in respons

e to stimulation which would normally be painful. However, brain may respond to noxious stimuli even in unconscious state. Then we have to distinguish analgesia and anti-nociception. Subjective pain intensity (SPI) evaluated using a visual-analog scale (VAS) is commonly used for assessing alert-state pain. During sedation or anesthesia patients cannot express pain perception, consequently autonomic nervous system (ANS) responses, such as changes in heart rate and peripheral perfusion, are commonly used as surrogate indicators.

It is widely held that anesthetics don’t have anti-nociceptive effects. However, previous reports suggested that subjective pain might be attenuated by sedation. Our group investigated the effect of sedation on VAS and ANS evaluated by peripheral perfusion index (PI) measured by oximetry in healthy volunteers. We controlled the sedation level as light, moderate and deep by manipulating the infusion of propofol or midazolam with the aid of PK/PD simulation. We found that VAS decreased with increase of sedation level, however ANS evaluated by changes of PI were unchanged. This suggested that cerebral processes, rather than mechanisms in the brainstem or spinal cord, are likely to determine subjective perception of pain intensity.