Common brain processes of anesthetic-induced unconsciousness identified

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A study from the June issue of *Anesthesiology* found feedback from the front region of the brain is a crucial building block for consciousness and that its disruption is associated with unconsciousness when the anesthetics ketamine, propofol or sevoflurane are administered.

Brain centers and mechanisms of consciousness have not been well understood, resulting in a need for better monitors of consciousness during anesthesia. In addition, how anesthetics with different structures and pharmacological properties can generate unconsciousness has been a persistent question in anesthesiology since the beginning of the field in the mid-19th century.

A team of researchers from the University of Michigan, Ann Arbor, Mich., and Asan Medical Center, Seoul, South Korea, conducted a brain wave (electroencephalographic, or EEG) study of the front and back regions of the brain in 30 surgical patients who received intravenous ketamine. They compared the results of this study to the EEG data collected from 18 surgical patients who received either intravenous propofol or inhaled sevoflurane in a previous study. These three anesthetics, known to act on different parts of the brain and produce different EEG patterns, had the same effect of disrupting communication in the brain.

"Understanding a commonality among the actions of these diverse drugs could lead to a more comprehensive theory of how general anesthetics induce unconsciousness," said study author George Mashour, M.D.,

Ph.D., assistant professor and associate chair for faculty affairs, Department of Anesthesiology, University of Michigan. "Our research shows that studying general anesthesia from the perspective of consciousness may be a fruitful approach and create new avenues for further investigation of anesthetic mechanisms and monitoring."

An accompanying editorial by Jamie W. Sleigh, M.D., professor of anaesthesiology and intensive care, Department of Anaesthesia, University of Auckland, Hamilton, New Zealand, supported the study's ability to better understand the neurobiology of consciousness.

"If the study's findings are confirmed by subsequent work, the paper will achieve landmark status," said Dr. Sleigh. "The study not only sheds light on the phenomenon of general anesthesia, but also how it is necessary for certain regions of the brain to communicate accurately with one another for consciousness to emerge."

In addition, Dr. Sleigh recognized the study's potential to lead to the development of better depth-of-anesthesia monitors that work for all general anesthetics.

Provided by American Society of Anesthesiologists

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