ANAESTHESIA & CONSCIOUSNESS

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PROMISING FIELD FOR FUTURE RESEARCH

CONSCIOUSNESS

BACKGROUND & GOAL OF STUDY

This paper intends to review and enhance the links between the study of consciousness and anaesthesia.

MATERIALS & METHODS

As part of an investigation project, research on PubMed database of the MeSH terms anaesthesia, pain and consciousness.

RESULTS & DISCUSSION

There is no concept formally defined to consciousness and its physiology is still to be discovered. Western medicine describes essentially two types of consciousness: arousal and awareness. Some of the states of arousal are: wakefulness, sleep, minimal consciousness, vegetative state, coma and brain death. If we can't measure awareness, how can we be sure about brain death and decide organ donation?

For science, the brain acts according to Hodgkin-Huxley model. In the 80s, neuroscientists announced the theory of corticothalamic oscillations. After that, the *Neural Correlates of Consciousness*, highlights minimum neural mechanisms for conscious perception. Other approach is given by the study of how consciousness can be generated by a physical system - *Integration Information Theory*. Anaesthetist SHameroff and physicist came together with the *Orch-Or Theory*, defending consciousness takes place inside microtubules in neurons by integration of potentials through gap junctions and directed towards different foci in the brain according to the spatial patterning of these gap junctions¹. Neuroimaging suggests the thalamus can function as a switch of consciousness, and anaesthesia is fundamental in this field of study since it functions by deactivating and disrupting corticothalamic integration, according to anaesthetist MAlkire's work².

Other questions not answered by corticothalamic oscillations include daydreaming and memory. To answer, the concept *default mode network emerged*. It's a network of brain regions structural and functionally connected, activated when the individual isn't focusing on the outside world, but when is awake and resting. Is characterised by neuronal oscillations at a rate lower than 0.1 Hz. Functionally, is removed from sensory processing and is engaged in metacognitive operations. It seems to be a key to construction of the "self". The pathology involving it is found in psychiatric diagnoses, but also in chronic pain syndromes³. If we act on "self" observation and on these regions of the brain, will this bring changes to pain management?

CONCLUSION(S)

The above considerations suggest anaesthesia can help understand the physiology of the brain, improving our knowledge of the Human Being and bringing unimaginable change to medical practice.

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ANAESTHESIA