Recent Advances In Policies Of Analgesia & Sedation In The ICU

Essay

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In Intensive Care Medicine

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قَالُوا سُبْحَانَكَ
لاَ عِلْمَ لَنَا
إِلاَّ مَا عَلَّمْتَنَا
إِنَّكَ أَنتَ
الْعَلِيمُ الْحَكِيمُ
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Mohamed Ibrahim Mohamed Gohar

الجديد فى سياسات الأدوية المسكنة والمهدئة بوحدة العناية المركزة

رسالة

توطئة للحصول على درجة الماجستير
فى الرعاية المركزة

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List of Abbreviations

ADS	Analgesia-Delirium-Sedation
AMPA	α-amino-3-hydroxy-5-methyl-4-isoxazole propionate
APA	American Psychiatric Association's
APOE	Apo lipoprotein E
ATICE	Adaptation to the Intensive Care Environment
BIS	Bispectral index
BPS	Behavioral Pain Scale
CAM	Complementary and Alternative Medicine
CAM-ICU	Confusion Assessment Method for the ICU
CGRP	Calcitonin gene-related peptide
COX-2	Cycloxygenase-2
CPOT	Critical-care Pain Observation Tool
CTD	Cognitive Test for Delirium
DDS	Delirium Detection Score
DEA	Drug Enforcement Agency
DIS	Daily interruption of sedation
DNICs	Diffuse noxious inhibitory controls
DOR	Delta opioid receptors
DREAM	Downstream regulatory element antagonistic modulator
DSM	Diagnostic and Statistical Manual of Mental Disorders
EEG	Electroencephalography
EMG	Electromyography
FLACC	Face, Legs, Activity, Cry, Consolability
GABA	Gamma-aminobutyric acid
H3G	Hydromorphone-3-glucuronide
ICDSC	Intensive Care Delirium Screening Checklist
KOR	Kappa opioid receptors
LAT1	Amino acid transporter type 1
M3G	Morphine-3 glucuronide
M6G	Morphine-6 glucuronide
MAAS	Motor Activity Assessment Scale Medicine
MOR	Morphine opioid receptors
MSAT	Minnesota Sedation Assessment Tool
NCCAM:	National Center for Complementary and Alternative
NMDA	N-methyl-d aspartate
NPS	Numeric Pain Scale
NSAIDs	Nonsteroidal anti-inflammatory drugs
Nu-DESC	Nursing Delirium Screening Scale

List of Abbreviations

NVPS	Nonverbal Pain Scale
OAA/S	Observer's Assessment of Alertness/Sedation Scale
ORL-1	Opioid-receptor-like
PAD	Pain, Agitation and Delirium
PAIN	Pain Assessment and Intervention Notation
PBAT	Pain Behavior Assessment Tool
PDYN	Pro-dynorphin
PENK	Proenkephalin
POMC	Pro-opiomelanocortin
PRIS	Propofol infusion syndrome
PTSD	post-traumatic stress disorder
RASS	Richmond Agitation-Sedation Scale
RSS	Ramsay Sedation Scale
SAS	Sedation Agitation Scale
SCCM	Society of Critical Care Medicine
SEDIC	Sedation Intensive Care Score
SSRI	Selective Serotonin Reuptake Inhibitor
TCAs	Tri-Cyclic Antidepressants
VICS	Vancouver Interaction and Calmness Scale

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INTRODUCTION

Pain, agitation and delirium (PAD) are commonly observed in critically ill patients. In addition to being unpleasant and often disturbing to the patient, these symptoms can lead to increased endogenous catecholamine activity, oxygen consumption, hypermetabolism and immune suppression ***(Epstein and Breslow, 1999).***

Unfortunately, the majority of patients at medical and surgical intensive care units (ICUs) experience significant pain during their ICU stay, both at rest and associated with movement and procedures ***(Ma et al., 2010).***

Significant pain leads to sleep deprivation, exacerbates delirium and agitation and is the most common unpleasant recollection of patients' ICU stays. It is also associated with higher incidence of posttraumatic stress disorder in ICU survivors ***(Granja et al., 2008).***

Delirium occurs in up to 80% of ICU patients and is frequently underdiagnosed. ICUdelirium is associated with longer durations of mechanical ventilation and lengths of ICU stay, and an increased risk of disability, long-term cognitive dysfunction and death in these patients ***(Brummel et al., 2014).***

Agitation and anxiety occur frequently in critically ill patients and are associated with adverse clinical outcomes.Sedatives are commonly administered to ICU

patients to treat agitation and its negative consequences.Prompt identification and treatment of possible underlying causes of agitation, such as pain, delirium, hypoxemia, hypoglycemia, hypotension, or withdrawal from alcohol and other drugs, are important. Efforts to reduce anxiety andagitation, including maintenance of patient comfort, provision of adequate analgesia, frequent reorientation and optimization of the environment to maintain normal sleep patterns, should be attempted before administering sedatives ***(Cohen et al., 2006).***

Analgesic and sedative medications are frequently administered to critically ill patients to treat PAD, to improve synchrony with mechanical ventilation, and to decrease the physiological stress response. However, prolonged, continuous deep sedation of ICU patients is associated with numerous adverse outcomes, including longer durations of mechanical ventilation, prolonged ICU stays, acute brain dysfunction (delirium and coma), and increased risk of death and worse cognitive outcomes. Implementing effective strategies to optimize pain management, reduce sedative exposure and to prevent and treat delirium in ICU patients can lead tosignificant improvements in ICU and long-term clinical outcomes in these patients ***(Jackson and Ely, 2013).***

AIMOFTHEWORK

The aim of the work is to discuss the current concepts in pathophysiology of pain and delirium, evaluation of pain and delirium, pharmacology of analgesia and sedation, treatment options in managing pain in end of life **and** sedation and analgesia drug withdrawal and long term psychological outcome.

Chapter(1):

PATHOPHYSIOLOGYOFPAIN AND DELIRIUM

A- Pathophysiology of pain:

Definition:

Pain is an unpleasantsensoryandemotional experienceassociatedwithactual or potentialtissue damage, or described in terms of such damage***(Merskey et al., 2011).***

Pain categories:

1. Somatogenicpainispain withcause (usually known) localisedin the body tissue that can be classified on pathophysiological base into:
    a. Nociceptive pain: 1-somatic 2-visceral 3-referred
    b. Neuropatic pain: 1-central2-peripheral**(Table 1-1).**
2. Psychogenicpainis pain for whichthereis no knownphysical causebut thepain itself is predominantly sustained by psycho- logical factors ***(Frances et al., 2000).***

Table (1-1): Differences between nociceptive and neuropathic pain modified from ***(Serra, 2006).***

	Nociceptive	Neuropathic
Definition	Pain caused by physiological activation of pain receptors	Pain caused by lesion or dysfunction ofthe somatosensory system, especiallythe nociceptive pathway
Mechanism	Natural physiological transduction	Ectopic impulse generation, among others
Localization	Local +referred pain	Confined to innervation territory ofthe lesioned nervous structure
Quality of symptoms	Ordinary painful sensation (good verbal descriptors)	New strange sensations (poor verbal descriptors)

Terminology of Pain:

- **Hypersensitivity:** increasedsensitivity of the system involved in the pain processing.
- **Hyperesthesia and hypoesthesia:** increase or decrease, respectively, in sensitivity to non-noxious stimuli.
- **Paraesthesia**: abnormal nonpainful sensation.