Project Description.

Background

Acute Pain in ICU

Pain is a common occurrence in critically ill patients, with 50-70% of both medical and surgical ICU patients experiencing moderate to severe pain at rest 1,2. Treatment of acute pain within the ICU can lead to improved outcomes and decreased length of ICU intervention 3, whilst inadequate analgesia can lead to chronic physical and psychological morbidity 4.

Sedation in the ICU

Sedation is used as both an anxiolytic and an amnesic to mitigate against the effects of invasive ICU therapies, particularly mechanical ventilation. The benefits of sedation in the mechanically ventilated patient include anxiolysis, improved tolerance of ventilator support, facilitating nursing care and decreasing the stress response 5.

Treatment of Pain

The most recent Society of Critical Care Medicine (SCCM) guidelines on the management of pain, agitation, delirium, immobility and sleep (PADIS)5 advocate for an analgosedation regime, with opioids being first-line for analgesia. Additionally, analgesic and sedative regimes should be targeted to pain assessment and sedation assessment, respectively. It is often difficult to discern, in the agitated patient receiving mechanical ventilation, the cause of the agitation. Even in the presence of pain, it may be plausible that sedation be given to the patient to mitigate the psychological effects of acute pain. There have been no studies to date that have examined this dichotomy.

Hence, we plan to examine the temporal relationship between pain scoring and subsequent opioid and sedative boluses in mechanical ventilated patients in the intensive care unit.

Methods

We will utilise the MIMIC and eICU databases to retrospectively examine patients that have undergone mechanical ventilation for any timeframe within the ICU. Patients will be excluded if they are admitted for cardiac surgery, neurological or neurosurgical diagnoses, received extracorporeal membrane oxygenation (ECMO) or are being palliated within the ICU.

Aims

The primary aim is to determine whether patients that have acute pain are given sedation boluses for their pain.

Secondary aims include the effect of sedation bolusing for pain on duration of mechanical ventilation, ICU length of stay, subgroup analyses (e.g. operative vs non-operative group, the elderly group, trauma), cumulative doses of opioids and sedative agents.

Analysis

Demographic data will be analysed descriptively. The primary outcome will be analysed using a generalised linear mixed model (GLMM) to account for the correlation between both analgesia dosing and sedative dosing and the longitudinal nature of the data collected. This will also account for clustering (either by physician or hospital). Parametric curves (e.g. restricted cubic splines, linear and quadratic trends will be used as appropriate) will be used to model the mean of the specified variables. Directed acyclic graphs will be constructed to determine causal pathways of the variables to specific outcomes. Secondary aims will be analysed by adding these covariates into the GLMM model.

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3. Chanques G, Jaber S, Barbotte E, et al. Impact of systematic evaluation of pain and agitation in an intensive care unit. Crit Care Med. 2006;34(6):1691-1699.

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