Clinical and Economic Evaluations of Morphine and Fentanyl with Mechanical Ventilation in Intensive Care Settings. A Systematic Review of Methodological Trends, and Reporting Quality

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Background

- Patients with respiratory disorders in the intensive care unit (ICU) may require mechanical ventilation (MV)
- Sedatives are required to facilitate the procedure of MV
- Fentanyl and morphine are widely used in ICUs as sedatives
- Research providing a summary of current methodological trends and gaps in the relevant research is needed to guide and improve future research

Objective

- To summarize the characteristics and gaps in the methods and quality of clinical and economic evaluations on the use of fentanyl and morphine in ventilated patients with respiratory disorders

Methods

Figure 1. The step-by-step methods process

Results

Figure 2. Flow diagram of literature search result

Table 1. Outcome measures

<table>
<thead>
<tr>
<th>Primary endpoints in adults</th>
<th>Optimum sedation (n= 8)</th>
<th>Duration of the MV (n= 8)</th>
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<tbody>
<tr>
<td>Primary endpoints in neonates</td>
<td>Optimum sedation (n= 6)</td>
<td>Duration of the MV (n= 1)</td>
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<tr>
<td>Neurodevelopmental function (n= 1)</td>
<td>Withdrawal symptoms (n= 1)</td>
<td>Level of sedation (n= 1)</td>
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<tr>
<td>The increase in opioid use (n= 1)</td>
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</table>

- In adults, 17 were randomized controlled trials (RCTs) and 5 were observational studies
- In neonates, 7 were RCTs and 1 was observational study
- In pediatric, 1 was RCT and 2 were observational studies
- Ramsay Sedation, Addenbrooke, Richmond Agitation-Sedation, and Sedation-Agitation scales were in adults
- Premature Infant Pain Profile, Visual Analogue, Neonatal Infant Pain, Neonatal Facial Coding System, and Postoperative Comfort Score were used in neonates
- Ramsay Sedation, Pediatric Intensive Care Unit, and Tracheal suctioning scales were used in pediatrics

Discussion

- The majority of studies in the review did not define the duration of sedation, which raises concerns about proper time management
- Findings of studies performed with short-term follow-up
- The included study publications are characterized by some gaps and variations in endpoint measures and the methodological strategies used
- In neonates and pediatrics, economic evaluations should more often be incorporated

Conclusion

- The review identified poor reporting quality and high heterogeneity of methods used, potentially limiting the degree to which studies could be interpreted and influence decisions, and findings could be generalized

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