



Perioperative Lidocaine: Towards More Precise Pharmacokinetic Modeling

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Introduction

- A robust body of literature supports the use of intravenous lidocaine as an analgesic adjunct in patients recovering from abdominal surgery, improving pain scores and lowering the amount of opioid consumption¹
- IV lidocaine in this setting may also hasten return of bowel function and reduce postoperative nausea and vomiting¹
- However, in practice, many clinicians do not use IV lidocaine²; contributing factors may include:

- Dosing unfamiliarity

- Potential toxicity: studies have found toxic range serum lidocaine levels not only with IV infusions but even with regional anesthesia blocks³ and epidural anesthesia⁴

- Clinical symptoms of toxicity may be blunted in patients also taking opioids or benzodiazepines⁵

- No established standards for lidocaine level monitoring

- Pharmacokinetic models of IV lidocaine have been described in various patient populations, but the generalizability of their findings are limited by:

- Relatively few patient parameters are typically included as covariates in their models

- Small patient population study sizes

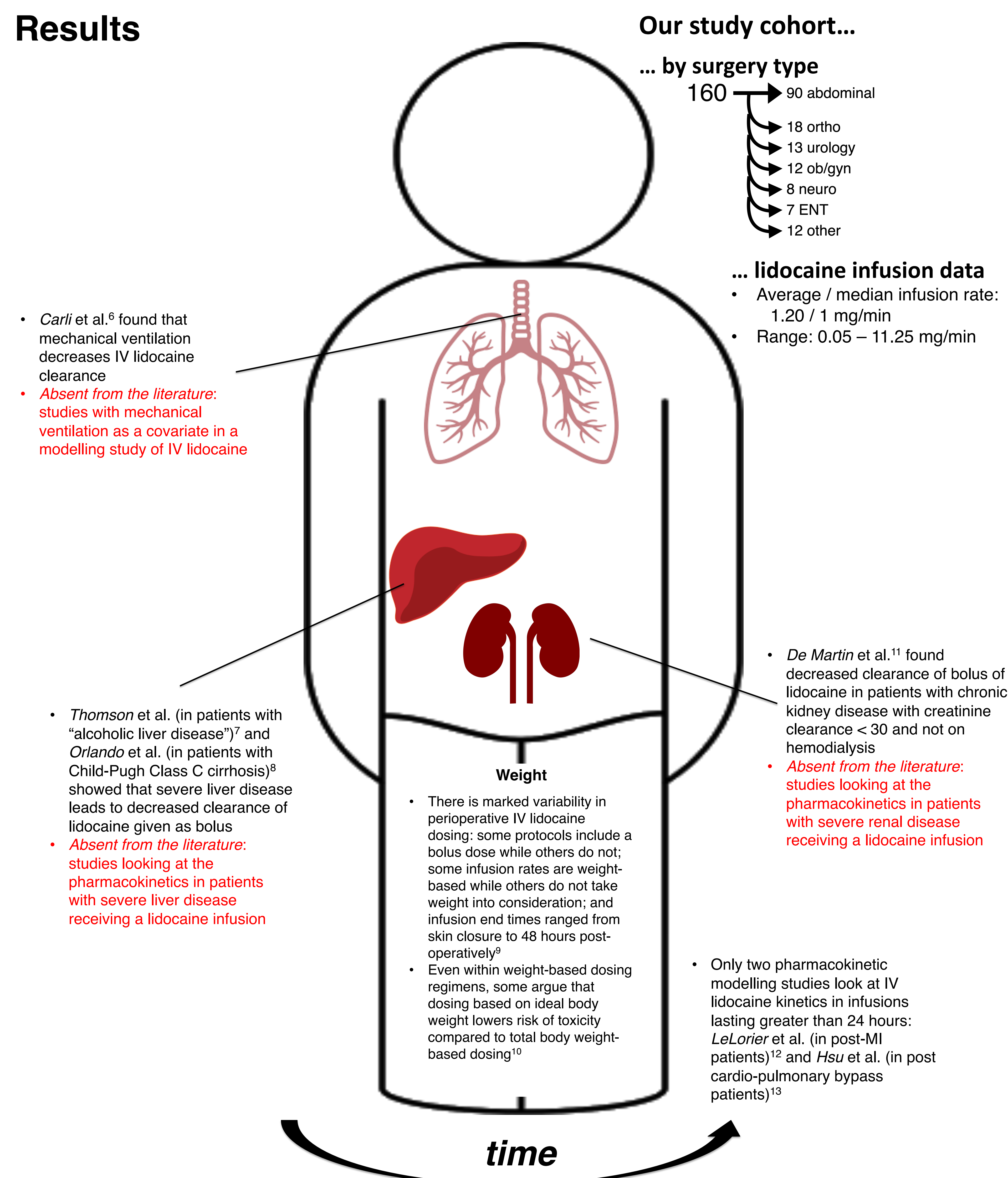
- The specificity of the clinical setting examined

- Conflicting results on parameters (eg weight, age) either improving or not improving the accuracy of the models

Aims and Methods

- We aim to search the literature to identify aspects of lidocaine pharmacokinetics that can be better elucidated in order to provide guidance for more precise, individualized lidocaine dosing
- We also collected data on postoperative patients in Ronald Reagan UCLA Medical Center from 2017 to 2021 who received IV lidocaine with intent to use patient factors as variables in a pharmacokinetic model of lidocaine to attempt to identify factors affecting lidocaine pharmacokinetics

Results



Discussion

- There is a dearth of literature examining the change in lidocaine infusion pharmacokinetics in patients with severe renal or hepatic disease
- No pharmacokinetic modelling studies exist that incorporate a wide range of covariates in the model. Most include just demographic variables (eg age, sex), or isolated clinical variables (eg CHF, cardiac output)
- The change in lidocaine pharmacokinetics with prolonged infusions is a poorly studied area, which is particularly relevant to our study; many postoperative patients received lidocaine for several days
- Wide variability exists in dosing regimens, underlying the need to develop more standardized dosing protocols to help with adoption of IV lidocaine postoperatively

Future Directions

- We plan to collect demographic and clinical data on the listed patients that received postoperative IV lidocaine
- We also plan to use these variables as parameters in a pharmacokinetic model to identify factors that influence lidocaine infusion pharmacokinetics

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