Lactate Rebound as an Independent Predictor of Mortality in the Intensive Care Unit

Tom Pollard[1], Matthieu Komorowski[2], Justin D Salciccioli[2], Dominic C Marshall[2], Mark Sykes[2], Ross Goodson[2], Adam Hartley[3], Joseph Shalhoub[4]

1 Massachusetts Institute of Technology, Cambridge, MA 2 Imperial College London, London, UK
[3] Department of Cardiology, Hammersmith Hospital, Imperial College Healthcare Trust, London, UK 4 Department of Surgery and Cancer, Imperial College Healthcare Trust

INTRODUCTION

➢ Lactate is used to identify inadequate tissue perfusion and is associated with outcomes in various critically ill populations
➢ Early lactate clearance is associated with improved survival in sepsis and cardiac arrest
➢ Whether secondary elevation in lactate is associated with worse outcomes in critical illness is unknown
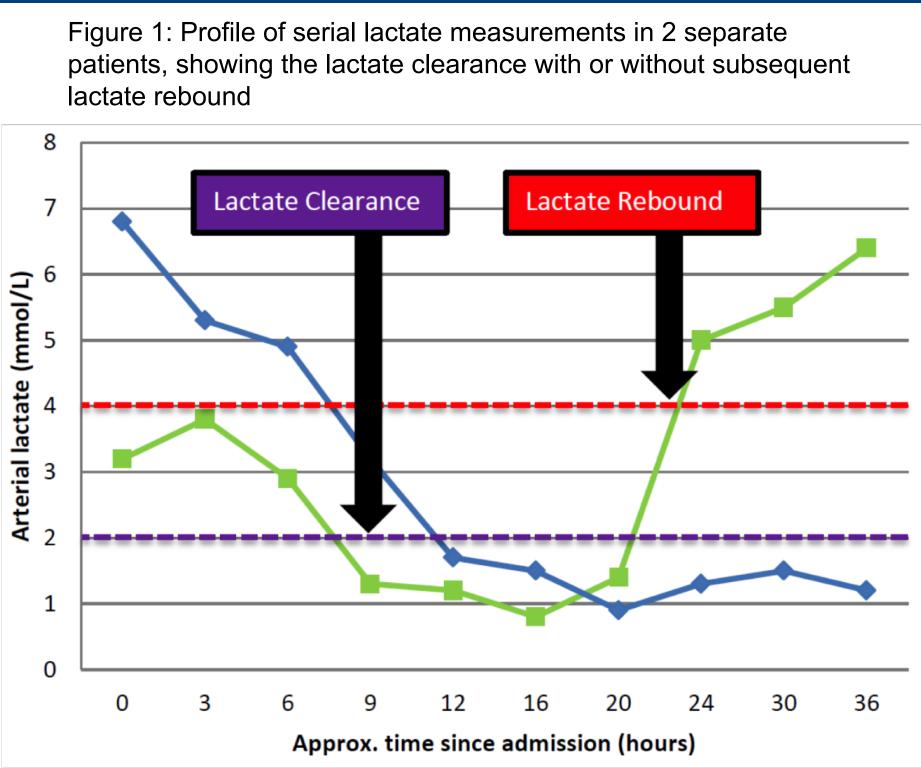
OBJECTIVE

➢ To assess the relationship between secondary lactic acidosis and mortality in critically ill patients

METHODS

➢ *Design*: Secondary retrospective observational analysis of a large clinical database (MIMIC-II)
➢ *Setting*: Intensive care units at a single academic teaching hospital in Boston, MA
➢ *Inclusion*: Adult patients with primary clearance of lactic acidosis
➢ *Exclusion*:
  ➢ Lactate not measured
  ➢ Lactate not elevated
  ➢ No primary lactate clearance

METHODS (cont.)

➢ *Data collection*:
  ➢ Subject demographics and co-morbid disease
  ➢ Routine vital signs and laboratory data
  ➢ Measured lactate data
➢ *Primary Exposure*: Secondary increase in measured blood lactate following initial lactate clearance
➢ *Outcome:* 28-day mortality
➢ *Data Analysis*: Simple descriptive statistics were used to summarize the study results

RESULTS

Figure 1: Profile of serial lactate measurements in 2 separate patients, showing the lactate clearance with or without subsequent lactate rebound

RESULTS (cont.)

Principal Findings

➢ 3390 subjects who had initial elevation in lactate with subsequent clearance were included in the study
➢ 341 (10%) demonstrated lactate rebound following initial clearance
➢ 28 day mortality in lactate rebound group was 42% compared to 12% mortality in lactate clearance group (p < 0.001)
➢ After multivariable adjustment there was a strong association between lactate rebound and 28-day mortality (OR 4.9, 95% CI 3.7 – 6.4)

CONCLUSION

➢ There is a strong association between secondary elevations in lactate and mortality in adult critically ill patients
➢ This study highlights the importance of detecting secondary lactate elevations
➢ Additional prospective investigations are necessary to assess this relationship in critically ill patients