

The Clinical Utility of Lactic Acid Trending with ABGs in the Critical Care Setting: A Case Study

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Introduction

With today's blood gas technology such as the Roche cobas b 221 blood gas system, healthcare providers can trend any four of the eighteen parameters including metabolites such as glucose and lactic acid. This provides a diagnostic platform for a number of clinical applications. For example, trending lactic acid gives the clinician the ability to not only monitor the level of lactic acid but also the ability to intervene early on in cases of tissue hypoxia, sepsis and the onset of myocardial infarction. The following study is a case in point.

Case

A 65 year old female presented to ED with the following clinical findings: shortness of breath, evaluated temperature 101, blood pressure 110/70, swollen ankles. The patient also has a history of COPD and CHF. The patient was given bronchodilator therapy, diuretics, chest x-ray and a blood gas was drawn at 14:39 with the following results:

pH	7.31
PaCO ₂	50
PO ₂	55
HCO ₃	28.8
Lac	1.2

The patient was admitted to the hospital and placed on oxygen, bronchodilator therapy, treatment for CHF and antibiotic therapy. A second blood gas was drawn at 20:55 on LPM with the following results:

pH	7.32
PaCO ₂	48
PO ₂	74
HCO ₃	14.2
Lac	8.8

After the results were called to the physician the patient was placed on non-invasive ventilation overnight. At 07:59 and another blood gas was drawn with the patient 40% O₂ with the following results:

pH	7.35
PaCO ₂	45
PO ₂	80
HCO ₃	16.1
Lac	7.4

At this point the patient seemed to be responding to the therapy. At 12:30 the patient's oxygen saturation started to drop and another blood gas was run with the following results:

pH	7.31
PaCO ₂	55
PO ₂	60
HCO ₃	10.1
Lac	13.3

Following this blood gas the patient was moved to the intensive care unit placed on 100% oxygen via mask and another blood gas was drawn to 13:52 with the following results:

pH	7.30
PaCO ₂	65
PO ₂	59
HCO ₃	15.3
Lac	13.8

Now the patient was placed on a ventilator and an infectious disease physician was consulted. At 15:15 another blood gas was drawn with the following results:

pH	7.35
PaCO ₂	50
PO ₂	80
HCO ₃	10.2
Lac	15.1

At 18:30 a final blood gas was drawn with the following results:

pH	7.35
PaCO ₂	50
PO ₂	84
HCO ₃	14
Lac	18.9

The patient was transferred to another facility.

Treatment

At the new facility the patient was placed on the ventilator for several more days and treated for a septic pulmonary infection and finally discharged 2 weeks later.

Conclusion

The respiratory staff had received several in-services on lactic acid prior to the admission of this patient. This knowledge and training was instrumental in providing the physicians with trending data that improved patient care and resulted in a positive patient outcome. Any critically ill patient should have blood gases with electrolytes and a direct measurement of lactic acid. Trending should be considered in cases where sepsis, tissue hypoxia and myocardial infarction are suspected. Hospital should consider blood gas lactic acid testing and trending as a standard of care when dealing with critically ill patients.