

به نام خداوند جان و خرد

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Serum lactate as a **prognostic factor**
in coronary artery bypass graft
operation by on pump method

Introduction

Lactic acid is a major end product of glucose metabolism.

Lactic acid is an organic compound with the formula $\text{CH}_3\text{CH}(\text{OH})\text{CO}_2\text{H}$.

lactic acid is classified as an alpha-hydroxy acid (AHA)

Introduction

- **Glucose** is broken down and oxidized to **pyruvate**, and **lactate** is then produced from the pyruvate faster than the body can process it.

Introduction

- The resulting lactate can be used in two ways:
- **Oxidation back to pyruvate** by well oxygenated muscle cells, heart cells, and brain cells
 - Pyruvate is then directly used to fuel the **Krebs cycle**
- Conversion to **glucose** via **gluconeogenesis** in the liver and release back into circulation

Introduction

- Increased lactic acid production is a characteristic metabolic consequence of **hypoxia**; but lactic acidosis can also develop under other Conditions.
- **Lactic acidosis** in cardiac surgical patients is a manifestation of **systemic inflammation** and excess **pro-inflammatory cytokine** production.

Aim of the study

- This investigation was designed to integrate basic concepts about lactate acidosis with a **clinically used of serum lactate** in patient under coronary artery bypass surgery by on pump method.
- We examined the role of lactic acidosis in prediction of patients' outcome after this surgery.

Settings and Design

- In this **retro/prospective descriptive analytic** study, **15** patients scheduled for routine cardiac surgery entered to our sample and followed over a **two week** period.
- Patients were admitted to a dedicated cardiac surgical intensive care unit after surgery.
- Lactate concentration in **arterial blood sample** was studied.

Material and Methods

Variables:

1. The nature of the **surgical procedure**,
 2. **duration** of cardiopulmonary **bypass**,
 3. **duration** of aorta **cross clamp time**,
 4. **hemodynamic parameter**,
 5. total prescribed **inotrope dosage**
 6. patient **outcome**
- were documented.

Results

- 15 patients aged 62 ± 14 years were enrolled during the study period.
- Patients with a **poor outcome** had **significantly higher lactate** levels in ABG samples (P-value ≤ 0.001).
- ABG lactate levels did not correlate with the magnitude of **intra operative bleeding** or **volume of packed cell transfusion** (p-value ≥ 0.05).

Results: patients' characteristic

Variables (patients' characteristic, No=15)	values (mean \pm SD)
Age (years)	62 \pm 14
Sex (F/M)	6/9 (0.67%)
Weight (kg)	62 \pm 24
High (cm)	164 \pm 9
BMI	23.13 \pm 2.25
Ejection fraction (EF %)	40 \pm 15
Cross-clamp time (min)	54 \pm 14
Cardiopulmonary bypass time (min)	86 \pm 16
Grafts per patient	3 \pm 1

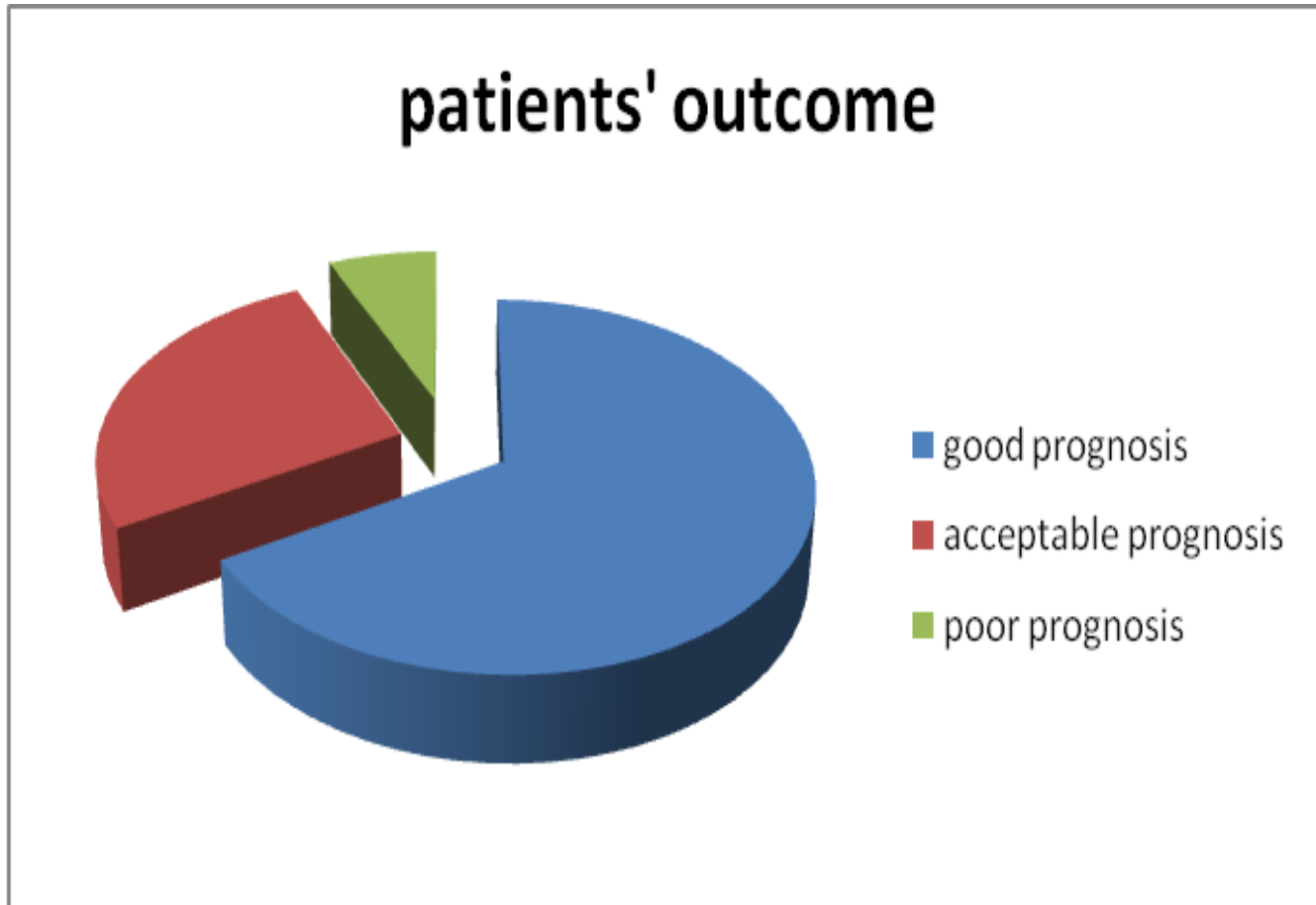
Results:

Arterial serum lactate level and hemodynamic parameters

Time	hemodynamic parameters		serum lactate level (mmol/L)
	BP (mmHg)	HR (bpm)	
Arter line preparation (0)	127±36/76±23	78±31	0.83±0.29
30th min from beginning	96±41/65±18	84±17	0.87±0.33
15th min of cardio pulmonary bypass (on pump time)	-	-	2.84±1.68
End of the cardio pulmonary bypass (off pump time)	-	-	3.48±2.23
End of the surgery	86±21/45±9	88±26	4.28±2.48
ICU admission time	92±18/52±11	89±24	4.33±2.56
2 h after ICU admission	98±27/58±13	90±18	3.87±2.17

- **PH** of ABG samples **did not** generally **correlate** with the ABG **lactate concentration** (r: 0.116, P-value: 0.68).

Results: Patients' outcome



Results

- Increased **lactate concentration** was reliably associated with
 - 1. patient hemodynamic parameters,
 - 2. total inotrope dosage,
 - 3. duration of on pump time
 - 4. aorta cross clamp time.

Conclusions

- This study was demonstrated a combination of **serum lactate level** to patient **prognosis** after CABG surgery by on pump method.
- **Serial assessment** of arterial blood gas for serum lactate level in patients under CABG operation is useful in the evaluation of prognosis and clinical course.

Thank you for your kind attention

Any question?

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