Supplementary files

Figure S1: Base Excess and Lactate Levels by acid-base disorder diagnosis based on the Boston Compensation rules.



Figure S2: Heatmap of 30-Day Mortality for Lactate and Base Excess Levels. The color intensity and the numbers within the heatmap indicate the count of 'died' cases for each combination.

A diagram of a graph

Description automatically generated with medium confidence

Table S1: Patient characteristics of Outliers from Figure 2 grouped into patients with acidosis (pH<7,35) and patients with normal pH (7.35≥pH≤7.45).

|  |  |  |
| --- | --- | --- |
|  | Acidosis (pH<7.35) | Normal pH (7.35≥pH≤7.45) |
| n | 10 | 1 |
| Male | 7 (70.0) | 1 (100.0) |
| Age (yrs) | 68.00 [58.50, 78.25] | 66.00 [66.00, 66.00] |
| pH | 7.16 [7.03, 7.24] | 7.43 [7.43, 7.43] |
| Base Excess (mmol/L) | -15.55 [-22.23, -13.02] | -10.50 [-10.50, -10.50] |
| Lactate (mmol/L) | 2.35 [1.75, 2.64] | 4.53 [4.53, 4.53] |
| pCO2 | 31.55 [21.15, 53.12] | 20.50 [20.50, 20.50] |
| HCO3- | 14.20 [5.32, 15.97] | 13.70 [13.70, 13.70] |
| SpO2 | 92.00 [78.50, 94.00] | 88.00 [88.00, 88.00] |
| GCS | 13.50 [6.50, 15.00] | 15.00 [15.00, 15.00] |
| Shock Index | 0.78 [0.71, 0.91] | 0.65 [0.65, 0.65] |
| NACA Score | 5.00 [3.25, 5.00] | 4.00 [4.00, 4.00] |
| Emergency Type |  |  |
| Cardiovascular Arrest | 1 (10.0) | 0 (0.0) |
| Internal Emergency | 6 (60.0) | 0 (0.0) |
| Neurological Emergency | 1 (10.0) | 0 (0.0) |
| Respiratory Emergency | 1 (10.0) | 0 (0.0) |
| Surgical Emergency | 1 (10.0) | 1 (100.0) |

Table S2: Potential reasons and underlying mechanisms of normal anion gap metabolic acidosis (NAGMA).

|  |  |  |
| --- | --- | --- |
| 1. | Gastrointestinal Bicarbonate Loss: | |
|  | Diarrhea | Loss of bicarbonate-rich intestinal secretions |
|  | Ileostomy or colostomy | Loss of bicarbonate in the stool |
|  | Ureterosigmoidostomy | Urinary diversion surgery leading to bicarbonate loss |
| 2. | **Renal Tubular Acidosis (RTA):** | |
|  | Type 1 (Distal RTA) | Impaired acid secretion in the distal nephron |
|  | Type 2 (Proximal RTA) | Reduced bicarbonate reabsorption in the proximal tubule |
|  | Type 4 | Hypoaldosteronism or aldosterone resistance leading to reduced acid secretion |
| 3. | **Renal Bicarbonate Loss:** | |
|  | Chronic kidney disease | Reduced acid excretion and bicarbonate reabsorption |
|  | Carbonic anhydrase inhibitors | Medications that inhibit bicarbonate reabsorption |
| 4. | **Hyperchloremia:** | |
|  | Administration of chloride-rich solutions (e.g., normal saline) | Dilutional acidosis |
|  | Hyperalimentation | Parenteral nutrition with high chloride content |
| 5. | **Acid Ingestion or Infusion:** | |
|  | Ingestion of acids like hydrochloric acid or ammonium chloride |  |
|  | Infusion of acid-containing solutions |  |
| 6. | **Rapid Dilution of Extracellular Fluid:** | |
|  | Post-hypercapnia | Rapid correction of chronic hypercapnia can lead to NAGMA. |
|  | Massive blood transfusion | Infusion of stored blood with reduced bicarbonate levels |
| 7. | **Drug-Induced:** | |
|  | Certain medications like acetazolamide, cholestyramine |  |
| 8. | **Endocrine Disorders:** | |
|  | Adrenal insufficiency | Reduced aldosterone production leading to decreased acid secretion |
| 9. | **Other Causes:** | |
|  | Ethylene glycol or methanol poisoning | Metabolism of these substances can lead to NAGMA |