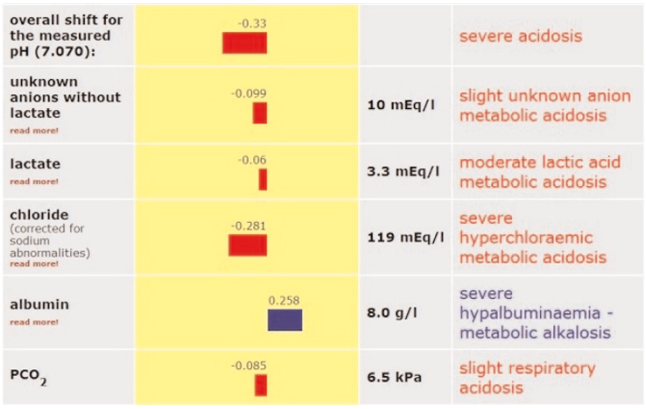
Figure 1 (abstract P449)



Summary AcidBase.org interpretation.

generating a total of 15,000 page-views as of December 2008. Feedback by users is voluntary and indicates multiple changes in diagnostic and/or therapeutic strategies.

Conclusions We have shown it is feasible to build an online software application that aids in the interpretation of complex acid–base disorders using the Stewart approach. In addition this tool enables the clinician to judge the impact of possible intervention using simulation. We will next set out to investigate the impact of exposure to this decision support tool on clinical patient management.

References

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2. [www.acidbase.org]

P450

Comparative study of factors that contribute to the severity of metabolic alkalosis in a surgical ICU

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Introduction This is a comparative study of factors involved in the development of acid–base disorders in surgical patients. The aim of this study was to isolate factors that may affect the severity of alkalosis, the prolongation of hospitalization and the final outcome in patients admitted to an ICU.

Methods Data were collected retrospectively from the electronic database of the surgical ICU of Hippocration Hospital, Athens, Greece. Inclusion criteria were defined as patients that developed metabolic alkalosis (pH >7.45 and $[HCO_3^-]$ >24) at a certain time during their hospitalization. Patients were divided into two groups; group I included those with 7.45 <pH ≤7.55 and group II those with pH >7.55. Statistical analysis was performed between groups with regard to gender, age, type of surgery, blood urea concentration, white blood cell count, hematocrit, APACHE II score, serum potassium concentration, creatinine levels, total bilirubin levels, the presence of sepsis criteria, the recurrence of the disorder, the need for mechanical ventilation, the total days of the disorder, the length of hospital stay, the post-admittance day when the maximum pH was recorded, the post-surgery day of maximum pH, the use and the quantity of furosemide administration, the use and quantity of dobutamine administration, the use of human albumin and the survival. Statistical analysis was performed with the use of chi-square for comparison of data.

Results Data charts from 1999 to 2005 were reviewed. In total, 987 patients were admitted to the ICU in this time period. Of these, 239 (24.2%) patients developed metabolic alkalosis at a certain time in their course. Group I included 210 patients (87.9%) and group II included 29 patients (12.1%). From the parameters that were analyzed, statistical significance was observed between the two groups in the value of the blood urea concentration, in the amount of sepsis criteria that were present and in the development of recurrence. We did not observe a statistical difference between the groups in creatinine levels, in the furosemide quantity or in serum potassium concentration.

Conclusions The severity of metabolic alkalosis is affected by renal function as expressed by blood urea concentration and the severity of sepsis–septic shock. Moreover, unlike what we expected, furosemide administration did not prove of importance in the development of the alkalosis in this study.

P451

Acid–base disorders evaluation in critically ill patients: hyperchloremia is associated with mortality

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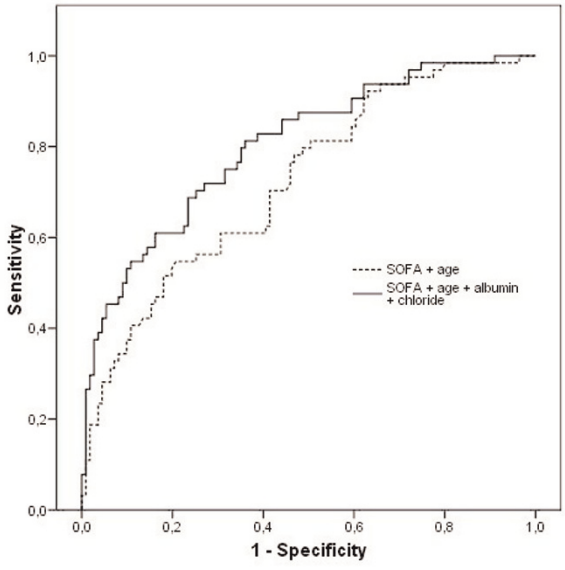
Introduction Acid–base disorders are common in critically ill patients, and they are generally associated with greater morbidity and mortality. The objectives of this study are to find out whether the diagnostic evaluation of acid–base disorders in a population of critically ill patients can be improved using Stewart's method compared with the traditional model, and whether acid–base variables are associated with hospital mortality.

Figure 1 (Abstract P451)



ROC curves for the models including SOFA, age, albumin and chloride.

Methods This prospective observational study took place in a university-affiliated hospital in Porto Alegre, Brazil, during the period of February to May 2007. We recorded clinical data and acid–base variables from 175 patients at ICU admission.
Results The evaluation according to Stewart's method would allow an additional diagnosis of metabolic disorder in 59 (33.7%) patients. Individually, none of the variables appear to be good predictors of hospital mortality. However, using the multivariate stepwise logistic regression, we had a model with good discrimination containing the SOFA score, age, chloride and albumin (area under receiver operating characteristic curve = 0.80; 95% CI = 0.73 to 0.87). See Figure 1.
Conclusions The Stewart approach, compared with the traditional evaluation, allows identifying more patients with major acid–base disturbances. Hypoalbuminemia and hyperchloremia were associated with mortality.

References

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P452

Buffer therapy in severe metabolic or mixed acidosis

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Introduction The current literature does not support buffers in acidosis except when facing proven losses of bicarbonates [1]. However, human studies are lacking and data are supported by *in vitro* or animal studies that showed the side effects of bicarbonates. The aim of this study was firstly to describe the frequency of buffering therapy in ICU and secondly to compare the outcome between patients treated by buffers (buffer group) or not (nonbuffer group).
Methods A prospective, multiple-center, observational study. All patients presenting a severe metabolic or mixed acidosis (pH <7.20) were screened. Acidoketosis was secondarily excluded. The mechanism of acidosis was defined by classical analyses [2]. At admission, Simplified Acute Physiology Score (SAPS) II and Sequential Organ Failure Assessment (SOFA) scores, pH, bicarbonatemia, lactatemia, dialysis, mechanical ventilation and vasopressor use were recorded. At ICU discharge, lengths of stay, mechanical ventilation and mortality were recorded. Data are presented as the medians and quartile ranges and compared with the Mann–Whitney and Fisher's exact tests.
Results One hundred and forty-six were included for analysis. The main diagnosis at admission was septic shock (36%) and cardiac arrest (12%). Ninety were not treated with buffers and 56 were treated at day 0. Severity scores at admission (SOFA 10 (7 to 13) vs. 11 (9 to 13) and SAPS II 62 (50 to 81) vs. 71 (54 to 81)), frequency of vasopressors (86% vs. 93%), dialysis (17% vs. 26%) and mechanical ventilation (86% vs. 93%) in the nonbuffer and buffer groups, respectively, were not different. Bicarbonatemia was significantly lower in the buffer group than in the nonbuffer group (15 (10.3 to 18.0) vs. 13.4 (8.0 to 17.0); $P < 0.05$). No significant difference was observed between groups for length of stay in the ICU (5 (3 to 7) vs. 4 (2 to 8) days), length of mechanical ventilation (4 (2 to 5) vs. 3 (2 to 4) days) and mortality (58 vs. 59%) in the nonbuffer and buffer groups respectively.
Conclusions In this multiple-center observational study, buffering practices was heterogeneous. Buffering therapy in severe acidosis (pH <7.20) does not seem to influence the ICU outcome. Further clinical studies should be performed to better define the impact of buffering therapy in selected patients in severe acidosis.

References

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P453

Incidence, severity and timing of hypophosphataemia in Glasgow Royal Infirmary ICU

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Introduction Hypophosphataemia is a common treatable problem in ICU, and is indicative of many pathophysiological processes that occur in critical illness. This audit's objective was to quantify the incidence, severity and timing of hypophosphataemia in the ICU. Namely, the incidence of hypophosphataemia on ICU admission and the incidence that develops following admission.
Methods A retrospective audit of data entered into the computerised medical record database (CareVue) from all admissions between 27 April 2006 and 7 July 2008. The time, date and value of all serum phosphate concentrations were analysed. Abnormal phosphate concentrations were categorised as following: critically low (<0.3 mmol/l), low (<0.7 mmol/l), high (>1.5 mmol/l).
Results A total 689 out of 795 patients admitted during this period had a serum phosphate recorded. Table 1 presents the classification of phosphate concentrations on admission to the ICU and the minimum reached during their ICU admission. The incidence of hypophosphataemia on admission to GRI ICU is 10%, of which <1% is at a critical concentration. The incidence of hypophosphataemia during the whole of the ICU stay rises to 42%. Five per cent of ICU admissions get critical hypophosphataemia at some point during their ICU stay; 69% of these patients have a normal or high phosphate concentration on admission, 19% have a low admission phosphate and 13% are admitted with a critically low phosphate concentration.
Conclusions Hypophosphataemia is common in ICU admissions. Most commonly it develops subsequent to admission to the ICU and reaches critical concentrations in 5% of ICU admissions. The timing of this fall in phosphate may indicate specific pathophysiological processes and merits further investigation.

Table 1 (abstract P453)

Phosphate concentrations in ICU admissions ($n = 689$)

Severity	On admission	ICU minimum
Critical	4	32
Low	69	289
Normal	364	311
High	256	89