Drug Shortages Alert

September 2016

Recommendations and information provided in Drug Shortage Alerts are compiled by experts in the field. Practitioners always are advised to consult with staff to ensure response to any drug shortage is in line with internal policies and procedures.

Introduction

- Intravenous (IV) sodium bicarbonate syringes and vials have previously and sporadically been affected by shortages due to manufacturer discontinuation and/or increased demand. More details can be found here: http://www.ashp.org/shortages
- In addition to this brief summary, the SCCM Drug Shortages Task Force has developed a detailed review of common uses of IV sodium bicarbonate in the ICU, and suggested management strategies.
- The recommendations provided are based on a combination of the current evidence as well as the need for conservation during this shortage.

Management Strategies

<table>
<thead>
<tr>
<th>Select Indications in the Critically Ill</th>
<th>Recommendation</th>
<th>Key Points</th>
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</thead>
<tbody>
<tr>
<td>Prevention of contrast-induced nephropathy in those at risk</td>
<td>0.9% NaCl 1 mL/kg/hr for 6–12 hrs pre- and 6–12 hrs post-procedure</td>
<td>Use of sodium bicarbonate is associated with mixed results; studies have differing therapeutic end points.</td>
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<tr>
<td></td>
<td>For emergent procedures: 0.9% NaCl 3mL/kg bolus, followed by 1 mL/kg/hr for 6–12 hrs post-procedure</td>
<td>Identify patients at high risk and minimize modifiable risks (concomitant nephrotoxins, etc.). Use iso-osmolar, non-ionic contrast where possible.</td>
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<tr>
<td>Urinary alkalization to enhance drug elimination</td>
<td>Optimal alternatives will be agent-specific (see text for details)</td>
<td>Evidence to support use of sodium bicarbonate is limited for most agents, with the best data in relation to enhancing elimination of high-dose methotrexate.</td>
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<td>Rhabdomyolysis (see Urinary Alkalization in previous row)</td>
<td>Aggressive resuscitation with 0.9% NaCl</td>
<td>Sodium bicarbonate offers no significant improvement over aggressive fluid resuscitation with 0.9% NaCl.</td>
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<tr>
<td>Hyperkalemia (acute management)</td>
<td>Insulin, 10 units IV push with 50% dextrose, 50 mL +/- inhaled beta-2 agonists</td>
<td>Sodium bicarbonate therapy has little use in the routine treatment of hyperkalemia unless severe metabolic acidosis is present.</td>
</tr>
</tbody>
</table>
Sepsis-induced acidosis

Sodium bicarbonate not recommended in patients with pH ≥ 7.15

Studies do not support the hypothesis that sodium bicarbonate enhances catecholamine effectiveness.

Treat underlying shock and/or source of acidemia.

Diabetic ketoacidosis

Sodium bicarbonate not recommended

Treat underlying ketogenesis.

Pharmacotherapeutic Considerations

- The use of IV sodium bicarbonate and management strategies in the setting of drug shortages is indication dependent. Please refer to the detailed review for more information.
- Sodium acetate is listed as an alternative; however, it is currently on shortage (as it has been before), and supplies may be sporadic. Tromethamine is no longer manufactured (as of May 2016) and therefore not a viable alternative.

Safety Implications

- Lack of prefilled syringes in code boxes may present patient and responder safety issues in emergent situations.
- Use of alternatives that are not commonly used presents safety concerns and a potential for errors throughout the entire medication use process. As such, a heightened awareness for errors is warranted during the prescription, preparation, and administration processes.

Impact on ICU Care

- Lack of availability of a buffering solution can present challenges for management of acidotic patients, potentially resulting in prolonged acidosis and the subsequent physiologic effects, which may include but are not limited to: depression of myocardial contractility, tachycardia, vasoconstriction, dysrhythmias, and central nervous system depression.
- Outsourcing the production of sodium bicarbonate syringes and continuous infusions (a strategy some pharmacies may use to obtain more supply) can represent increased drug acquisition costs.

Additional Resources

See detailed review developed by the SCCM Drug Shortages Task Force.

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