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| **Supplemental Table 1. Included studies characteristics** |
| **First author** | **Country** | **Design** | **Center (n)** | **Population** | **Setting** | **Balanced Solution** |  | **Unbalanced Solution** | **Metabolic Acidosis Outcome** |
|  |  |  |  |  |  | **Fluid** | **Patients (n)** |  | **Fluid** | **Patients (n)** |  |
| Gutierrez-Camacho, 1994 | Mexico | Retrospective observational | 1 | Severe acute gastroenteritis | Hospital | Hartmann Solution | 14 |  | 0.9% normal saline  | 6 | change in bicarbonate |
| Dung, 1999 | Vietnam | RCT | 1 | Dengue shock syndrome | PICU | Ringer's Lactate | 13 |  | 0.9% normal saline  | 12 | not reported |
| Nhan, 2001 | Vietnam | RCT | 1 | Dengue shock syndrome | PICU | Ringer's Lactate | 55 |  | 0.9% normal saline  | 56 | not reported |
| Mahajan, 2012 | India | RCT | 1 | Severe acute gastroenteritis | ED | Ringer's Lactate | 11 |  | 0.9% normal saline  | 11 | change in pH\* |
| Allen, 2016  | US/ Canada | RCT | 8 | Severe acute gastroenteritis | ED | Plasma-lyte A | 39 |  | 0.9% normal saline  | 38 | change in bicarbonate |
| Weiss, 2016 | US | Retrospective cohort | 382 |  Severe sepsis/ septic shock | Hospital | Ringer's Lactate | 459 |  | 0.9% normal saline  | 459 | not reported |
| Emrath, 2017 | US | Retrospective cohort | 43 |  Severe sepsis/ septic shock | PICU | Balanced Solution | 1474 |  | 0.9% normal saline  | 8844 | not reported |
|  Kartha, 2017 | India | RCT | 1 | Severe acute gastroenteritis | ED | Ringer's Lactate | 34 |  | 0.9% normal saline  | 34 | change in bicarbonate, pH, base deficit and pH ≥7.35 |
| Samransamruajkit, 2017 | Thailand | Prospective observational | 1 |  Severe sepsis/ septic shock | Ward/PICU | Ringer's Lactate | 15 |  | 0.9% normal saline  | 20 | changes in base excess |
| Yung, 2017 | Australia | RCT | 1 | Diabetic ketoacidosis | PICU/ HDU △ | Hartmann Solution | 38 |  | 0.9% normal saline  | 39 | time to bicarbonate ≥15 mmol/L and pH of 7.3 |
| Balamuth, 2019 | US | RCT | 1 | Severe sepsis/ septic shock | ED | Ringer's Lactate | 24 |  | 0.9% normal saline | 26 | not reported |
| Anantasit, 2020 | Thailand | RCT | 1 | Severe sepsis/ septic shock | PICU | Ringer's Acetate | 30 |  | 0.9% normal saline | 31 | hyperchloremic acidosis |
| Williams, 2020 | India | RCT | 1 | Diabetic ketoacidosis | ED/ PICU | Plasma-lyte A | 34 |  | 0.9% normal saline | 32 | change in bicarbonate and pH |
| △ High dependency unit\* Reported as follow-up pH adjusted for baseline pH, sodium and chloride |