Hypertonic Saline (3%) for Trauma Patients with an Open Abdomen

Background:

Damage-control laparotomy (DCL) is an accepted technique for the management of the exsanguinating trauma patient in an effort to attenuate or avoid the lethal triad of acidosis, coagulopathy, and hypothermia. (#2) Although DCL has been associated with increased survival in this patient population, the technique itself is associated with significant morbidity and mortality. Failure to achieve early fascial closure increases the risk of gastrointestinal fistulas, anastomotic leaks, intra-abdominal abscess, systemic infection, and prolonged ICU/hospital stays. (#2) Thus, great effort has been placed on how to achieve early definitive fascial closure. One such strategy is using hypertonic saline for fluid administration. Hypertonic saline has been shown to lower a patient's total fluid intake, reduce resuscitation induced intestinal edema, blunt the systemic inflammatory response, and improve the rate of early primary fascial closure. (#1, #3)

Therapeutic Goal:

- Decreased total volume fluid balance
- Achieve fascial closure

Inclusion Criteria:

- Adult trauma patients (>18yo) with open abdomens who have undergone damage control laparotomy.

Exclusion Criteria

- Na < 120mmol/L or Na > 155mmol/L

Treatment:

- Continuous infusion of 3% hypertonic saline @30cc/hr

Administration:

- Infuse via a peripheral iv (central venous catheter is preferable)
- Infusion is not to be titrated
- Additional fluids may be administered for resuscitation at the discretion of the primary team

Monitoring:

- Metabolic Panel prior to initiation
- Serum sodium check Q4hrs
- Serum Osmolality check Q24hrs

Discontinuation Requirements:

- When fascial closure is achieved
- Sodium > 155 or Sodium increases >12mmol/L within 24hr period
- Meeting any of the exclusion criteria
- Discretion of the primary team

PENN FORMULARY:

3% Sodium Chloride

Indication	Approval	Administration/Dose	Location for administration
Open abdomen after damage control laparotomy	Trauma or Surgical Critical Care Attending or Fellow	30cc/hr as a continuous infusion (not to be titrated)	OR, ICU

References:

1. Harvin, J. A., Mims, M. M., & Duchesne, J. C., et al. (2012, November 8). Chasing 100%: The use of hypertonic saline to improve early, primary fascial closure after damage control laparotmy. Journal of Trauma and Acute Care Surgery, 74, 426-432

2. Hatch, Q. M., Osterhout, L. M., & Ashraf, A., et al. (2011, June). Current Use of Damage-Control Laparotomy, Closure Rates, and Predictors of Early Fascial Closure at the First Take-Back. The Journal of TRAUMA Injury, Infection, and Critical Care, 70(6), 1429-1436

3. Han, J., Ren, H. Q., & Zhao, Q. B., et al. (2015, March). Comparison of 3% and 7.5% Hypertonic Saline in Resuscitation after Traumatic Hypovolemic Shock. SHOCK, 43(3), 244-249