SUBJECT: Guideline for use of hypertonic saline to facilitate early fascial closure following damage control laparotomy

SUPERSEDES: New

RECOMMENDATION(S): William Beck, MD

EFFECTIVE: 11/15/16

Purpose

To describe the use of 3% hypertonic saline in trauma patients with an open abdomen.

Background:

The use of damage control laparotomy (DCL) in severely injured trauma patients to attenuate or avoid the “bloody vicious cycle” of acidosis, coagulopathy has been associated with improved survival. Unfortunately, failure to achieve fascial closure after DCL is not uncommon and carries a tremendous economic and morbidity burden. Failure to achieve early fascial closure (within the first 7 days) may result from intestinal and/or retroperitoneal edema, recurrent abdominal compartment syndrome, and continued coagulopathy, acidosis, or hypothermia. The open abdomen has multiple physiologic implications, including increased insensible losses, protein losses, and nutritional demands. The open abdomen also may result in significant morbidity, including, but not limited to incisional hernias, gastrointestinal fistulae, intraabdominal infections, anastomotic leakage, and sepsis/infections.

Hypertonic saline (HTS) prevents and reverses resuscitation induced intestinal edema in rat models. HTS has also been shown to mitigate the systemic inflammatory response secondary to intestinal ischemia-reperfusion injury in rat models.

In the clinical setting, recent data suggests that replacing standard maintenance intravenous fluids (LR or NS @ 125-150 mL/hr) with HTS (3% NaCl @ 30 mL/hr) in patients undergoing damage control laparotomy for trauma limits intestinal edema, assists in diuresis, and results in early fascial closure.

On multiple logistic regression modeling, the usage of hypertonic saline perfectly predicted primary fascial closure by day 7. The use of hypertonic saline as maintenance intravenous fluids in the ICU after damage control laparotomy decreases the time to fascial closure and improves the percentage of patients being discharged with intact fascia.
**Indications:**

Patients who arrive to the SICU with an open abdomen after initial DCL.

**Contraindications:**

- Serum sodium >160 mEq/L

**Dosing:**

1. 3% Normal saline is infused at a rate of 30 cc/hr by central venous catheter.
2. This is the patient’s maintenance intravenous fluids and should not be titrated.
3. Resuscitation with crystalloid, colloid, or blood products should continue as dictated by the patient’s clinical picture.
4. HTS is discontinued as maintenance fluid replacement once the fascia is closed or 72 hours, whichever comes first.
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