

UAMS MEDICAL CENTER
TRAUMA and CRITICAL CARE SERVICES MANUAL

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

SUPERSEDES:11/15/16

PAGE: 1 of 4

RECOMMENDATION(S): Kyle Kalkwarf, MD

APPROVAL: 11/15/16

CONCURRENCE(S): Trauma Faculty

EFFECTIVE: 11/15/16

Last Review Date: 12/16/18

Purpose

To describe the use of 3% hypertonic saline in 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.¹⁻² Unfortunately, failure to achieve fascial closure after DCL carries a tremendous economic and morbidity burden and has multiple physiologic implications, including increased insensible losses, protein losses, and nutritional demands.³⁻⁶ The open abdomen also may result in incisional hernias, gastrointestinal fistulae, intraabdominal infections, anastomotic leakage, and intraabdominal infections.⁷⁻¹⁰

There are multiple reasons for failure to achieve early fascial closure within 7 days including intestinal and retroperitoneal edema. In rat models, hypertonic saline (HTS) has been demonstrated to prevent and reverse resuscitation-induced intestinal edema in rat models¹¹⁻¹³ as well as mitigate the systemic inflammatory response secondary to intestinal ischemia-reperfusion injury.¹⁴⁻¹⁶

Clinical data suggests that replacing standard maintenance intravenous fluids (crystalloid @ 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 and improves the percentage of patients being discharged with intact fascia.¹⁷ Furthermore, the use of HTS at this rate and duration did not result in an increased incidence of acute kidney injury nor a difference in urine output. There were no incidences of central pontine myelinolysis during this study, or subsequent patients, at the institution which initiated this protocol.

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Indications:

Patients who arrive to the SICU with an open abdomen after 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 to be provided as dictated by the patient's clinical picture.
4. HTS is discontinued as maintenance fluid replacement once the fascia is closed or 72 hours after initiation, whichever comes first.
5. If a patient is moderately hyponatremic (Na <129), sodium levels should be checked every 8 hours to ensure that correction does not occur faster than 0.5 mEq/L/hr (4 mEq/L over 8 hours)

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