

# Autotransfusion for Hemothorax Clinical Practice Guideline

## Purpose

The purpose of the autotransfusion (ATS) chest drainage system is to decrease the transfusion requirements in patients with hemothorax by transfusing autologous blood. ATS is initiated for patients with smaller volumes of blood loss who are hemodynamically stable. ATS may be used in conjunction with resuscitative transfusion for those patients in hemorrhagic shock but is not adequate to replace blood loss without additional blood products.

## Indications

Hemothorax with at least 300 ml of expected blood loss

## Contraindications

- Pulmonary infection
- Pericardial, mediastinal, or systemic infection
- Enteric contaminated thoraco-abdominal cavities
- Coagulopathy or DIC
- Presence of malignant neoplasm
- Intraoperative thoracic or mediastinal cavity use of topical thrombin, microfibrillar hemostatic agents, or providine-iodine gels or solutions

## Warnings/Precautions

- Collected autologous blood should not remain in the chest drain for more than 6 hours prior to ATS.
- All air must be removed from the blood filter and IV blood administration set prior to use.
- Rapid infusion of citrate anticoagulated blood may cause citrate toxicity and myocardial depression. Symptoms include tingling sensations around the mouth, stomach cramps, and dysrhythmia.
- ATS requires ICU level care and is never continued on the trauma floor.

## Procedure

1. The provider determines appropriateness for ATS and places the order.
2. The RN obtains the equipment and citrate, sets up the drainage system, and follows the provider's orders for autologous transfusion.
3. The rate for ATS is always set to 999ml/h on an IV pump.
4. The provider remains immediately available to oversee the ATS, provide additional orders as needed, and determine when operative intervention is indicated.
5. The RN documents the intake and output hourly and adjusts the ATS volume to infuse as ordered.
6. The RN adds additional citrate doses and places the lab orders for ionized calcium as ordered in the PowerPlan.
7. The RN will administer calcium gluconate per standing orders.
8. ATS is discontinued when the ATS volume is less than 300 ml/h x2 hours or at 6 hours whichever is first.

9. An attending order is required to continue ATS longer than 6 hours.
10. Once ATS is completed, the RN will change the chest drainage system to the standard Pleur-Evac system.

#### Order

- The provider will use the ATS PowerPlan
- The PowerPlan will include the following:
  - The volume of transfusion each hour, the default is the entire volume of output from the previous hour.
  - Citrate administration into the drainage system as follows: Add citrate 40 ml during set-up. Add an additional 20 ml once the total output reaches 450 ml. Then add an additional 20 ml of citrate for every 150 ml of output.
    - < 450 ml = 40 ml citrate
    - 450 - 599 = 60 ml citrate
    - 600 - 749 ml = 80 ml citrate
    - 750 - 899 ml = 100 ml citrate
    - 900 - 1049 ml = 120 ml citrate
    - 1050 - 1199 ml = 140 ml citrate
    - > 1200 - 160 ml citrate
  - Send an ionized calcium level once more than 40 ml of citrate is required (total output has been 600 ml).
  - Calcium gluconate
  - Repeat the ionized calcium level in 4 hours if ATS is still in use.
  - Discontinue ATS in 6 hours or when output is <300 ml/h x 2 hours.

#### Citrate

Citrate will be added to all autologous blood transfusions. The citrate will be dosed as above and given directly into the chest drainage system. If more than 40 ml of citrate is used, ionized calcium levels will be obtained. Calcium replacement will be provided based on ionized calcium levels as above. The RN will initiate the orders per the PowerPlan. The provider will ensure that the orders are followed.