



TECHNICAL MANUAL

Model 7940 ACD-A Anticoagulant Citrate Dextrose Solution A USP

CAUTION: Federal law requires that this product may not be dispensed without a prescription. Please read these instructions carefully.

PRODUCT DESCRIPTION

Anticoagulant Citrate Dextrose Solution A (ACD-A) is an anticoagulant specified for use with the Boehringer AUTOVAC® Autotransfusion System. It is a sterile and non-pyrogenic solution of citric acid ($C_6H_8O_7$) sodium citrate ($C_6H_5Na_3O_7 \cdot 2H_2O$), dextrose ($C_6H_{12}O_6 \cdot H_2O$), and water. Each 100 ml. contains:

- 0.73 g citric acid (anhydrous)
- 2.20 g sodium citrate (dihydrate)
- 2.45 g dextrose (monohydrate)
- Balance: water for injection to make 100 ml.

ACD-A acts as an anticoagulant by binding the free calcium in the blood. Calcium is a necessary component to several steps of the clotting cascade.

INDICATIONS FOR USE

Model 7940 ACD-A is indicated for use as an anticoagulant in the Boehringer AUTOVAC® Intraoperative Autotransfusion Systems and the Boehringer AUTOVAC® Postoperative Orthopedic Autotransfusion Systems.

CONTRAINDICATIONS FOR USE

Not for direct injection or infusion.

Infusion and storage of autologous blood products treated with ACD-A must be in accordance with AABB Standards and hospital Blood Bank policies.

Blood treated with ACD-A must not be infused through a central venous access device.

WARNINGS

- **Citrate Toxicity:** Rapid infusion of blood products anticoagulated with citrate may cause citrate toxicity and myocardial depression. Indications are perioral paresthesias, followed by stomach cramps and possible arrhythmia. Citrate toxicity may occur in cases where excess anticoagulant is present and rapid infusion is employed into central lines. This is a main reason for prohibiting infusion into a central line. Partial withdrawal of catheters has been shown to reduce this effect. It may be necessary to increase the supply of serum calcium by slowing the infusion or through the ingestion of an antacid pill. One antacid pill contains approximately 500 mg. calcium.
- Be sure to use sterile technique when injecting or aspirating the solution into the Boehringer AUTOVAC® canister.

DIRECTIONS FOR USE

CAUTION: For exact anticoagulant doses, reference the technical manual provided with each AUTOVAC® product.

In general, ACD-A is administered in ratiometric proportion. The recommended ratios range from 5:1 to 10:1 blood to ACD-A. These ratios would normally provide sufficient citrate and dextrose to store blood for 21 days. A number of factors make these ratios very conservative. In fact, 40 ml. of ACD-A is sufficient anticoagulant to chelate the calcium in 500 ml. of whole blood; however, the blood in the Boehringer AUTOVAC® procedures is stored for a period measured in hours (not 21 days). In some applications, the blood is reported to be defibrinogenated by prolonged contact with wound surface tissue (pleural drainage, orthopedic wound drainage) and becomes resistant to clotting. This natural defibrinogenation of the blood depends on many variables, including the length of the procedure, surgical site and rate of bleeding.

REFERENCES

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2. Cooper N, Brazier JR, Hottentott C: Myocardial Depression Following Citrated Blood Transfusion. Arch. Surg., Vol. 107, November 1973.
3. Raines J, Buth J, Brewster DC: Intraoperative Autotransfusion: Equipment, Protocols and Guidelines. The Journal of Trauma, Vol. 16 No. 8.
4. Noon GP, Solis RT, Natelson EA: A Simple Method of Intraoperative Autotransfusion. Gynecology and Obstetrics, Vol. 143, July 1976
5. Technical Manual of the American Association of Blood Banks, Ninth Edition, 1985.
6. Fleming AW: Intraoperative Salvage. Autologous Transfusion, Sandler SG, Silvergleid AJ, eds: American Association of Blood Banks, Arlington, Virginia, 1983, pp. 41-56.
7. US Pharmacopeia National Formulary, USP XXI, NF XVI, 1985.

PRODUCT SPECIFICATIONS

- Fluid Volume: 40 ml.
- Transport: 40°F to 104°F
- Storage: 60°F to 104°F
- Sterile, non-pyrogenic and non-toxic

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