

Albumin (Human) U.S.P.

Albutein® 5%

HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use Albutein 5% safely and effectively. See full prescribing information for Albutein 5% .

Albutein 5%
Albumin (Human) U.S.P.
5% solution
Initial U.S. Approval: 1978

RECENT MAJOR CHANGES

Indications and Usage, Plasma Exchange (1.4) 04/2012
Dosage and Administration, Hypovolemia, Cardiopulmonary Bypass, Hypoalbuminemia, Plasma Exchange (2.1) 04/2012
Warnings and Precautions, Hypersensitivity (5.1), **Hypervolemia/Hemodilution** (5.2), **Electrolyte Imbalance** (5.3), **Coagulation Abnormalities** (5.4), **Laboratory Monitoring** (5.5), **Application Precautions** (5.6) 04/2012

INDICATIONS AND USAGE

Albutein 5% is an albumin solution indicated for:

- Hypovolemia. (1.1)
- Cardiopulmonary bypass procedures. (1.2)
- Hypoalbuminemia. (1.3)
- Plasma exchange. (1.4)

DOSAGE AND ADMINISTRATION

For Intravenous Use Only

Dosage and infusion rate should be adjusted to the patient's individual requirements.

Indication	Dose
Hypovolemia	Adults: Initial dose of 20 g (including renal dialysis). For acute liver failure: initial dose of 12 to 25 g. (2.1)
Cardiopulmonary bypass procedures	Adults: Initial dose of 25 g. (2.1)
Hypoalbuminemia	Adults: 50 to 75 g For pre- and post-operative hypoproteinemia: 50 to 75 g. For burn therapy after the first 24 h: initial dose of 25 g and dose adjustment to maintain plasma protein concentration of 2.5 g per 100 mL. Third space protein loss due to infection: initial dose of 50 to 100 g. (2.1)
Plasma exchange	The dose required depends on the volume of plasma removed during the procedure.

Do not dilute with sterile water for injection as this may cause hemolysis in recipients. (5.6)

DOSAGE FORMS AND STRENGTHS

Albutein 5% is a solution containing 50 g per L of total protein of which at least 95% is human albumin.

CONTRAINDICATIONS

- Hypersensitivity to albumin preparations or to any of the excipients.
- Severe anemia or cardiac failure with normal or increased intravascular volume. (4)

WARNINGS AND PRECAUTIONS

- Suspicion of allergic or anaphylactic reactions requires immediate discontinuation of the injection and implementation of appropriate medical treatment. (5.1)
- Hypervolemia may occur if the dosage and rate of infusion are not adjusted to the patient's volume status. Use with caution in conditions where hypervolemia and its consequences or hemodilution could represent a special risk to the patient. (5.2)
- Monitor electrolytes, coagulation and hematology parameters, and hemodynamic status when albumin is given. (5.3, 5.4, 5.5)
- Do not dilute with sterile water for injection. (5.6)
- This product is made from human plasma and may contain infectious agents, e.g., viruses and, theoretically, the Creutzfeldt-Jakob disease agent. (5.7)

ADVERSE REACTIONS

The most common adverse reactions are anaphylactoid type reactions. (6)

To report SUSPECTED ADVERSE REACTIONS, contact Grifols Biologicals Inc. at 1-888-GRIFOLS (1-888-474-3657) or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

USE IN SPECIFIC POPULATIONS

- Pregnancy: No human or animal data. Use only if clearly needed. (8.1)

See 17 for PATIENT COUNSELING INFORMATION.

Revised: 04/2012

FULL PRESCRIBING INFORMATION: CONTENTS*

1 INDICATIONS AND USAGE

- 1.1 Hypovolemia
- 1.2 Cardiopulmonary Bypass Procedures (Treatment Adjunct)
- 1.3 Hypoalbuminemia
- 1.4 Plasma Exchange

2 DOSAGE AND ADMINISTRATION

- 2.1 Dosage
- 2.2 Administration

3 DOSAGE FORMS AND STRENGTHS

4 CONTRAINDICATIONS

5 WARNINGS AND PRECAUTIONS

- 5.1 Hypersensitivity
- 5.2 Hypervolemia/Hemodilution
- 5.3 Electrolyte Imbalance
- 5.4 Coagulation Abnormalities
- 5.5 Laboratory Monitoring
- 5.6 Application Precautions
- 5.7 Transmissible Infectious Agents

6 ADVERSE REACTIONS

- 6.1 Clinical Trials Experience
- 6.2 Post-Marketing Experience

7 DRUG INTERACTIONS

8 USE IN SPECIFIC POPULATIONS

- 8.1 Pregnancy
- 8.2 Labor and Delivery
- 8.3 Nursing Mothers
- 8.4 Pediatric Use
- 8.5 Geriatric Use

11 DESCRIPTION

12 CLINICAL PHARMACOLOGY

- 12.1 Mechanism of Action
- 12.3 Pharmacokinetics

15 REFERENCES

16 HOW SUPPLIED/STORAGE AND HANDLING

17 PATIENT COUNSELING INFORMATION

* Sections or subsections omitted from the full prescribing information are not listed.

FULL PRESCRIBING INFORMATION

1 INDICATIONS AND USAGE

1.1 Hypovolemia

For restoration and maintenance of circulating blood volume where hypovolemia is demonstrated and colloid use is appropriate. When hypovolemia is long standing and hypoalbuminemia exists accompanied by adequate hydration or edema, 20-25% albumin solutions should be used.^{1,2,3}

Acute liver failure is a special situation in which both hypovolemia and hypoalbuminemia can be present. Albutein 5% can be used in such cases.¹

Albutein 5% may be of value in the treatment of shock or hypotension in renal dialysis patients.¹

1.2 Cardiopulmonary Bypass Procedures (Treatment Adjunct)

Preoperative dilution of blood using albumin and crystalloid can be used in cardiopulmonary bypass procedures. Albumin also may be used in the priming fluid.^{4,5,6}

1.3 Hypoalbuminemia

Albutein 5% may be indicated for subjects with hypoalbuminemia who are critically ill and/or actively bleeding. When albumin deficit is the result of excessive protein loss, the effect of Albutein 5% administration will be temporary unless the underlying disorder is reversed.^{7,8,9}

Septic patients and patients undergoing major surgery may lose more than half of their circulating plasma volume.^{1,10} Treatment with Albutein 5% may be of value in such cases, especially when plasma colloid oncotic pressure is abnormally low.¹ In the first 24 hours after thermal injury, large volumes of crystalloids are infused to restore the depleted extracellular fluid volume. Beyond 24 hours, Albutein 5% can be used to maintain plasma colloid osmotic pressure.^{2,11,12} Protein loss from the third space due to infection (acute peritonitis, pancreatitis, mediastinitis or extensive cellulitis) may require treatment with an infusion of albumin.^{13,14}

1.4 Plasma Exchange

Albutein 5% may be used as a replacement fluid during therapeutic Plasma Exchange treatments.¹⁵

2 DOSAGE AND ADMINISTRATION

For Intravenous Use Only

2.1 Dosage

Adjust the concentration, dosage and infusion rate of the albumin preparation to the patient's individual requirements.

The dose required depends on the patient's body weight, severity of injury/illness and on continuing fluid and protein losses. Use adequacy of circulating blood volume, not plasma albumin levels, to determine the dose required.

Indication	Dose
Hypovolemia	Adults: Initial dose of 20 g. If hemodynamic stability is not achieved within 15 to 30 minutes, an additional dose may be given. Hemodilution may follow administration of Albutein 5%. Anemia resulting from hemorrhage should be corrected by administration of compatible red blood cells or compatible whole blood. For acute liver failure: initial dose of 12 to 25 g. An infusion rate of 1-2 mL per minute is usually indicated. For renal dialysis, the initial dose should not exceed 20 g and patients should be carefully observed for signs of fluid overload.
Cardiopulmonary bypass procedures	Adults: Initial dose of 25 g. Additional amounts may be administered as clinically indicated.
Hypoalbuminemia	Adults: 50 to 75 g For pre- and post-operative hypoproteinemia: 50 to 75 g. In burns, therapy usually starts with administration of large volumes of crystalloid solution to maintain plasma volume. After 24 hours: initial dose of 25 g and dose adjustment to maintain plasma protein concentration of 2.5 g per 100 mL or a serum protein concentration of 5.2 g per 100 mL. Third space protein loss due to infection: initial dose of 50 to 100 g. An infusion rate of 1-2 mL per minute is usually indicated in the absence of shock. Treatment should always be guided by hemodynamic response.
Plasma exchange	The dosage and infusion rate of Albutein 5% infused should be titrated to the volume of plasma removed during the procedure.

2.2 Administration

Intravenous use only

- Albutein 5% is a clear and slightly viscous solution. Visually inspect parenteral drug products for particulate matter and discoloration prior to administration, whenever solution and container permit. Do not use if the solution is turbid or if there is sediment in the bottle.
- Do not freeze.
- Warm product to room temperature before use if large volumes are administered.
- Albutein 5% contains no preservatives. Do not begin administration more than 4 hours after the container has been entered. Discard unused portion.
- Do not dilute with sterile water for injection [see *Warnings and Precautions* (5.6)].
- Adjust the infusion rate to the individual circumstances and the indication. In plasma exchange, adjust the infusion rate to the rate of plasma removal.

3 DOSAGE FORMS AND STRENGTHS

Albutein 5% is a solution containing 50 g per L of total protein of which at least 95% is human albumin.

4 CONTRAINDICATIONS

- Hypersensitivity to albumin preparations or to any of the excipients.
- Severe anemia or cardiac failure with normal or increased intravascular volume.

5 WARNINGS AND PRECAUTIONS

5.1 Hypersensitivity

Suspicion of allergic or anaphylactic reactions requires immediate discontinuation of the infusion and implementation of appropriate medical treatment.

5.2 Hypervolemia/Hemodilution

Hypervolemia may occur if the dosage and rate of infusion are not adjusted to the patient's volume status. At the first clinical signs of fluid overload (headache, dyspnea, jugular venous distention, increased blood pressure), the infusion must be slowed or stopped immediately.

Use albumin with caution in conditions where hypervolemia and its consequences or hemodilution could represent a special risk to the patient. Examples of such conditions are:

- Decompensated heart failure
- Hypertension
- Esophageal varices
- Pulmonary edema
- Hemorrhagic diathesis
- Severe anemia
- Renal and post-renal anuria

5.3 Electrolyte Imbalance

Monitor regularly the electrolyte status of the patient and take appropriate steps to restore or maintain the electrolyte balance when albumin is administered.

5.4 Coagulation Abnormalities

Regular monitoring of coagulation and hematology parameters is necessary if comparatively large volumes are to be replaced. Care must be taken to ensure adequate substitution of other blood constituents (coagulation factors, electrolytes, platelets, and erythrocytes).

5.5 Laboratory Monitoring

Monitor regularly hemodynamic parameters during administration of Albutein 5%; this may include:

- Arterial blood pressure and pulse rate
- Central venous pressure
- Pulmonary artery occlusion pressure
- Urine output
- Electrolytes
- Hematocrit/hemoglobin

5.6 Application Precautions

Albutein 5% must not be diluted with sterile water for injection as this may cause hemolysis in recipients [see *Dosage and Administration* (2.2)].

5.7 Transmissible Infectious Agents

Albumin is a derivative of human blood. Based on effective donor screening and product manufacturing processes, it carries an extremely remote risk for transmission of viral diseases. A theoretical risk for transmission of Creutzfeldt-Jakob disease (CJD) is also considered extremely remote. No cases of transmission of viral diseases or CJD have been identified for Albutein 5%.

6 ADVERSE REACTIONS

The most serious adverse reactions are anaphylactic shock, heart failure and pulmonary edema. The most common adverse reactions are anaphylactoid type reactions.

Adverse reactions to Albutein 5% normally resolve when the infusion rate is slowed or the infusion is stopped. In case of severe reactions, the infusion is stopped and appropriate treatment initiated.

6.1 Clinical Trials Experience

No clinical studies were done using Albutein 5%.

6.2 Post-Marketing Experience

Because adverse reactions are reported voluntarily post-approval from a population of uncertain size, it is not always possible to reliably estimate their frequency or to establish a causal relationship to product exposure. The following adverse reactions have been identified during post approval use of human albumin, including Albutein (all strengths) in decreasing order of significance:

- Anaphylactic shock
- Heart failure
- Pulmonary edema
- Hypotension
- Tachycardia
- Vomiting
- Urticaria
- Rash
- Headache
- Chills
- Fever
- Flushing
- Nausea

7 DRUG INTERACTIONS

Albutein 5% must not be mixed with other medicinal products.

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Pregnancy Category C. Animal reproduction studies have not been conducted with Albutein 5%. It is also not known whether Albutein 5% can cause fetal harm when administered to a pregnant woman or can affect reproductive capacity. Albutein 5% should be given to a pregnant woman only if clearly needed.

8.2 Labor and Delivery

No human or animal data. Use only if clearly needed.

8.3 Nursing Mothers

No human or animal data. Use only if clearly needed.

8.4 Pediatric Use

No human or animal data. Use only if clearly needed.

8.5 Geriatric Use

No human or animal data. Use only if clearly needed.

11 DESCRIPTION

Albutein 5% is a sterile, aqueous solution for single dose intravenous administration containing 5% human albumin (weight/volume). Albutein 5% is prepared by a cold alcohol fractionation method from pooled human plasma obtained from venous blood. The product is stabilized with 0.08 millimole sodium caprylate and 0.08 millimole sodium acetyltryptophanate per gram of protein. Albutein 5% is osmotically and isotonicity equivalent to an equal volume of normal human plasma.

A liter of Albutein 5% solution contains 130-160 milliequivalents of sodium ion. The aluminum content of the solution is not more than 200 micrograms per liter during the shelf life of the product. The product contains no preservatives.

Albutein 5% is manufactured from Source Plasma collected from FDA approved plasmapheresis centers in the United States.

Albutein 5% is heated at 60 °C for ten hours against the possibility of transmitting viruses.

12 CLINICAL PHARMACOLOGY

12.1 Mechanism of Action

Human Albumin accounts for more than half of the total protein in the plasma and represents about 10% of protein synthesis activity by the liver.

Human Albumin 5% is almost isoosmotic to normal plasma.

The primary physiological function of albumin results from its contribution to plasma colloid oncotic pressure and transport function. Albumin stabilizes circulating blood volume and is a carrier of hormones, enzymes, medicinal products and toxins. Other physiological functions include antioxidant properties, free radical scavenging and capillary membrane integrity.

12.3 Pharmacokinetics

Albumin is distributed throughout the extracellular space and more than 60% of the body albumin pool is located in the extravascular fluid compartment. Albumin has a circulating life span of 15-20 days, with a turnover of approximately 15 g per day.

The balance between synthesis and breakdown is normally achieved by feedback regulation.

Elimination is predominantly intracellular and due to lysosome proteases.

In healthy subjects, less than 10% of infused albumin leaves the intravascular compartment during the first 2 hours following infusion. There is considerable individual variation in the effect of albumin on plasma volume. In some patients, plasma volume can remain elevated for several hours. In critically ill patients, however, albumin can leak out of the vascular space in substantial amounts at an unpredictable rate.

15 REFERENCES

- Tullis JL. Albumin: 1. Background and Use. 2. Guidelines for Clinical Use. *JAMA*. 1977;237:355-360, 460-463.
- Vermeulen LC, et al. A Paradigm for Consensus. *Arch Intern Med*. 1995;155:373-379.
- SAFE Study investigators. A comparison of albumin and saline for fluid resuscitation in the intensive care unit. *N Engl J Med*. 2004;350:2247-2256.
- Sedrakyan A, Gondek K, Paltiel D, et al. Volume expansion with albumin decreases mortality after coronary artery bypass graft surgery. *Chest*. 2003;123:1853-1857.
- Russell JA, Navickis RJ, Wilkes MM. Albumin versus crystalloid for pump priming in cardiac surgery: meta-analysis of controlled trials. *J Cardiothorac Vasc Anesth*. 2004;18:429-37.
- American Thoracic Society. Evidence-based colloid use in the critically ill: American Thoracic Society consensus statement. *Am J Respir Crit Care Med*. 2004;170:1247-59.
- Mendez CM, McClain CJ, Marsano LS. Albumin Therapy in Clinical Practice. *Nutrition in Clinical Practice*. 2005;20:314-320.
- Haynes GR, Navickis RJ, Wilkes MM. Albumin administration-what is the evidence of clinical benefit? A systematic review of randomized controlled trials. *Eur J Anaesthesiol*. 2003 Oct;20(10):771-93.
- Vincent JL, Navickis RJ, Wilkes MM. Morbidity in hospitalized patients receiving human albumin: a meta-analysis of randomized, controlled trials. *Crit Care Med*. 2004;32:2029-38.
- Skillman JJ, Tanenbaum BJ. Current Topics in Surgical Research. Vol. 2. New York: Academic Press. 1970:523.
- Muir IA, Barclay TL. Burns and their treatment. Chicago: Year Book Medical Publishers. 1974.
- Pruitt BA Jr, Goodwin CW Jr. Current treatment of the extensively burned patient. *Surg Annu*. 1983;15:331-64.

13. Clowes GHA Jr, Vucinic M, Weidner MG. Circulatory and metabolic alterations associated with survival or death in peritonitis: clinical analysis of 25 cases. *Ann Surg.* 1966;166:866-85.
14. Sort P, Navasa M, Arroyo V, et al. Effect of intravenous albumin on renal impairment and mortality in patients with cirrhosis and spontaneous bacterial peritonitis. *N Engl J Med.* 1999;341:403-409.
15. Szczepiorkowski ZM, Bandarenko N, Kim HC, et al. Guidelines on the use of therapeutic apheresis in clinical practice-evidence-based approach from the Apheresis applications committee of the American Society for Apheresis. *J Clin Apheresis.* 2007. 22:106-175.

16 HOW SUPPLIED/STORAGE AND HANDLING

Albutein 5% is supplied in single-use, individually laser etched vials.

The following vial sizes of Albutein 5% are available:

NDC Number	Fill Size	Grams Protein
68516-5214-1	250 mL	12.5 g
68516-5214-2	500 mL	25.0 g

Each vial has an integral suspension band and a label with a peel-off strip showing the product name and lot number.

Albutein 5% is stable for three years provided the storage temperature does not exceed 30 °C. Protect from freezing.

17 PATIENT COUNSELING INFORMATION

This product is usually given in a hospital setting.

Inform patients being treated with Albutein 5% about the risks and benefits of its use [see *Adverse Reactions (6)*].

Inform patients to immediately report the following signs and symptoms to their physician:

- Allergic or anaphylactic type reactions [see *Warnings and Precautions (5.1)*].
- Cardiovascular overload (e.g., headache, dyspnea and jugular venous distention) [see *Warnings and Precautions (5.2)*].
- Increased blood pressure, raised venous pressure and pulmonary edema [see *Warnings and Precautions (5.2)*].

Inform patients that Albutein 5% is a derivative of human plasma and may contain infectious agents that cause disease (e.g., viruses, and theoretically, the CJD agent). Inform patients that the risk that Albutein 5% may transmit an infectious agent has been reduced by screening plasma donors for prior exposure to certain viruses, by testing the donated plasma for certain viral agents and by the inactivation and/or removal of certain viruses during the manufacturing process [see *Warnings and Precautions (5.7)*].

Manufactured by:

Grifols Biologicals Inc.

5555 Valley Boulevard

Los Angeles, CA 90032, U.S.A.

U. S. License No. 1694