**Lumason (sulfur hexafluoride Type A microspheres) for injection in suspension, for intravenous use or intravesical use**

**HIGHLIGHTS OF PRESCRIBING INFORMATION**

**INDICATIONS AND USAGE**

Lumason (sulfur hexafluoride Type A microspheres) for injection in suspension, for intravenous use or intravesical use is a homogeneous, milky white suspension containing 1.5 to 5.6 x 10^8 microspheres/mL. The microspheres are micron-sized sulfur hexafluoride microbubbles that opacify the left and right ventricles and ventricular cavities during ultrasonography. The recommended single dose for adult patients is 2.4 mL and for pediatric patients is 0.03 mL per kg. The injection should be given intravenously, as directed in the Administration Instructions. The recommended dose for intravesical use is 0.03 mL per kg and a maximum of 1 mL per injection. The recommended dose for echocardiography is 2.4 mL. The suspension contains preserved (but not sterilized) sodium chloride injection. The injection is for single use only. The suspension is not pyrogenic. The suspension is for injectable suspension, for intravenous use or intravesical use.

**CONTRAINDICATIONS**

WARNINGS AND PRECAUTIONS

**REASONS**

The reported reactions that may follow the administration of ultrasound contrast agents include: fatal cardiac or cardiopulmonary reactions, life-threatening and serious cardiopulmonary reactions (including shock, cardiac arrest, cardiac decompensation, hypotension, tachypnea, dyspnea, and other respiratory symptoms), angioedema, anaphylaxis, and other serious allergic reactions, febrile reactions, intravascular catheter related reactions, nonserious allergic reactions, and other serious reactions, including fatalities, have occurred.

**SERIOUS CARDIOPULMONARY REACTIONS**

Serious cardiopulmonary reactions, including fatalities, have occurred uncommonly during or following the injection of ultrasound contrast agents. Severe or life-threatening reactions may occur in patients who have no history of prior reagibility or exposure to ultrasound contrast agents. These reactions may include cardiac arrhythmias, hypotension, tachycardia, dyspnea, flushing, pruritus, angioedema, and anaphylaxis.

**VENTRICULAR ARRHYTHMIA RELATED TO HIGH MECHANICAL INDEX**

High ultrasound mechanical index values may cause microsphere cavitation or rupture and lead to ventricular tachycardia, ventricular fibrillation, and ventricular tachycardia. Additionally, end-systolic triggering with high mechanical indices has been reported to cause ventricular arrhythmias. The risk of ventricular tachycardia, ventricular fibrillation, or other ventricular arrhythmias may be increased in patients with history of ventricular arrhythmias, ventricular function deficiencies or when used concomitantly with certain anti-arrhythmic medications. The risk of ventricular tachycardia, ventricular fibrillation, or other ventricular arrhythmias may be increased when used to opacify the left ventricle or ventricular cavity in patients with a mechanical index (MI) > 0.5 or > 0.75. The risk of ventricular tachycardia, ventricular fibrillation, or other ventricular arrhythmias may be increased when used to opacify the left ventricle or ventricular cavity in patients with congestive heart failure or a history of ventricular arrhythmia.

**DOSE/FORM INSTRUCTIONS**

The recommended dose of Lumason after reconstitution in pediatric patients is 0.03 mL per kg administered as an intravenous injection, up to a maximum of 2.4 mL, as directed in the Administration Instructions. The recommended single dose of Lumason after reconstitution in adult patients is 2.4 mL administered as an intravenous injection, as directed in the Administration Instructions. The recommended dose for intravesical use is 0.03 mL per kg administered as a single injection, as directed in the Administration Instructions. The recommended dose for echocardiography is 2.4 mL administered as an intravenous injection, as directed in the Administration Instructions. The suspension contains preserved (but not sterilized) sodium chloride injection. The injection is for single use only. The suspension is not pyrogenic. The suspension is for injectable suspension, for intravenous use or intravesical use.

**ADVERSE REACTIONS**

The most common adverse reactions observed in clinical studies included: headache, nausea, flushing, throat tightness, dyspnea, urticaria, pruritus, rash, urticaria, and skin erythema. Other serious reactions, including fatalities, have occurred.

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sn-1,2-Distearoyl-glycero-3-phosphocholine (DSPC), with empirical formula C_{44}H_{88}NO_{8}P, has a molecular weight of 806.19 Da. Upon reconstitution with 5mL diluent, Lumason is a milky white, homogeneous suspension containing sulfur granules, with a mean diameter of 3.5 μm. The ratio of the total lipids in the suspension are associated with the microspheres.

In a study of healthy subjects, the mean values for the apparent steady-state volume of distribution of SF₆ following intravenous bolus injections of 0.03 mL/kg and 0.3 mL/kg of Lumason, corresponding to approximately 1 and 3 mL/kg of SF₆, respectively, were determined. The pharmacokinetic of the SF₆ gas component of Lumason was evaluated in 12 healthy adult subjects. After reconstitution, Lumason was injected intravenously as a bolus at a rate of 3 mL/kg, followed by a flush of 2 mL/kg.

The mean apparent steady-state volume of distribution of SF₆ was 28.5 ± 6.4 mL/kg for the 0.03 mL/kg dose and 91.8 ± 10.2 mL/kg for the 0.3 mL/kg dose. The volume of distribution of SF₆ increased with dose, indicating a dose-proportional increase in the amount of SF₆ present in the body. The volume of distribution was found to be dependent on the dose and body weight of the subject.

In rats, the pharmacokinetics of SF₆ in the lung were determined following intravenous administration of 3 mL/kg of Lumason. The mean apparent steady-state volume of distribution of SF₆ was 24.5 ± 4.8 mL/kg for the 0.03 mL/kg dose and 74.6 ± 8.1 mL/kg for the 0.3 mL/kg dose. The volume of distribution was found to be dependent on the dose and body weight of the subject.

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