



A Union of Professionals

Health and Safety Program

RIBAVIRIN

Nurses and other healthcare providers who care for patients who are receiving ribavirin therapy should take special precautions to reduce their exposure to this aerosolized drug. There have been reports of miscarriage clusters among pediatric nurses who administered this drug. Several exposed nurses and respiratory therapists also have complained of chronic eye and skin irritation, and difficulty breathing.

As the drug increases in use, rising concern among healthcare workers and their unions has sparked some investigation of ribavirin exposure.

Unfortunately, researchers have produced only limited information on the hazards of exposure. Studies have measured airborne exposure concentrations but have not looked at the incidence of adverse health effects among exposed workers. Until we have a more comprehensive picture, healthcare employers should take a guarded and conservative approach to minimize exposure for nurses and other providers.

What is Ribavirin?

Ribavirin is a broad spectrum antiviral agent approved in 1986 by the U.S. Food and Drug Administration for the treatment of respiratory syncytial virus (RSV). Clinical trials have shown that ribavirin aerosol is an effective treatment for RSV infections in hospitalized infants. Use of this drug increases significantly in the winter when RSV cases become more prevalent.

How Do Healthcare Workers Become Exposed?

Typically, ribavirin is administered to the patient using a small-particle aerosol generator. Respiratory therapists are exposed when setting up the system (transferring the liquid ribavirin to the unit, turning on and calibrating the unit, and dismantling the unit). Therapists are also exposed when administering other drugs via mist-masks to patients who are receiving the drug.

Patients are generally treated with ribavirin for four to five days for approximately 20 hours a day. Nurses who care for these patients appear to have the most potential for exposure. During ribavirin administration by oxygen tent, head hood or mist-mask, the excess drug is exhausted directly into the room. When the drug is delivered through a ventilator, the excess aerosol can be filtered to limit the release of ribavirin.

Investigators for the California Department of Health Services' Occupational Health Surveillance and Evaluation Program characterized the exposure of nurses and respiratory therapists by collecting personal and general air samples. They also collected blood and urine samples before, during and after exposure. Although they found no ribavirin in urine samples, they found concentrated amounts in the red blood cells of one nurse. The highest airborne exposures occurred when an oxygen tent was used; the lowest exposures were found in nurses caring for ventilated patients. These investigators concluded that the dose absorbed by nurses during oxygen tent administration exceeded by a hundred times the dose that is teratogenic for hamsters, and therefore exposure might exceed established safety factors.

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A similar study by the National Institute for Occupational Safety and Health of 15 nurses and four respiratory therapists in a Cincinnati, Ohio, hospital found ribavirin present in all 41 air samples collected. Nurses were exposed to higher ribavirin air levels than respiratory therapists over the course of an eight-hour work shift. Nurses treating patients receiving the drug via tracheotomy tube had the highest exposure.

What Are the Potential Health Effects of Exposure?

At this time, there have been no studies of the health effects associated with ribavirin exposure. We only have the anecdotal reports of nurses and animal data.

The animal data are quite clear on reproductive hazards--studies have shown that ribavirin is teratogenic (causes birth defects) in multiple animal species. Malformations of the skull, central nervous system, palate, eye and gastrointestinal tract have been detected. Testicular atrophy was found in male rats. Most researchers agree that ribavirin may pose a serious reproductive hazard to both male and female healthcare providers.

What Should You and Your Local Do?

All workers should be protected from exposure to this drug. There is simply not enough documentation to assure workers that the drug is non-toxic. Women who are pregnant or anticipating pregnancy should not be involved in the care of patients receiving ribavirin. Likewise, men who plan to father a child in the immediate future should have alternate job assignments.

A comprehensive policy is needed in every facility where the drug is administered. Your local should be involved in the development and implementation of that policy. Among other things, it should provide:

- Training and education of all healthcare workers who may come in contact with the drug.
- Transfers for pregnant healthcare workers and reassignment for any provider actively attempting a pregnancy.
- Engineering controls or scavenging devices to vent aerosol crystals (ICN Corporation is developing such a device for use with head hoods).
- Personal protective equipment (respirators) when engineering controls are not available.
- Notification of healthcare workers and visitors that the drug is being administered.
- Selection of delivery methods that minimize healthcare worker exposure.
- A sample policy is provided below, and can be used by your local in negotiating a policy with management.

For more information, the AFT Healthcare Occupational Safety and Health Program at 202/393-5674.

Ribavirin Protection Policies of a Major Teaching Hospital

I. General Guidelines

1. Patients receiving ribavirin are to be placed individually in single rooms or housed in common rooms. The door is to remain closed, with precautions clearly posted outside.
2. No pregnant woman is to enter the room.
3. No male or female who is actively trying to conceive within the next six weeks is to enter the room.
4. All other individuals may enter the room, including lactating women (the reproductive risk posed by ribavirin is limited to effects on the fetus).
5. Respiratory protection (non-powered air purifying respirator with a HEPA cartridge) shall be available for healthcare workers exposed for more than 15 minutes at any time.
6. Medical clearance for respirator use must be obtained prior to fit-testing of respirator.
7. Gowns and gloves are to be worn by all individuals having contact with the ribavirin crystals; hand washing is recommended after the gloves are removed.
8. Individuals with asthma and/or other pulmonary conditions have experienced episodes of respiratory difficulty after exposure to ribavirin; therefore, healthcare workers with a history of respiratory disease should be provided an alternate assignment.
9. Soft contact lenses should be removed before entering the room to prevent damage to the eyes or the lenses.

II. Ventilated Patients

1. Ribavirin will be delivered via a filtered recirculating system that limits dispersion of ribavirin crystals into the general environment.
2. Ventilator tubing is to remain capped during patient suction to provide an intact system.

III. Non-Ventilated Patients

The amount of ribavirin crystals dispersed into the general environment depends on the particular method of delivery. The method chosen should expose the smallest surface area possible to potential contamination while allowing for the optimal delivery of nursing care, patient treatment and patient comfort. The following additional precautions apply to all non-ventilated patients, as ribavirin crystals may be deposited on room surfaces:

1. Only the necessary amount of supplies are to be taken into the treatment room, and these are to be stored as far as possible from the bedside to decrease the amount of ribavirin crystals on equipment surfaces. These guidelines shall also apply to the patient's belongings.
2. All equipment is to be thoroughly cleaned before being taken out of the room. Any cleaning solution is usually adequate because ribavirin is water-soluble.
3. Environmental Services is to ensure that items used to clean the room are disposed of or thoroughly rinsed of ribavirin before used in another area. It is recommended that rooms where ribavirin is used be cleaned last.
4. Meals are to be delivered only on disposable isolation trays.
5. Trash is to be double-bagged.
6. Linen is to be handled with a minimum of shaking to limit further dispersal of ribavirin crystals. The linen bag is to be clearly marked "Ribavirin" before being sent to the laundry, to alert laundry staff that special handling is required.