A Preliminary Report on the Spray Application of Topical Silver Sulfadiazine to Burn Wounds

ARLEN D. DENNY, M.D., JOHN A. TWOMEY, M.D., AND CLAUDE R. HITCHCOCK, M.D., PH.D.

A simple, flexible system for spray application of topical antimicrobials has been developed in the Burn Unit at Hennepin County Medical Center. In contrast to previous attempts, this method allows spray application of silver sulfadiazine without dilution. Because of the viscosity of the micronized cream, aerosol spread is minimal. Inexpensive commercially available components are used without modification. This system can be readily adapted to most hospital situations and provides rapid topical antimicrobial application. Time required for dressing changes has been reduced in our Burn Unit by 75% and fewer nursing personnel are required. Spray application avoids direct physical contact with burn wounds, eliminating potential contamination and greatly reducing pain associated with dressing changes. Patient acceptance is high.

Application of topical antimicrobials to the burn wound has increased control of burn wound sepsis (2). The present method of applying fine mesh gauze strips impregnated with silver sulfadiazine to the burn wound is time consuming, often painful, and represents a potential mechanism for spread of contamination from one burn wound area to another. A system for spray application of topical antimicrobials could be useful and efficient.

Currently we are testing such a device developed in the Burn Unit at the Hennepin County Medical Center. Previous attempts at spray application of silver sulfadiazine required dilution of the product to a degree which rendered it ineffective against bacteria (1). By using commercially available equipment without modification, we have been able to spray silver sulfadiazine in micronized cream form directly onto the burn wounds. No alteration of the commercial silver sulfadiazine has been necessary.

MATERIALS AND METHODS

Silver sulfadiazine (Silvadene, Marion) is used as supplied by Marion Laboratories. The spray system consists of four mechanical components: a Devilbiss CGA #501 spray gun, 100 gauge (Devilbiss, Elmhurst, IL), with nozzle #Z-46FF, an adjustable air pressure regulator (#27767A, Dayton Elect. Manufacturing Co., Chicago, IL) and a length of ¼ inch flexible rubber air hose with wall fitting (Model 33A, Ohio Medical Products, Madison, WI), and pop-off connector, ¼” inside diameter (Dayton Elect. Manufacturing Co.) (Fig. 1). If central compressed air is not available, portable air tanks or a small compressor capable of delivering 30 pounds per square inch pressure at 3 cubic feet per minute can be used.

Procedure. After connecting the air line to pressurized air source, the pressure regulator is adjusted to 30 pounds. Using sterile technique, the product container is filled with topical antimicrobial. Container pressure is adjusted to maximum by the thumb screw on the container. Delivery rate is controlled by adjusting the screw on the handle. The air line is connected and spraying of the burn wound commences. Care is taken to point the discharge nozzle away from the patient’s face.

At a distance of 4 to 6 inches from the burn wound, several passes with the sprayer allow coverage of the wound with a thickness of 2 to 3 mm of silver sulfadiazine and minimize overspray to the surroundings (Fig. 2). Because of the viscosity of the agent, aerosol spread is minimal. The time required to cover an entire back or chest and abdomen is about 1 minute of spraying. Absorbent dressings are then placed onto the coated burn wound and held in place with flexible netting. No direct contact with the wounds is necessary. Alternatively, this method is ideal for open wound treatment.

DISCUSSION

There are several significant advantages to using this method. Spray application of topical agents promotes rapid dressing changes. Our previous method of impregnated gauze application often required 2 hours for a major burn dressing. The spray method has allowed a 75% reduction in time required. Fewer nurses are needed for a dressing change and therefore are available for other essential duties. Decreased time for dressing changes reduces metabolic demands on the patient from uncontrolled heat loss during open exposure.

Spray application of topical antimicrobials eliminates the physical contact with the open wound inherent to the
application of impregnated gauze. This precludes the potential for contamination and spread of infection from one area to another.

Since the sprayer has no patient contact, multiple patients can be rapidly dressed using the same sprayer without cross-contamination. The sprayer is cleaned and cultured on a regular basis. All cultures to date have been negative. If positive cultures are obtained the spray unit can be readily gas autoclaved.

Patient acceptance of this method is high. Rapid dressing changes without wound contact necessitated by impregnated gauze application are much less painful. Our two initial patients had impregnated gauze dressings applied several times before the spray equipment was available. After each patient had experienced the spray application method they requested it for all future dressing changes. Reasons cited were the decreased pain and time involved. This level of acceptance has remained unchanged through our experience with 10 patients and over 200 spray applications.

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REFERENCES