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Featured Article

Blazing the Way: Developing and Implementing a Burn Simulation

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Approximately 40,000 burn victims require hospitalization at more than 5,000 hospitals in the United States each year (Carter, Neff, & Holmes, 2010). According to the American Burn Association (ABA), there are only 125 burn facilities in the United States; most burn patients are being evaluated and treated at hospitals where staff may not be trained to care for this type of patient. There is a need to train health care providers at facilities without burn centers to care for these patients, who require specialized care. The ABA has set criteria for determining when patients need to be transferred to a facility with a burn center. To date, there are no set criteria for caring for these patients prior to transfer to a burn center or for providing preliminary care for those who do not meet transfer criteria. There may be differences of opinion over which resuscitation formula to use, when to change fluid types, what type of dressings to use, and other specifics of care for burn patients. Fortunately, there is no argument that this type of patient requires rapid assessment and treatment.

Early management is essential to reduce patient mortality and morbidity (Williams, 2009). The management of the burn patient at a facility that has a low frequency of this type of injury may not provide the patient with the care needed to maximize long-term outcomes. Nurses and physicians not routinely exposed to low-volume, high-risk burn patients can easily become overwhelmed with the care of a complex burn patient. It is essential that these burn patients receive initial care that will not harm them or hinder the care they may require at a burn center.

Proper burn care, including assessment by referring-hospital providers, can have a profound impact on burn patients' outcomes (Freilburg, Igneri, Sartorelli, & Rogers, 2007). Airway, breathing, and circulation must be addressed immediately in the burn patient because of the possibility of swelling in the airway or extremities. Intravenous access is also an immediate concern because of the large volume of fluid that the patient may need to receive. Immediate care involves accurate assessment of burn depth and appropriate fluid management (Williams, 2009).

Effective fluid resuscitation is one of the cornerstones of modern burn care and perhaps the advance that has most directly improved patient survival (Latenser, 2009). Determining the proper amount of fluid is accomplished with a formula based on the percentage of burn injury and the weight of the patient. The *Parkland formula* is one of most popular guidelines used in the medical arena. It states that 4 mL lactated Ringer's solution per kilogram of body weight per percentage of burn area should be infused during the first 24 hours after burn injury (Latenser, 2009). The *rule of nines* is an easy and effective way of estimating the size of the burn by dividing the body into 11 sections (each 9%) and the genitals (1%). The knowledge necessary to identify the degree of the burn injury is required to determine appropriate fluid resuscitation (Johnson & Richard, 2003).

Very little research was found on using burn simulations. Breederveld, Nieuwenhuis, Tuinebreijer, and Aardenburg (2011) developed an Web-based questionnaire that includes a simulated burn incident in which nurses, ambulance workers, and physicians participated. However, this simulation did not involve any hands-on experience. This article describes the use of a simulated burn patient to educate staff about essential assessment skills and treatment required for the patient. The purpose of developing this simulation was to educate staff members who may not see burn patients frequently and increase their competence in caring for these types of patients, who require a high acuity of care.

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Reasons for Developing a Burn Scenario

While all emergency department (ED) patients should be assessed for airway, breathing, and circulation, burn patients require a special type of care beyond that required for other types of emergency patients. Burn patients need to be assessed for extent of injury, including depth and degree of burn and size of burn, using the rule of nines. Further treatment of the burn patient, such as the amount of fluid to be given, as well as the type of dressings to be used, is determined by the results of this assessment. It must also be determined whether the patient is a candidate for transfer to a burn center. After determination of transfer is made, care must be given to stabilize the patient and begin treatment, yet not compromise the treatment to be provided at the burn center. The simulated burn patient scenario described in this article was designed for ED nurses; it can be adapted for all members of the ED staff.

Simulation Scenario

The simulated burn patient scenario involved a 65-year-old white man who was smoking with nasal oxygen in use. An explosion took place in a smoking area within walking distance of the ED; therefore, there was no initial treatment from emergency first responders. The patient was brought into the ED by his friends.

Before Simulation: Learning Modules

Prior to performing the simulation, participants were given learning modules that included content on determination of degree and percentage of burn (including the rule of nines), as well as the Parkland formula, transfer criteria, and care to be provided prior to transfer of the patient to a burn center. These modules were developed as a PowerPoint presentation based on ABA and evidence-based practice guidelines. All participants were asked to view these modules prior to attending their scheduled simulation time in the laboratory. The intended effect of these modules was to refresh the participants' knowledge of the burn patient's condition thereby giving participants the foundation to care for the patient.

Preparation: Moulage

One of the most challenging parts of developing a good simulation is to allow the participants to suspend disbelief and feel they are really part of an actual clinical situation. Simulation fidelity can be increased through the use of burned clothing and makeup. It is possible to make a medium-fidelity or low-fidelity manikin resemble very realistically a burn patient.

Burns

Superficial burns (first degree) were made by applying a very thin layer of petroleum jelly to the skin of the manikin and then dusting the petroleum jelly with a makeup brush dipped in blush. The petroleum jelly on the skin prior to the application of makeup made the manikin easy to clean after the simulation was completed.

Partial-thickness and full-thickness burns were made in a similar manner by placing 1-ply toilet paper saturated with petroleum jelly on the skin of the manikin in a wrinkled fashion (Figure 1). For blisters, a small amount of petroleum jelly was placed on the skin and a 1-ply toilet paper sheet was placed over it and allowed to stay in place until the petroleum jelly had soaked through the paper (Figure 1). Then makeup was applied to the areas covered with petroleum jelly. First, for a base color, pink was applied with a brush to all areas, and then brown eye shadow was applied in a circular fashion around the edges. Black and yellow eye shadow were used to make a more realistic burn appearance. Drops of simulated blood were added on top of the makeup and scattered about for effect.

As mentioned earlier, the simulation scenario involved a man who had been smoking while wearing a nasal cannula for oxygen delivery. He had dropped his cigarette on his leg. First, a nasal cannula was melted, placed in his nares, and secured with hot glue (Figure 2). (The hot glue was easily removable and caused no damage to the manikin.) Then his pants were cut around the area of the thigh, taken outside the lab, and burned with a lighter (Figure 3). The smell of burned clothing increased the fidelity of the simulation and made a memorable impression on the staff participating in the scenario.

Simulation Implementation

Assessment

ED nurses were brought into the simulation laboratory in groups of three to complete the simulation. First, they

Figure 1 Using petroleum jelly and toilet paper.