A History of Burn Care Therapy in Sacramento

By F. James Rybka, MD

DURING THE 19TH CENTURY Sacramento was not spared from major fires. There was one in the 1850s that destroyed about two-thirds of the young city, and this led to the use of bricks, rather than wood, in reconstruction.

The vast majority of fires were accidental, but ever since biblical times, military conquests have often been followed by retributive arson, such as the burning of Atlanta by the Union Army in 1864.

Sacramento had its own ugly story some years later when the Chinese community, located then near today's Amtrak station, caught fire and the Sacramento fire department was ordered to let it burn. Furthermore, the Chinese burn victims who ran from the inferno were not allowed to go to hospitals.[1]

Treatment 100 Years Ago

One hundred years ago, burn victims in Sacramento were treated certainly no better than in the larger cities back East. By today's standards, they were uniformly primitive across America. In our SSVMS Historical Library, such treatment is found in "Textbook on Surgery" written in 1891 by a New York surgeon, Dr. John Wyeth. He found that the victims of major burns usually died from shock ("collapse") within two days. According to Wyeth:

Pain relief. Relieve pain "by the administration of morphia hypodermically, or some form of opium by the rectum or stomach. Stimulation with whisky or brandy by enema, or by the mouth, is also indicated to prevent collapse….

"The use of both opium and alcohol should be made with a certain degree of caution, for there is danger from a too profound narcosis from the former, while alcohol in excess will unnecessarily add to the fever of reaction…"

Grafting "When an extensive area is to be grafted over, the method of Thiersch should be employed… [also,] Pieces of skin taken from a healthy man six hours after death by accident, cut into a great many small pieces and laid upon a healthy granulating surface will become revitalized" (although eventually rejected).[2]

Modern Therapies

The survival rate from major burns improved dramatically with fluid, electrolyte and colloid replacements during the 1930s and 1940s. This brought many victims through the shock phase, but, too often, they then died from infection some weeks later. Around this period, the mortality from a 50 percent burn was about 50 percent.

Another major breakthrough has been the use of silver in wound care. Silver had been used for centuries as a disinfectant for water. The American settlers routinely placed a silver dollar in barrels of liquids to avoid spoilage. More recently, NASA used it to maintain water purity on the space shuttle. The silver ion apparently kills micro-organisms instantly by blocking the respiratory enzyme system, but has no effect on human cells.

Prior to 1960, colloidal silver solutions were used in burns. Silver sulfadiazine has been used since the 1970s.

Today's senior plastic surgeons may have seen their professors cut split-thickness skin grafts freehand using a Humby knife, which is like a long straight-edged razor. This required considerable skill, and also an assistant to keep the skin taut. But it was inexact, time-consuming, and difficult to use for large grafts.

Certainly, one of the most valuable surgical instruments in burn care has been a relatively simple one, the electric Brown dermatome. It has a gauge to accurately determine thickness, requires less manual dexterity, and can be used, not only to rapidly obtain long sheets of grafts, but also for debridement of eschars, particularly in deep second degree, or partial thickness skin loss.

Local Burn Care in the 1970s

In the 1970s, most of Sacramento's plastic surgeons had one or two burn victims a year under their care. There was no "burn unit" then so large burns were managed in local hospitals. This required "special nurses" around the clock, strict isolation precautions, and daily dressing changes with application of silvadene. Although the nursing staff was excellent, it nevertheless amounted to a staggering amount of care for just one patient.

One drug used 100 years ago is still used actively today - morphine. I recall its near-miraculous power from one burn disaster in the 1970s when two men were horribly burned at Aerojet. They were cleaning a rocket fuel tank when an explosion occurred. One victim died within minutes after arriving at Mercy San Juan Hospital. The other seemed hopelessly burned, screaming uncontrollably in pain until we were able to give him a bolus of morphine intravenously. This relaxed him immediately and dramatically, and he became almost euphoric.

Then, there was perhaps an hour during which he spoke to his family and divulged some information to an inspector about how the accident happened. However, despite all our efforts, he became weaker, was given the last rites, thanked us for our care, and lapsed off to die in peace.

Another case I recall says something about laws governing flammable clothing. The long dress of an 11 year-old girl from Rough and Ready was engulfed in flames at a campfire, causing third degree burns of both legs and thighs. We treated her at the Sacramento Medical Center and she survived. (Our colleague, Dr. John Osborn, who was in training then, will remember her.) In collaboration with an obstetrician, we used human amnion as a temporary biologic dressing.

At this time, there was a recent federal law requiring flame-retardant clothing for children. One would think that such a bill would have sailed through Congress, but the garment industry put up a terrific fight which it lost only after the pediatricians and AMA weighed in. However, adult garments were not covered by the law and, in this case, the dress had originally been her grandmother's.

Plastic surgeons have historically been involved in burn care because that specialty developed techniques of debridement, skin grafting and reconstruction. However, acute burn care has now developed into a specialty of its own following research at the Brook Army Hospital in Texas, as well as centers in Boston, Cincinnati, Galveston and elsewhere. The Shriners hospitals have contributed greatly to this research.

Burn Units in Sacramento today

In 1974, the University of California at Davis opened its burn unit at the Sacramento Medical Center and, thereafter, most of the major burns of the area were taken there. In fact, there is now a law requiring paramedics to take major burns to a Level 1 Trauma Center, UC Davis Medical Center being the only one in our area. At present, it has a census of about 12 patients, mostly adults, who come from all over central and northern

California, except for the Bay Area. In an emergency, it could handle more.

In 1997, the Shriners Hospital of Northern California vacated its facility in San Francisco and moved to a beautiful modern hospital on the UC Davis Medical Center campus. Aside from the care and research that this facility has given to children with burns, it is all the more remarkable in that the costs, which are huge, are underwritten by the Shriners of North America.

Only four of the 22 Shriners Hospitals in the US, Mexico and Canada have a burn unit, and Sacramento is one of them. It has a census of approximately 14, but could have a capacity of 30 to 40 if a disaster occurred. It cares for children under age 18 with both acute burns and those needing subsequent reconstruction. They come from all over the western United States, as well as a few from Mexico.

General surgical residents from UCD and San Joaquin General Hospitals rotate through the units and manage acute care, while plastic surgery residents are involved with reconstruction. The nursing staff is specialized and skilled in all aspects of burn wound management.

Although no large burn disaster has yet hit Sacramento, the area does have contingency plans on how to handle such an event. From the 9/11 attack in New York, it has been estimated that, had the towers not crumbled but stayed erect as infernos, the US would have had to suddenly handle about 2,000 major burns. The American Burn Association has a computerized clearing house to determine which facilities could suddenly handle increased loads.

We are fortunate indeed to have as the chief of both burn units, Dr. David Greenhalgh, a Professor of Surgery at UCD, who has devoted his professional career to the care and research of burns.

Today, in addition to using the patient's own skin as grafts, and temporary dressings with cadaver (allograft) or pigskin (xenograft), a new advance has been the cultivation and growth of the patient's own skin. This can be accomplished experimentally; in about a month, there may be enough new skin grown to cover one's back, let us say. This is done by cultivating the dermis (fibroblast) layer separately from the epidermis, and then using the two as a "sandwich." Dr. Greenhalgh said that this skin cultivation is still experimental, and not yet approved by the FDA.

Fighting for one's life after a major burn is one of the most exhausting burdens a human body can face, so it is no surprise that those in top shape to begin with have the best chance to survive. Today, it is not unusual to see a previously robust patient with a 90 percent burn stay alive in our units.

However, even with the best of wound care, there are many hazards remaining with major burns, such as pulmonary problems, infections, and phlebitis. Finally, there is multiple organ failure (MOF), an insidious syndrome that has been seen with increasing frequency over the last two decades and which is now responsible for 50 to 80 percent of deaths in surgical intensive care units around the country. The causes of this are still being worked out.

It must be inappropriate to use the metaphor, "passing the torch" when discussing burn care. Yet, I know I speak for the senior Sacramento surgeons by imparting to Dr. Greenhalgh how comforted we are that he is here, and supported with such an energetic, young team. We wish him every success in the future.

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2. Wyeth, John, A, Professor of Surgery, N.Y. Polyclinic Hospital, "Textbook of Surgery" pg 93-95, Appelton, New York, 1891.

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