Published in final edited form as:

Am J Kidney Dis. 2010 August ; 56(2): A28–A29. doi:10.1053/j.ajkd.2010.06.003.

The Normal Saline Ceremony

David S. Goldfarb, MD

Dr Goldfarb is Chief of the Nephrology Section at the New York Harbor VA Health Care System and Professor of Medicine and Physiology at NYU School of Medicine.

“The end product of medical education should be a physician who is prepared to function in and provide direction for the changing health care system.”

-American Medical Association, “Initiative to Transform Medical Education”¹

The medical school curriculum is changing in response to a perceived need to train medical students in a way that acknowledges the complexity of the American health care system. Students, it is now thought, need to learn about performance improvement programs, health maintenance organizations, the Centers for Medicare & Medicaid Services, institutional review boards, emergency medicine, and palliative care; they need “designer assessment tools” to evaluate their performance and “point of learning products” to guide their learning. But when these undoubtedly important changes are implemented, when everyone, despite a lack of evidence, does what they think is best for the new initiates, there will have been a loss of something simple. Our students will have lost a clear picture of what physicians do, what being at the bedside, outside of the regulatory morass, once was like. And we will have failed to tell them what the ideal of medical practice still might be.

Before we leave them to the FDA, CMS, HMOs, IRBs, and QAPI committees, we will have to show students what our aspirations for them comprise. We will need a ceremony to tell them that to be a practitioner of medicine is not to be a bureaucrat, but a healer. The current “white coat ceremony” conducted at many medical schools is inadequate for this purpose, a donning of a symbol of power and a separator of doctor from patient. Rather, they will need to see themselves as healers whose place of work is at the patient’s bedside before they are lost to the guidelines, algorithms, and consensus statements.

My suggestion is to give every medical student, with appropriate pomp, on the occasion of their entrance to the hospital, a 1 liter bag of normal saline. Here is a simple, elegant means of telling students that they will soon become physicians with the awe-inspiring ability to save people’s lives. Normal saline, 0.9% sodium chloride, is a powerful substance, something physicians can actually give to patients to revive the near-dead. Sodium, the ion most sacred to nephrologists, is the cation that distributes in the extracellular fluid volume, and chloride is the anion that accompanies it. Together, their abundance or depletion determines what proportion of the body’s stores of water remain outside cells and in the blood. Sodium chloride is therefore the major determinant of the heart’s preload, the preload

Address for correspondence: Nephrology Section/111G, New York DVAMC, 423 E. 23, St., New York, NY 10010.
david.goldfarb@va.gov.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

¹From “Initiative to Transform Medical Education: Recommendations for change in the system of medical education.” The American Medical Association; Chicago, June 2007. Available at <http://www.ama-assn.org/ama1/pub/upload/mm/377/itme-final.pdf>; accessed May 8, 2010.

is the first determinant of the cardiac output, and the cardiac output is one of the major variables determining blood pressure. In turn, blood pressure means delivery of oxygen to tissues, and oxygen is life. In short, without sodium chloride, blood pressure falls and death ensues. Each liter of saline alludes to this fundamental physiology and draws one nearer to the bedside and further from the boardroom.

Put a bag of normal saline in the hands of a medical student and we have given that person one of the most effective therapeutic agents ever devised. We have told students that when dramatic conditions arise, they have an effective tool that can resuscitate the critically ill. We have put in their hands a powerful treatment that has been administered for as many conditions as aspirin. It is not the newly developed monoclonal antibody that a patient cannot fathom, not the lavishly expensive therapy accompanied by a 12-page consent form, not the high-tech robotic surgical technique applied by an elite faceless specialty team. A bag of saline is just salt and water, a substitute for plasma, an echo of our oceanic origins. It is physiologically complex, but can be superficially understood as an easily administered way to restore life to those threatened by the most basic threat to life: the loss of blood, the loss of intravascular volume. No matter how the health care system changes and how the medical school curriculum follows, the compassionate physician will always have a bag of saline to administer.

These fluids are not to be used without caution. Their administration is not like megadose vitamin therapy, ineffective and safe in surfeit. Used indiscriminately, without care and without an appreciation of the nuances of renal, cardiac, and pulmonary physiology, these solutions can be dangerously overprescribed. Their appropriate use requires reverence for the fine balance that constitutes human homeostasis. One must have achieved success as an apprentice to be trusted with a bag of normal saline.

Intravenous fluids were first used early in the 19th century to save the lives of British cholera victims; other than improvements in sterility and the form of container, they remain, for all practical purposes, essentially unchanged. Try to think of an effective therapy that has been available for as long. What else ties us as effectively to our history? Since those days, the ubiquity of intravenous fluids, hanging in wait in every trauma slot and beside every ICU bed, has deprived them of the sense of holiness and power they deserve. We can restore their sanctity, and preserve the sanctity of physicians, by making intravenous fluids the central feature of a rite of medical school passage. We can consecrate students' entrance to the hospital, let them know that they will imminently minister to the unwell. Tell them they are healers and send them to the wards with their elixir in a bag. With saline in their backpacks, they will be drawn away from the house staff office, away from the electronic medical record, and to the patient's bedside. Give them normal saline, say a blessing, and anoint them with the holy water. Direct those students to seek out the desperate hypotensives and gastrointestinal bleeders, and give them normal saline. Tell them to restore the intravascular volume of the afflicted until they are again pink and suffused with oxygen and adenosine triphosphate. Students will know that the moment for them to treat mankind has arrived when we give them, as protophysicians, the gift of normal saline. And when they graduate, when they have shown that they can use intravenous fluids wisely, we will acknowledge their mastery and remind them of their high station by awarding them the wondrous loop diuretic furosemide.