May 2009

Re: ***David and Kathleen Pluchinsky, Individually and as Representatives of the John Albert Pluchinsky Estate vs. Houston Racquet Club***

TO WHOM IT MAY CONCERN

I am Fernando Stein, M.D. I practice Pediatric Critical Care Medicine at Texas Children's Hospital in Houston. The following is a summary of my opinions reached after a review and analysis of the depositions, medical records, and other materials given to me in this litigation in order that I could provide my expert opinions regarding John Pluchinsky's drowning death at the Houston Racquet Club on July 18, 2007. My opinions are related to John's medical condition prior to his death, an analysis of the pool side resuscitation, the cause of his death, and an assessment of his survival odds in the presence of appropriate resuscitation efforts.

QUALIFICATIONS, TRAINING AND EXPERIENCE

My curriculum vitae is submitted along with this report. Briefly, however, my qualifications to provide these medical opinions are as follows: I am an associate professor of medicine in the section of Critical Care Pediatric Medicine at Baylor College of Medicine in Houston. I am board certified in Pediatric Critical Care Medicine and I regularly practice Critical Care Medicine at Texas Children's Hospital, one of the largest hospitals in the United States devoted solely to the care of children. At Texas Children's Hospital, I am Chief of the Critical Care Clinic, Medical Director of the Progressive Care Unit and Medical Director of Texas Children's Hospital International. I also serve as a technical advisor for the Pan American Health Organization and the World Health Organization.

I have done laboratory and clinical research and written medical articles on, among other topics, pediatric asphyxial brain damage, airway obstruction, pediatric cerebral blood flow, brain resuscitation, and cardiac arrest I have taught Advanced Pediatric Life Support to hundreds of medical students, pediatric residents, and pediatric critical care Fellows. In my 30 years of pediatric critical care medicine I have cared for scores of pediatric near-drowning victims many of who survived and a great many who died.

MATERIAL REVIEWED

Shortly after John Pluchinsky's death, I was asked to review John's medical records, autopsy report, as well as the statements and deposition testimony and other materials developed during the litigation, and provide my opinions regarding John's overall health prior to his death, the autopsy findings, his cause of death, as well as the resuscitation efforts made at poolside following the discovery of John's body in the pool. I carefully reviewed the medical records, the autopsy report, and the statements and deposition testimony of those who were involved in the attempted resuscitation. My opinions follow.

SUMMARY OF OPINIONS

John Pluchinsky was a healthy young 4-year old on July 18, 2007. He experienced the usual childhood medical issues but overall was a typical, healthy, young 4-year old without any significant physical, mental or psychological disability or issue.

The autopsy, performed by the Harris County Medical Examiner's office and observed by Baylor College of Medicine Associate Professor of Pediatric Pathology, Dr. Edwina Popek, revealed typical findings associated with pediatric drowning. There were no other significant medical conditions or causes of death. Death was due solely to drowning and not to any events such as seizure, vomiting, or any other cause.

The poolside resuscitation was inadequate. The rescuers did not perform the basics of resuscitation, implying insufficient training or poor maintenance of skills. A number had

lapsed certificates. There had been no practice training drills oriented toward a coordinated response to emergencies such as that presented by John Pluchinsky. The resuscitation efforts revealed an uncoordinated effort to respond to John's emergency and also revealed the total inadequacy of the resuscitation effort. Medical studies reveal that if immediate bystander basic life support is life saving to pediatric drowning victims, a large number can and are resuscitated and varying percentages of these rescued victims can end up living a normal life. The rescue effort for John Pluchinsky, however, was as inadequate as it was disorganized.

JOHN PLUCHINSKY'S HEALTH

On July 18, 2007, John Pluchinsky was a healthy 4-year old male. I reviewed his early medical records as well as his periodic visits to his pediatrician throughout his young life. John was a healthy young boy. There were no significant medical issues beyond those encountered by any ordinary 4-year old. In particular, John had no medical conditions that contributed to or could have contributed to his drowning death.

THE AUTOPSY

The autopsy was thorough. As with all post-mortem examinations, the gross examination looks for obvious things that can be seen by human eyes. The second part of any post-mortem is the microscopic examination. In the case of pediatric autopsies in Houston, the Harris County Medical Examiner routinely prepares microscopic slides and forwards them to Texas Children's Hospital pathology department for expert examination. Pediatric pathology is different from adult pathology. Those physicians specializing in pediatric pathology are uniquely qualified to examine pediatric microscopic specimens and form opinions concerning what those specimens reveal.

In John's case, Dr. Edwina Popek, pediatric pathologist at Texas Children's Hospital and Associate Professor of Pediatric Pathology at Baylor College of Medicine, not only personally observed the gross autopsy but she also performed the microscopic examination.

Dr. Popek's report and the gross examination are all eventually used by the medical examiner to come to a conclusion as to cause of death. In this case, it was the medical examiner's expert opinion that John Pluchinsky's cause of death was drowning. There were no other contributing causes found at either the gross or microscopic examinations nor were there any medical causes that contributed to John Pluchinsky's death. All of the findings were typical of a pediatric drowning and nothing else.

During my 30-year career as a pediatric critical care physician, I have cared for dozens of what pediatricians refer to as near-drowning victims. These are children who are found in water, swimming pools, lakes, streams, and the Gulf, and who are at least partially resuscitated and then cared for in pediatric critical care facilities. Many of these victims die. Others recover although recovery can mean living with varying degrees of neurologic brain damage. As a result of this experience, however, I am very familiar with the presentation of pediatric drowning. Having reviewed all of the information provided to me regarding John Pluchinsky it is my opinion, just as it was the Medical Examiner's opinion and Dr. Popek's opinion, that John Pluchinsky died as a result of drowning. There was and is no evidence that this drowning was caused by any event such as vomiting his lunch, experiencing a seizure, or any other malady. There simply was no evidence of any condition that caused or contributed to his death other than water submersion.

DROWNING

Accidental human drowning has been studied primarily from anecdotal case reports. Many medical papers have been published documenting the events of drowning as best medicine can understand it. Animal studies have also added to our understanding of the patho-physiology of dying from submersion.

Asphyxia is a combination of decreased blood oxygen, increased blood carbon dioxide and a state of the body becoming acidotic which is a state incompatible with life if the acidosis lasts

too long. A state of acidosis causes human cells to stop working. The heart stops, the brain can no longer function and blood stops circulating. How long this process takes varies from human to human. We simply do not know how long it takes to lose consciousness while drowning. There is a period of struggling to stay afloat and a period of struggling to get a breath when finally submerged. At the same time, there is undoubtedly a profound state of fear and panic and fright as one struggles to get a breath. Exactly how long all of this may last must vary from person to person and would be difficult for medicine to document. We do know, however, drowning is not an instantaneous event.

What we also know is that young people are less susceptible to asphyxia than are adults. What this means is that a child can be resuscitated when adults under similar circumstances cannot. This includes victims whose hearts have stopped and in which there is no breathing effort. Medical studies have documented that children with prolonged submersion of 25-minutes can be revived with functional recovery if prompt resuscitation is instituted. The general practice in the United States is to attempt resuscitation if the victim was underwater for one hour or less. This hour has been analogized to the golden hour in the event of severe trauma like car accidents where the chances of survival are greatest if the victim receives medical care within one hour of the accident. That is not to say that there are no drowning deaths within the one-hour period or survivors beyond it, it is merely a way to point out how extremely important it is for bystanders like lifeguards and counselors to know Basic Life Support. We know that any delay in initiating CPR exponentially increases the probability of a poor outcome. Studies prove that the quality of CPR is an important determinant in the eventual outcome of a drowning victim.

I reviewed all of the statements and deposition testimony from the responders who attended John's resuscitation at the poolside. The outcome of this resuscitation could easily have been predicted based solely on the lack of training, the failure to be certified in basic life support, failure to have an emergency action plan, and the failure to assign specific areas of responsibility to individuals responding to this emergency. These failures were shocking to say the least.

The American Heart Association, The American Red Cross, and other high profile organizations provide significant amounts of information and education concerning basic life support particularly for those who will be engaged as lifeguards. Over the years, basic life support algorithms have changed somewhat but can be summed up in the phrase "Push Hard, Push Fast." This refers to chest compressions which, medical studies have shown, is the most important part of basic life support for pediatric victims. Push hard refers to sufficient force to depress the chest approximately one-third to one-half of the front to back diameter of the chest. Push Fast means push at a rate of least 100 compressions per minute. It is also important when a child is not breathing for the basic life support rescuer to maintain an open airway and to give at least two breaths before initiating chest compressions. The approximate ratio of compressions to breath is taught to lay rescuers as 30:2 for one rescuer and 15:2 for multiple rescuers.

Unfortunately, none of John's rescuers seemed to be able to articulate these basic life support principals in their testimony much less apply them in the actual emergency situation. Applying information that has been learned at a previous time to a situation involving a child who is lifeless and not breathing is a skill that even professionals must practice. It is a known fact that emergencies generate high stress in all individuals particularly those who are unprepared by training to respond almost in rote fashion. Without training, without practice, without constant drills, no one can be expected to respond appropriately and use the

information they have previously learned. Even among hospital personnel, emergency responses are practiced on a routine basis. Personally as a critical care physician, I have to maintain proficiency by submitting to a Pediatric Advance Life Support course every two years and pass a test. If failed my credentials are suspended.

The testimony of those who responded to John Pluchinsky confirms what is known from an assessment of the actual response – there was no training in emergency procedures, there was no emergency plan, and there had been no drills designed to allow rescuers to practice rescue techniques. As a result, the response and attempted resuscitation of John Pluchinsky was totally inappropriate.

John's lower legs were left dangling in the water. Optimal resuscitation technique is laying the victim on a flat, hard surface. Whenever legs are dangled, as John's were, the blood trapped in the lower extremities is not circulated by chest compressions. This diminishes the effectiveness of CPR.

A rescuer should not push on a victim's stomach especially as the first act in the rescue sequence. Basic life support in drowning situations teach rescuers that stomach distention will occur as a natural part of the drowning process but manual compression of the stomach is inappropriate. Abdominal thrusts do nothing to assist in resuscitation and, in fact, may well interfere with resuscitation by causing the victim to aspirate stomach contents into his lungs thereby making oxygen exchange even more difficult if not impossible.

John's rescuers, as the first act of resuscitation, pushed on his stomach not once but multiple times. This act was carried out by at least three people who eventually responded to John's emergency. Their rationale, gleaned from the testimony, was that John's stomach was distended or bloated and pushing on the stomach was "hoped" to be something that would relieve an obstructed airway. John did not have an obstructed airway, nor does the testimony reveal any effort by any rescuer to determine first, before pushing on the stomach, if the

airway was obstructed. In an obvious drowning situation, the first response of any person adequately trained in Basic Life Support is to assess the victim, open the airway, and give two rescue breaths. It is the rescue breaths that will help assess the adequacy of the airway which, in John's case, was not obstructed. We know this from the subsequent assessments by the paramedics, the emergency room physicians, and the autopsy.

Pushing on the abdomen not only carries with it the significant risk of aspiration but, more importantly, pushing on the abdomen simply delays the most important aspects of resuscitation – rescue breaths and chest compressions. I cannot emphasize enough that medical research has demonstrated through multiple studies that the single most important factor in resuscitation is chest compressions. It has also been demonstrated in medical studies that if pediatric drowning victims are provided CPR by bystanders immediately upon being pulled from the water, the chances of resuscitation even after 25 and more minutes in the water are significantly increased. On the other hand, delay in basic life support significantly decrease the victim's revival chances.

THE HOUSTON PEDIATRIC DROWNING STUDY

Drowning is one of the most common causes of death for children especially those ages one – five. Until 2000, the data on the contribution of basic CPR in drowning events related to children was sparse. The medical profession thought that basic CPR by bystanders increased the likelihood of intact survival by children but actual data supporting this hypothesis was lacking. Between 1990 – 2000, a study was undertaken in Houston of pediatric drowning and CPR. The Houston pediatric drowning data revealed some impressive facts regarding lay bystanders and their rescue efforts.

During the study an average of 43 drownings per year occurred in the at-risk population of 0-14 years and 71% of those occurred in children five years old or less. During

the study 473 serious drowning cases required EMS response and 2/3^{rds} of those required some type of resuscitative effort. Of the 300 cases requiring resuscitation, 101 died.

The most impressive fact gleaned from this study was the impact of bystander CPR. Half of the drownings received CPR by bystanders and 79% of those receiving bystander CPR survived to hospital discharge and 97% of those survivors were neurologically in tact.

Previous studies had shown similar facts. There was concern in these previous studies, however, that the effectiveness of bystander CPR was over estimated by including patients who actually did not need CPR but had CPR administered by bystanders who then credited themselves for the child's recovery. In the Houston study, however, this concern was eliminated by imposing a strict set of criteria for patient inclusion in the study. To be included in the data the patient had to be reported by all available witnesses at the scene as being clearly unresponsive, lifeless, apneic, cyanotic, or the patient had to have x-ray and laboratory and physiological abnormalities consistent with water aspiration. The witness reports were documented by follow-up interviews to confirm adherence with the strict criteria. Thus, the information in this study is quite reliable. At least 173 cases of drowning not included in the study because of lack of documentation to meet the strict criteria means that the survival rates were even better than the results reported in the published data.

This decade's long, population-based study demonstrated most strikingly that bystander CPR is the most definitive action for pediatric drowning victims that can possibly be initiated. As noted above, other studies from around the world support this conclusion.

In summary, rapid effective performance of CPR by bystanders, who in almost every case in the Houston study were lay people, appears to be the necessary factor for neurologically intact survival for the pediatric drowning victim. In essence, without the basic CPR techniques applied by bystanders subsequent advanced and invasive life support techniques applied by critical care physicians such as myself and many others throughout the

world can do very little. The Houston study demonstrates the imperative need for more CPR training but, even more importantly, demonstrate that those who have responsibility for children's water safety must be well trained, current, and ready to act. The third leg of this tripod – ready to act – requires weekly if not daily reminders and drills.

JOHN PLUCHINSKY'S RESUSCITATION

The statements and deposition testimony of those in attendance at John Pluchinsky's pool side resuscitation tell a very sad story of caregivers unprepared to act in an emergency.

It is always difficult to say that any particular act within a sequence of events such as a drowning would absolutely alter the outcome. In this case, however, given the medical studies published to-date regarding bystander resuscitation when quickly performed it seems apparent that the delay in initiating rescue breaths and chest compressions in John Pluchinsky's case may well have deprived him of a modality which could have altered the outcome. It is impossible to say that his condition would be entirely normal but it is a medically supported conclusion that not initiating quick, appropriate CPR deprived this young man of at least a chance at life.

The data from the Houston study and other published medical articles makes it very clear that pediatric victims have the best chance at survival if bystanders initiate rapid, effective CPR. This includes victim whose hearts have stopped, who are not breathing, who, for all intents and purposes are completely lifeless. I cannot overemphasize the known medical fact that young people the age of John Pluchinsky have more resistance to the effects of asphyxia than do adults. So no matter how a victim may look, pale, blue, limp, eyes glazed over, completely lifeless, they can be and have been revived by quick thinking rescuers who give quality CPR until more help arrives. And in John's case, the EMS arrived without delay when finally called. Unfortunately, too much time had been wasted pushing on his stomach and trying to organize a rescue.

RESPONSE TO EMERGENCY

It is well known that life savers responding to a drowned person or any person who has experienced a traumatic episode resulting in the need for resuscitation, experience a highly stressful psycho-physiological reaction. The lifesaver's nervous system responds as does a lifesaver's emotions. Without regular training emphasizing psycho-motor skill performance, it is unlikely that the rescuer will respond appropriately because too many physical and psychological factors affect those who have not trained to respond to emergencies. Reading the statements and deposition testimony of John Pluchinsky's resuscitation effort reveals that all of those who responded did so in a panicked, ineffective, disorganized, and inappropriate manner.

I cannot overemphasize the need for training to respond to emergencies. One simply cannot expect young people to appropriately respond to a drowning victim or anyone who needs assistance without regular drills that emphasize an organized, effective, timely response. Medical professionals train regularly to respond to emergencies. Lay people given the responsibility for the safety of others must also train to respond appropriately. Lives depend on quick, accurate, effective responses from rescuers. Young people in particular responding to their first trauma victim need all the practice that they can possibly get. Those in charge of these young rescuers did them no favors by placing them in a position of having to respond to John Pluchinsky's situation and having given them no training.

Yours very truly,

Fernando Stein, M.D.