



Organ Donation in a Pediatric Trauma Victim

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Abstract

We describe a patient with severe traumatic injury who had a cardiac arrest in the emergency department and the subsequent outcome to discuss timing of termination of resuscitation and organ donation in children.

Keywords

Traumatic cardiac arrest, Organ donation children, Termination of resuscitation

Case

A previously well 7 year old female was struck by a car traveling 60-70 kms/hr while crossing the street on her bicycle. She had no helmet on at the time of the collision, was thrown 15 feet and landed on her head according to witnesses at the scene.

Initial assessment by paramedics within 5 minutes of the event demonstrated a palpable pulse, a patent airway, but no respiratory effort. Initial Glasgow Coma Scale (GCS) was recorded as 3. Other obvious injuries noted were an open right femur fracture and abrasions to her lower extremities. The child was placed on continuous monitors with cervical spine precautions and was ventilated with a bag and mask (BMV) during transport to a pediatric trauma center.

The child arrived in the trauma bay 45 minutes after the incident where the trauma team was assembled. Upon arrival her initial vital signs recorded on monitors were a Temperature 34.6°C, axillary, Heart Rate 150 beats/minute, Blood Pressure 125/80 mmHg and oxygen saturations of 100% through BMV at a rate of 20/minute.

The primary survey found that the child had a patent airway, midline trachea, equal breath sounds bilaterally with no obvious chest deformities and absent central pulses. Within 3 minutes of her arrival into the trauma bay the priority she had pulseless electrical activity and cardiopulmonary resuscitation (CPR) was started with chest compressions. The child regained return of spontaneous circulation with 2 rounds of CPR and epinephrine. The anesthesiologist obtained a definitive airway with oral intubation. It was also noted that she had non-reactive pupils.

Once the child had regained a pulse and had a secured airway the secondary survey was completed the open femur fracture was bound and she received 1 unit of blood. A whole body computerized

tomography scan (CT) was performed. She remained stable for transport and during the CT scan.

Initial head CT showed an atlanto-occipital dislocation with a large prevertebral/longus colli hematoma. There was global reduction of gray-white matter differentiation with basal cistern and sulcal effacement with bilateral uncal and tonsillar herniation.

The child was transported to the pediatric intensive care unit (PICU) and her parents were informed about the nature of her injuries. The PICU staff physician initiated the conversation about organ donation with the parents and contacted Trillium gift of Life, the organ donation team. The parents expressed wishes to donate her organs to the Trillium Gift of Life; their wishes were honoured and their gracious gift was accepted. The child's blood pressure and heart rate were unstable and required inotropic support with dopamine and Epinephrine to ensure adequate perfusion to all organs. The child was pronounced brain dead the following day. Six of her organs were donated and 4 transplants were performed the following day at the pediatric trauma center.

Discussion

There is a paucity of literature with regards to the question of whether there should have been termination of resuscitation in the field. A review published in 2014 that looked at when it is appropriate to withhold or terminate resuscitation of traumatic pediatric cardiac arrest outside of the hospital suggests that most children are routinely excluded from state termination-of-resuscitation protocols [1]. The decision to withhold resuscitative efforts in a child under specific circumstances such as decapitation or dependent lividity, rigor mortis is reasonable [1].

The article goes on to say that generally if the patient has had resuscitative measures that have been ongoing for greater than 30 minutes and the closest facility is greater than 30 minutes away, then discussions with family members along with assistance and guidance from medical professionals should be considered since evidence suggests poor outcome or death [1].

Children with severe traumatic brain injury and an initial GCS of 3 or 4 have a high likelihood of death and morbidity. However, a recent study examining the long-term outcomes of 67 children presenting with traumatic brain injury and a Glasgow coma scale of 3 or 4 found that 57% had died at 1 year, but 15% had good outcomes at 10 years [2]. Factors associated with poor outcomes

included abnormal pupillary response, hypothermia and the presence of abuse [2].

Organ donation especially of a child is a difficult subject to broach with any family suffering a loss. There are many factors that affect parental perceptions and willingness to donate their child's organs and parents are put in a situation where they must make a decision about donation without knowledge of their child's wishes [3]. A study published in 2015 compared request process and outcomes in adult and pediatric organ donation found that organ donation rates in children tend to be higher than in the adult population [4]. Many parents also believe that organ donation would allow something positive to come from their child's death. An understanding of brain death, approach of donation from the child's healthcare team, and mention of organ donation prior to death declaration, enhanced likelihood of obtaining consent [3,4].

Conclusion

This case shows that, although the child probably suffered terminal injuries prior to arrival to the hospital, quick recognition of pulseless

electrical activity and adequate resuscitation ensured viability of her organs for donation, a chance for the parents to hold on to something positive to while they mourn the tragic loss of their child.

References

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