The Study of Success rate of CPR in 0-14 years Trauma Children who admitted to the Emergency of Khatam-Alanbia Hospital Zahedan, Iran 2016

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Abstract:

Trauma emergencies of children are the main causes of permanent morbidity and mortality in this age group. CPR is a set of measures that is done to restore life after clinical death. The purpose of present research is to determine the success rate of CPR and its effective factors in trauma children who admitted to the emergency of Khatam-Alanbia hospital in Zahedan, 2016. This cross sectional study was conducted on all trauma children who suffered cardiac arrest during their hospitalization in the emergency of the hospital and underwent cardiopulmonary resuscitation. Relevant information was extracted from medical records and designed and used resuscitation forms in the hospital and its relation with the success of resuscitation was studied. Information was analyzed by central and dispersion indices and statistical tests of chi-square and T-test. We studied 28 trauma children with mean age of 10.12 ± 3.42. The most common type of events that led to trauma in children was traffic accidents (35%) which followed by burns (25%). The highest number of individuals who were resuscitated was in 1-10 years age group with 35% (P<0.005). There was not a meaningful different between males and females in terms of success rate (P>0.005). Obtained results showed that the presence of resuscitation team in the hospital and using it as soon as possible is the most important factor in the increases of resuscitation efficiency. Also immediate attention to trauma children who have not suffered cardio respiratory arrest is very important to increase the rate of resuscitation.

Key Words: CPR, Trauma, Children, Zahedan, Iran.

Introduction:

Trauma has shown itself as the leading cause of death and disability in children and young people in developed and industrial countries. Lifetime of trauma can be traced back in history to human life on earth [1-3]. While in developing countries infection and epidemic diseases are the main cause of mortality [4]. Trauma is the final cause of mortality and disability in 1-14 years children [5]. Trauma leads to more mortality and disability relative to all children diseases [6]. Trauma emergencies of children are the main cause of permanent morbidity and mortality in this age group [7]. Despite the activation of the emergency care system and facilitating the transfer of patient to the nearest place with appropriate facility, children may...
require to undergo cardiopulmonary resuscitation by parents, health care providers and the witnesses. CPR is a set of measures that is done to restore life after clinical death. These measures have shown their beneficial effects particularly on patients who have suffered a sudden death [8]. The most common cause of traumatic death is brain injuries in children and this is due to the inappropriate effects of traumatic injury on airway function and respiration control of brain blood flow [9]. In contrast, the injuries of the chest and abdomen cause the least trauma death in children because these causes are less associated with the shock of blood volume depletion [10, 11]. Children trauma is a major problem of public health in US that causes the death of more than 10 thousand children at the international level every and about 10 percent of all pediatric hospitalizations [12]. In addition, 15 percent of all pediatric ICU admissions, nearly 25 percent of pediatric emergency visits, 50 percent of all transportsations of pediatric ambulances and 20 percent of all hospitalizations for severe injuries relate to age group of children [13-15]. Success factors of resuscitation in traumatic children are somewhat different. The identification of these factors helps the patients who benefit from resuscitation to be hospitalized in situations that to be more available for resuscitation [16]. Although speed is one of the important factors of success trauma patients, but it is not be the only determinant of success, and background causes related factors and resuscitation techniques are more determinant of success [17, 18]. The purpose of present research is to determine the success rate of CPR and its effective factors in trauma children who admitted to the emergency of Khatam-Alanbia hospital in Zahedan in 2016.

Materials and Methods:
Present research is a cross sectional study. The studied individuals were all trauma children who pulse and respiration on arrival at the hospital and then suffered cardiac arrest. However, they suffered the cardiac arrest shortly after arrival. In addition all patients who suffered cardiopulmonary arrest outside of the hospital or lacked pulse and respiration on arrival to the emergency were excluded from the study. In the study, the return of pulse after resuscitation or without return of respiration was considered as early success of resuscitation, and discharge of patient from hospital was considered as the ultimate success of resuscitation. The information such as the variables of age, sex, time interval from hospitalization to cardiac arrest, time interval from collapse to being resuscitation, time interval from collapse to the presence of resuscitation team, time interval from collapse to begin tracheal intubation, time interval from collapse to cardioversion, the first heart rhythm in monitoring after arrest, the number of CPR, the place of hospitalization and the manner of cardiac arrest was extracted from medical records and designed and used CPR forms in the hospital, and its relation with the success of resuscitation was studied. Data was described by central and dispersion indices. We used chi-square and t-test statistical tests to compare the qualitative and quantitative variables in groups with successful and failed resuscitation. We analyzed data using SPSS software version 18 [19].

Results:
In present research, we studied 28 trauma children with mean age of 10.12 ± 3.42 that admitted to the emergency of Khatam-Alanbia hospital due to cardio respiratory arrest. The most common type of events that led to trauma in children were traffic accidents with 35% in 10 persons which followed by burns with 25% in 7 persons. The least causes of trauma in children related to drowning and motorcycles with 0.04 (Table 1). Finally, of all children who were undergone CPR 17 people were faced with initial success and 10 people with the ultimate success. In addition, the majority of resuscitated people were in 1-10 years age 20217

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group with 35%. There was not a meaningful difference between males and females in terms of resuscitation success (P>0.005). The highest resuscitation was done on the first day of hospitalization. The mean time of cardiac arrest to onset of resuscitation was 48.4 ± 21.2s. The least time interval was zero second that cardiac arrest occurred in the presence of resuscitator doctor or nurse. The highest interval was 145s. In addition, the highest resuscitation was done in the period of 45 to 55 seconds after cardiac arrest. The mean time of the collapse to the presence of resuscitation team was 3.45 ± 1.15 min that the minimum time was 1 min and the maximum time was 12 min. the presence of resuscitation team took less than 3 min in 64% of cases and more than 5 min in 7% of cases. The highest resuscitation was done in the period of 45 to 55 seconds after cardiac arrest with 35 percent. Only 18 percent were resuscitated in less than 10s. In addition, 58 percent were resuscitated one time, 28 percent twice and 14 percent more than twice. The highest problems of resuscitation process were multiple attempts for opening airways and tracheal intubation. There was a meaningful relationship between multiple attempts for intubation and error in the manner of suction with CPR (P<0.005) (Table 2).

Generally, patients in whom resuscitation operation was started in less than 3 min had the higher rate of resuscitationfinal success

Table 1. Frequency based on the kind of accident, in the children studied.

<table>
<thead>
<tr>
<th>Type of accident</th>
<th>Frequency</th>
<th>percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic accidents</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td>Burns</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td>Riding bike</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Drowning</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Motorcycles</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Poisoning</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2. Early and final success CPR in Trauma Children.

<table>
<thead>
<tr>
<th>Factors examined</th>
<th>Early success</th>
<th>Final success</th>
<th>P value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Successful</td>
<td>Unsuccessful</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay in opening the airways</td>
<td>Yes</td>
<td>2</td>
<td>8</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>15</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Delay in intubation</td>
<td>Yes</td>
<td>3</td>
<td>10</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>14</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Error in the manner of suction</td>
<td>Yes</td>
<td>1</td>
<td>7</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>16</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Delay in the onset of massage</td>
<td>Yes</td>
<td>2</td>
<td>6</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>15</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Putting a hand in the wrong place during massage</td>
<td>Yes</td>
<td>1</td>
<td>4</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>16</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
Discussion:

Findings of present research showed that the frequency of trauma in boys is twofold that of girls. This finding is similar to that of Brehaut et al’s study [20]. It seems that more freedom of boys in the society is the main causes of most of the trauma for them. In addition, present research showed that traffic and vehicle accidents are the main factor of trauma in the children. In present research, overall CPR was successful in 35 percent of cases. This rate is 61 percent in FISER’S study and is 44 percent and 78 percent in the studies of Hartmann and Barzily. In these studied and ours, resuscitation has had immediate success in significant number of children [21, 22]. The high rate can be attributed to the dominance of airways related causes as the etiology that in many of these cases, opening the airway and assist breathing take out children of crisis situation. In present research, 35% of patients were below 1 year age group, but in the study of Zaritsky 55% of patients and in the study of Hickey 43.1% of patients for resuscitation in the emergency were below 1 year children [23]. It seems that age group of children are at greater risk than others. We can refer to certain conditions of airway anatomy as possible causes of greater risk in the age group including small and narrow airways, softer cartilages of larynx and trachea and relatively larger tongue that lead to the increase of resistance of these ways to air flow and obstruction. In present research, there was a meaningful difference among age groups in terms of the number of successful resuscitation, but in the study of Nicholas, age didn’t influence the survival rate [24]. In this study, the number of male trauma patients was higher than female ones. The most common causes that required CPR was respiratory obstruction. In resuscitation of children with cardio respiratory arrest the factors such as the speed of onset of CPR, the speed of tracheal intubation, the speed of using electric shock and the speed of presence resuscitation team are the most important factors that determine the success of resuscitation. Also in some studies like Brindley et al’s study, these factors were considered as important factors [25]. In present research, the speed of presence of resuscitation team and tracheal intubation were considered as important factors. It seems that the finding reflects the impact of quality of resuscitation efforts. In the study of Abella et al, the quality of resuscitation was studied according to American Heart Association standards and was determined as an important factor in the success of resuscitation [26]. In the study of Peters et al, similar results were obtained in Australia [27]. In the present research, the speed different is 4 minutes, and the minimum time interval is 4 minute in the presence of resuscitator doctor or nurse. While in the study of cooper et al, the range of this variable has been greater and has been divided into less than 15 min and above 15 min [28]. In the present research, the time interval from hospitalization to cardio respiratory arrest didn’t influence the result of resuscitation. It seems that patients who suffer cardiac arrest on arrival to the emergency and very soon are a sample of patients who have the chance to resuscitate with a higher speed and quality. In the present research, it was determined the there is not a relationship between the number of resuscitation and the result of resuscitation. The patients who were resuscitated for the second time and more had the chance to resuscitate. Since the number of patients in this research is limited, we require a large sample to give reliable results. According to the fact that children require more resuscitation due to the high incidence of respiratory problems, simple actions such as opening the airway and contribution in pulmonary ventilation can resolve the problems. Implementation of the basic principles of resuscitation can decrease the mortality of this vulnerable group.

Conclusion:

Present research shows that the present of resuscitation team in the hospital and using it as soon as possible is the most important factor of increasing the efficiency of resuscitation. In addition, immediate attention the
Mohamad Reza Havasian et al, The Study of Success rate of CPR in 0-14 years Trauma Children who admitted to the Emergency of Khatam-Alanbia Hospital Zahedan, Iran 2016

trauma children who haven’t suffered cardiac or respiratory arrest are very important to increase the success rate of resuscitation

References:


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20220


