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Problems and Prospects of Treatment of Combined Trauma in Children

Shamsiyev A. M., Shamsiyev J. Z., Shamsiyev J. A.

Samarkand State Medical University, Uzbekistan

Abstract This article describes the problems and prospects of treatment of combined injuries in children. The timeliness of diagnostic and therapeutic measures is a necessary condition for improving the provision of care and treatment outcomes for combined trauma. However, children with combined trauma, outside large settlements, are initially hospitalized in general surgical departments, where the possibilities of providing specialized assistance to victims are limited, which indicates the presence of a number of unresolved organizational and medical issues.

Keywords Combined trauma, Children, Fractures

1. Introduction

According to a number of authors such as K.V. Pshenisnov, Yu.S. Alexandrovich, P.I. Mironov and others, reducing the time spent by the victim at the stage of qualified medical care and transfer to a specialized center has a positive effect on the outcome of the injury. In 37.4 - 51.6% of patients transferred from other institutions, additional injuries were detected, and 17% were delivered with already developed complications.

It should be noted that the work of intensive care centers, assessment of the severity of injury and condition, based on the choice of informative and simple assessment systems that allow choosing the optimal patient management scheme, is essential in the correct choice of patient treatment tactics.

Fractures of limb bones occur in 76% of children with combined trauma. The authors' opinions on the stabilization of fractures differ. The continuing unsatisfactory functional outcomes of treatment of diaphysis fractures of the lower extremities with combined injuries indicate the need to optimize surgical treatment tactics and conduct a comparative analysis of outcomes and quality of life in children who have suffered a combined injury.

Thus, improving the diagnosis and improving the effectiveness of treatment of fractures of the lower extremities in children with combined trauma remains one of the most urgent problems of pediatric surgery today.

2. Materials and Methods

In recent decades, there has been a change in the structure of injuries, due to an increase in the severity of injuries and an increase in the proportion of combined injuries, the frequency of which reaches 55-80%, which causes high mortality and disability of young people of working age. This negative trend is especially relevant for children, since their share in the total number of cases of combined trauma increases annually, and the severity of the injury increases. Mortality in children is also high – 7.1 – 22%, has no tendency to decrease and is the main cause of death in children over one-year-old.

Combined injuries are one of the leading causes of loss of functional activity. Disability due to damage to the ODS and their consequences in case of a combined injury are directly dependent on the severity of the injury suffered. Post-traumatic conditions leading to long-term functional disorders, disability and psychological consequences are noted in 10 - 42% of victims.

Severe concomitant injury is an increasing problem in healthcare, and requires complex diagnostic and treatment algorithms. Treatment of children in specialized centers has lower mortality rates compared to general hospitals. However, due to the high economic costs, especially in developing countries, most of those affected with CT are treated in general hospitals, which affects treatment outcomes and mortality. Only 53% are admitted to the intensive care unit during the golden hour. When analyzing the causes of CT, 54.8% of patients were injured in road accidents, 26.9% were injured as pedestrians, which is 81.7% of children as a result of an accident. The majority of affected children have a much greater recovery potential than adult patients with respect to the musculoskeletal system, as well as other systems. Accurate algorithms, high-quality diagnostics, monitoring and comprehensive treatment have a significant impact on the positive end result and improved survival and recovery of affected children. However, despite the development of new

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medical technologies, the mortality rate in shock has remained consistently high for many decades. In case of traumatic shock, it remains stable at the level of 15-30%.

Polytrauma is a collective concept (medical term), which refers to multiple traumatic injuries to organs or tissues in one victim, assessed on the ISS scale by 17 or more points. As a rule, polytrauma is a consequence of a high-energy injury (motorcycle and car accidents, falling from a considerable height, etc.). For patients with polytrauma, there is a discrepancy between the severity of the condition and the severity of the damage, which is due to the so-called phenomenon of mutual aggravation. Usually, the frequency of polytrauma does not exceed 14-15% of all cases of damage, but in extreme situations (hostilities, man-made and natural disasters, etc.), their frequency increases up to 30-40%.

The term "combined injury" includes damage to organs and systems of one, two or more anatomical and topographic areas with different functional orientation, requiring not only conventional syndrome-based therapy to remove the patient from a serious condition, but also complex diagnostic and therapeutic measures in relation to the localization of damage.

To more accurately define a combined injury, it is important to understand the differences between isolated and multiple injuries:

- Isolated injury is a lesion of one organ.
- Multiple trauma — lesions of several organs.

The peculiarity of this type of injury is the existence of a dominant traumatic focus, concealing concomitant injuries in the acute period, which, manifesting after a while, can lead to severe complications, disability, and death.

In the last decade, there has been a significant increase not only in the number of victims, but also in the severity of injury in children. An analysis of the literature data on the frequency of damage to individual areas of the body and the number of damaged areas showed significant differences in the results obtained by different authors. Thus, the rates of skull injury in combined trauma ranged from 41-42.3% to 81.4-92% in children and from 37-39% to 84.3-86% in adults. Such significant differences may be related to different damage accounting criteria.

Currently, in critical condition medicine, modern scales of assessment of the severity of the condition are usually used to objectify the assessment of the prognosis in various clinics. One of the most accurate pediatric assessment systems is the PELOD scale. Currently, there are dozens of scales for assessing the severity of injury in both children and adults. The authors disagree on the information value of the scales of current assessment of the severity of the condition (PELOD) and predictive assessment systems (PRISM, PIM). Until now, most experts recommend only assessing the severity of damage on the – ISS and VPX-P scales [1,12]. Moreover, ISS is more reasonable to use to determine the probability of death in severe injuries, and VPX-P – to exclude the risk of death. Neurological status is recorded according to the Glasgow Coma Scale (GCS) [5,18]. At the same time, the volume of damage in children with combined trauma is less than in adults. This allows us to express the opinion that with a combined injury, children have a better chance of successful resuscitation and intensive care.

To date, there are several models in the Republic of Uzbekistan for providing step-by-step assistance to injured people. In the Samarkand region, qualified medical care for children is provided in central district and city hospitals, specialized care is provided in the SamSMU clinic No. 2, the regional trauma hospital and the children's multidisciplinary hospital. In rural areas with urban centers, the medical care system involves the delivery of the victim from the scene immediately to the stage of qualified medical care in a large multidisciplinary hospital in the city of Samarkand. In the vast majority of cases, emergency medical care for children is primarily provided in hospitals focused primarily on the treatment of the adult population. An important factor in the stage–by-stage treatment system that determines the outcome of a severe injury is the availability of specialized care, which largely depends on the remoteness of the nearest trauma center. Reducing the time spent by the victim at the stage of qualified medical care and transfer to a specialized center has a positive effect on the outcome of the injury. As a rule, this structure operates on the basis of intensive care units. At the same time, for patients with severe trauma and acute surgical diseases, better results within the hospital can be achieved with a multidisciplinary approach. [2,11]

Criteria for exclusion from the study:

1. The death of the victim in the first 6 hours after injury.
2. The presence of a combined injury in a child, without damage to the bone structures of the musculoskeletal system (ODS).

Criteria for inclusion in the study:

1. Children aged from 1 to 14 years inclusive.
2. The presence of a combined injury in a child with damage to the bone structures of the musculoskeletal system (ODS).
3. Hospitalization in a surgical hospital in the first 6 hours from the moment of injury.

The end points of the study are mortality, duration of ICU treatment, duration of inpatient treatment, functional results of surgical treatment of limb fractures, quality of life.

We conducted research and analyzed the results of surgical treatment of 165 injured children with fractures of the long bones of the extremities with combined injuries who were treated at the Department of traumatology of the city of Samarkand in the period from 2022-2024, Among the injured boys there were 99, girls – 66. There were 101 school–age children and 64 preschoolers. As a result of a traffic accident, 114 victims were injured, 51 on the street and at home, so it should be noted that 125 children were in a state of traumatic shock of varying severity, of them: Grade I shock was observed in 80 patients, grade II in 25, and grade III in 20 children. Also, 125 children had predominant

damage to the musculoskeletal system with traumatic brain injury, 20 had traumatic brain injury (TBI) with damage to the ODS, 14 patients had damage to internal organs (spleen in 7, liver in 3, lung in 2, kidney in 2) in combination with damage to the ODS and TBI. Concussion of the brain was noted in 68 children, brain contusion of varying degrees in 72. 36 victims had injuries to two segments of the musculoskeletal system.

3. Results and Discussions

It should be noted that all affected children with combined injuries were necessarily examined jointly by an intensive care specialist, a traumatology's, a surgeon and a neurosurgeon. Scales for assessing the severity of the injured patient were used for statistical analysis, comparison and objectification of data. The assessment systems used are generally accepted standardized systems for assessing the severity of injury and, according to experts involved in predicting the outcome of injured patients, these assessment systems objectively correlate with outcome forecasts. Patients with shock of any degree were hospitalized in the intensive care unit, and in some cases, during emergency operations, patients were immediately lifted into the operating unit. Antismoke measures were accompanied by diagnostic ones. In case of severe condition of the patient, the presence of shock of II and III degrees in the first hours after the injury, priority was given to operations on the skull, chest and abdominal cavity. After the elimination of the shock phenomena, the treatment of fractures was started. In mild shock, operations for limb fractures were performed in the first 6 hours from the moment of admission, anti-shock measures were carried out in parallel. Upon admission of the patient, before he was brought out of a state of moderate and severe shock and stabilization of hemodynamic parameters, the primary traumatology aid consisted mainly of anesthesia of fracture sites and temporary immobilization of fragments with transport tires, plaster splints or skeletal traction. Primary attention was paid to the topical diagnosis of brain and abdominal injuries. The final decision on the choice of a method for the treatment of ODS fractures was made after the completion of diagnostic and therapeutic manipulations with respect to these organs and systems. It is fundamentally important to divide patients into groups depending on the nature of the "dominant" injury, using modern highly informative diagnostic methods.

4. Conclusions

Improving the diagnosis and improving the effectiveness of treatment of children with combined trauma remains one of the most urgent problems of pediatric surgery today. Combined trauma requires not only conventional syndrome-based therapy to remove the patient from a critical condition, but also comprehensive diagnostic and therapeutic measures in relation to the localization of damage. The peculiarity of this type of injury is the existence of a dominant traumatic focus, concealing concomitant injuries in the acute period, which, manifesting after a while, can lead to severe complications, disability, and death. The correct assessment of the severity of the lesion and the prognosis of the outcome of the injury using diverse formalized scoring systems plays an essential role in the correct choice of treatment tactics for the patient. The unsatisfactory functional outcomes of surgical treatment of fractures with combined injuries indicate the need for further search for more reliable techniques and methods of treatment. Most studies consider the delivery of a patient with severe trauma within the framework of the "golden hour" concept, but not all regions have such an opportunity. Most often, patients are taken to the nearest level 3 hospital. So far, the issue of the final choice of reasonable timing, scope and methods of performing delayed surgical interventions has not been resolved. Thus, there is a need to develop criteria that determine the optimal timing of transfer of patients to a specialized department, the use of external devices as the primary method of fixation of fragments, the possibility of using internal minimally invasive osteosynthesis within the framework of sequential osteosynthesis. This circumstance determines the expansion of indications for minimally invasive osteosynthesis in combined injuries in children and determines the need for a comparative analysis of these surgical technologies. The uncertainty of the tactics of implementing some problems of surgical treatment of combined trauma in children, which we noted, was the motivation for carrying out this work.

The aim of the study was to improve the results of surgical treatment of diaphyseal fractures of the lower extremities in children with combined trauma.

REFERENCES

[1] Enin, A.V. Features of medical care in road accidents, taking into account the distribution of areas of responsibility of medical and preventive institutions of the Voronezh region / A.V. Enin // Biomedical and socio-psychological problems of safety in emergency situations. - 2013. - No. 4. - pp. 40-43.

[2] Zorin, V.I. Problems of providing assistance to children injured in road accidents / V.I. Zorin, N.G. Zhila // Far Eastern Medical Journal. - 2011. – No. 3. - pp. 44-46.

[3] Intramedullary osteosynthesis with locking pins for near- and intra-articular fractures of long limb bones in the complex treatment of victims with severe trauma / A.K. Dulaev, A.V. Dydykin, V.V. Zayats [et al.] // Emergency medical care. - 2013. - No. 1. – pp. 69-73.

[4] Nabiev, Z.N. Modern approaches to the complex treatment of polytrauma in children / Z.N. Nabiev, H.A. Shamsov // Healthcare of Tajikistan. - 2015. - № 1 (324). - Pp. 44-50.

[5] Our experience in surgical treatment of multiple and combined injuries of the upper limb / A.M. Khadjibaev, R.E. Asamov, T.R. Minaev [et al.] // Emergency medical care. -

2010. - No. 1. – pp. 62-65.

[6] Novokshonov, A.V. Craniocerebral injuries in children with polytrauma / A.V. Novokshonov, T.V. Lastaev // Polytrauma. - 2015. - No. 1. - pp. 23-28.

[7] New approaches to physiotherapy in severe combined trauma in children / M.F. Vasilyeva, O.V. Karaseva, E.R. Solovyova, T.A. Chernysheva // Physiotherapy, balneology and rehabilitation. - 2013. - No. 6. - pp. 48-49.

[8] Optimization of the tactics of surgical treatment of fractures of the lower extremities in combined trauma in children. Yunusov D. I. Dissertation, Ufa 2018.