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*Injuries sustained by children in road accidents
in the Lublin province as a cause of hospitalisation*

Obrażenia doznane przez dzieci w wypadkach komunikacyjnych na terenie
województwa lubelskiego jako przyczyna hospitalizacji

The aim of the paper was the analysis of reasons and character of injuries sustained by children in road accidents, of their effects and the results of hospital treatment applied.

With the progress of civilisation, especially the development of industry, motor transport and mechanisation of agriculture, a constant increase in the number of accidents and disasters may be observed. They have become the most frequent cause of deaths for children at the age of 0-15, which exceeds even the total number of deaths from cancer and diseases of breathing, nervous and blood-vascular systems. Among the causes of deaths, communication accidents are the most frequent, then falls and sports accidents (1,2,13).

In Poland from 1980 to 1985 the number of road accidents increased four times (3). A similar situation can be observed in other countries of Middle and Eastern Europe. In 1995 2,577 people at the age of 0-19 died in such accidents and 123,000 landed in hospitals. Among the reasons of getting disabled by young people injuries make 14.3%. (7.8)

Multiorgan injuries are more frequent among children than among adults. This is caused by the smaller surface of their bodies and topographic relationships of the internal organs (4,5,10). The treatment of such patients is a difficult diagnostic and therapeutic problem and in a great extent it depends on a well-functioning immediate aid, quick transport to health service centres and, in consequence of that, early application of specialistic treatment (6,9).

MATERIAL AND METHODS

The research material were the data included in the medical documentation (case records) of children hospitalised in 1995 in the Lublin province and the data concerning traffic accidents taken from the Lublin Police Office. In the analysis of the data we took the following elements into account: age and sex of the victims, circumstances of the accident, the day of the week and the season of the year. We were also interested in kinds of injuries, localisation and the time that passed from the moment of the accident till the time of an operation, the decision which treatment to choose and the treatment's results. The statistic analysis of the data was carried out using the Chi 2 test.

RESULTS AND DISCUSSION

In 1995 in the Lublin province 1,181 road accidents took place in which 1,622 persons suffered damages. 15% of them were children under 14 (243 persons), including 21 children aged 0-3; 61 4-6 year-old children and 161 children at the age of 7-14. The largest group were patients at school age (66.3%). 65.4% of victims were boys.

Among 243 examined persons the most frequently observed were head and neck injuries that happened to 191 persons (78.6%). In 100 cases (52.41%) they were the only injury of the body. In all other cases they coexisted with various other injuries. Altogether in 144 persons we observed only injuries of soft tissues, vessels, sensory organs and facial skeleton – the first type and in 154 – central nervous system lesions (brain concussion, brain and trunk contusions, haematomas, spinal cord lesions, spinal fractures) – second type (11,12).

The majority of victims with severe chest injuries die on the spot of an accident, immediate professional aid gives them a chance of survival in case of lighter injuries. Among the examined population 24 persons (9.9%) were hospitalised with the diagnosis of chest injuries.

Abdomen injuries were recognised among 36 persons (11.8%). Traumatic limbs injuries among children belong (apart from head injuries) to the most frequently occurring. They were the case among 116 examined patients (47.7%). If the examinations included also ambulant treatment they would undoubtedly be predominant among road injuries. Open fractures appeared among 4 persons (3.4%), displaced fractures – among 25 persons (21.6%) and dislocation in two cases (1.7%). Open fractures appeared especially on tibial and peroneal bones.

Injuries of one region of the body occurred in cases of 146 persons (60.1%), so in the majority of patients. In 100 (68.5%) cases they were concerned with the head and neck, in 40 cases (27.4%) - limbs, in 4 (2.7%) abdomen and in 2 (1.4%) - chest.

Among 71 persons (29.2%) injuries of two regions were recorded, predominantly they concerned the head and limbs - 51 persons (71.8%), then the head and abdomen - 11 persons (15.5%), the chest and the head - 4 cases (5.6%) and 2 cases (2.6%) of both chest and limbs injuries and abdomen and limbs injuries. One patient had chest and abdomen injuries.

In 27 cases (11.1%) lesions of 3 parts of the body were recorded. 13 of them (48.1%) were head, abdomen and limbs injuries, 8 (29.6%) - head, chest and limbs, 5 - head, chest and abdomen and one was the case of chest, abdomen and limbs injury.

Head injuries most often occurred in isolated injuries (52.4%), chest and abdomen injuries - in injuries of 3 regions of the body (58.3%; 52.8%) and limbs lesions - in 2 region injuries (50.9%).

CIRCUMSTANCES OF INJURIES

Analysing the circumstances of accidents it turned out that the largest group were pedestrians (110 persons - 45.3%), then people driving one-track vehicles (72-29.6%) and then passengers (61-25.1%). The number of children suffering damages was increasing with their age. Examining the interdependence of the number of accidents and the season of the year, it turned out that the biggest number of people sustaining injuries (about 43%) was in the summer months (June, July, August), with considerable intensification in June. The fewest accidents happened in winter months (December, January, February)- 9%. Analysing the intensification of accidents during the week it turned out that most of them happened on Saturday and the fewest accidents happened on Sunday.

Injuries of 2 or 3 regions of the body most often concerned pedestrians and passengers, injuries of one part of the body concerned generally cyclists. Greater percentage of chest and abdomen injuries was observed among pedestrians, and of limbs injuries - among cyclists (Fig.1).

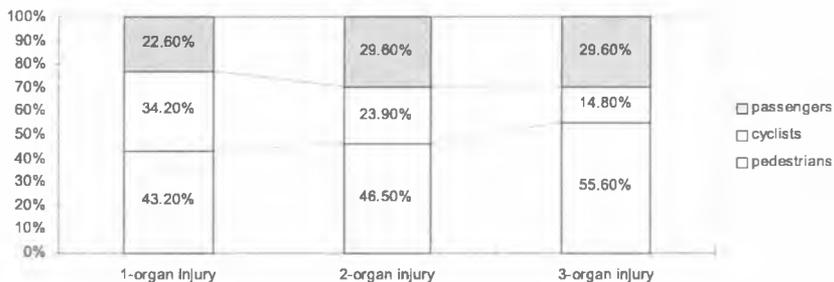


Fig. 1. Location of injuries and accident circumstances

TREATMENT

Among 15 children undergoing treatment in the Intensive Care Unit (OIOM) there were 14 pedestrians and one passenger. This fact confirms the belief that pedestrians are those who are more exposed to severe injuries connected with dysfunctions of basic life activities than other participants of traffic.

Among pedestrians 75.5% of persons underwent conservative therapy and 24.5% - surgical treatment. 77.8% of cyclists were under conservative treatment and 22.2% of them underwent operations; in case of passengers-respectively 80.3% and 19.7%. What can be noticed on the basis of these data is the fact that operations concern generally pedestrians and cyclists. On the other hand, passengers more often than pedestrians and cyclists undergo conservative curative treatment (probably owing to the partial amortisation of the injury by the body of the car).

Surgical treatment was more frequently required in case of children with abdomen injuries, than with limbs and chest injuries. Together with the growth of the number of injured regions of the body the amount of surgical interventions also increased (Fig.2).

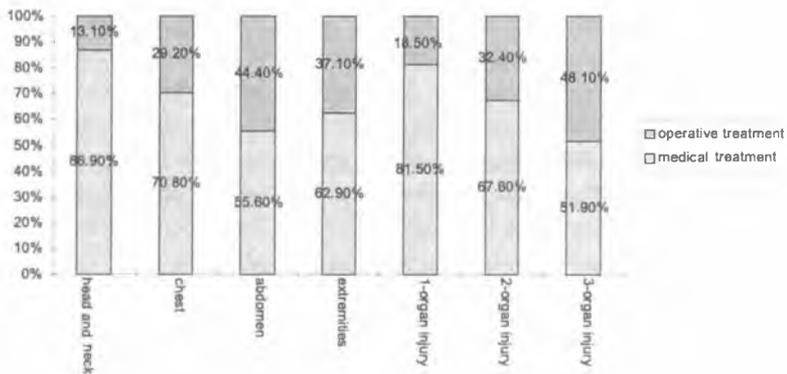


Fig. 2. Location of injuries and therapy

TIME OF TREATMENT

122 (50.2%) children were treated during the period shorter than 7 days, 102 (42%) - up to 30 days, 18 (7.4%) children - up to 90 days, 1 person was in hospital for more than 90 days. Among those who were hospitalised for the shortest period of time 84.4% suffered head injuries, 33.6% - limbs injuries, 12.3% abdomen and 8.2% - chest injuries. 49% of them were pedestrians, 27.5% - cyclists and 23.5% - passengers.

There were 102 (42%) patients hospitalised up till a month's time: 50 (49%) of them were pedestrians, 28 (27.5%) - cyclists and 24 (23.5%) - passengers. 72% of this group sustained head, 56.9% - limbs, 15.7% - abdomen and 10.8% chest injuries.

The period of 90 days was necessary in treatment of 7 pedestrians (38.9%), 4 (22.2%) cyclists and 7 (38.9%) passengers. 88.9% suffered limbs injuries, 72.7% - head injuries, 22.2% - abdomen injuries and 16.7% - chest injuries.

Among all the population the largest group were persons hospitalised for the time of not more than 7 days, with the slightest injuries; they were mainly pedestrians. The longest time of treatment was observed in the group of passengers and pedestrians. Considering the kind of injury it appeared that children with head injuries were most often hospitalised up till 7 or 30 days. Persons, whose treatment lasted up till 90 days, had mainly abdomen and limbs injuries (Fig.3).

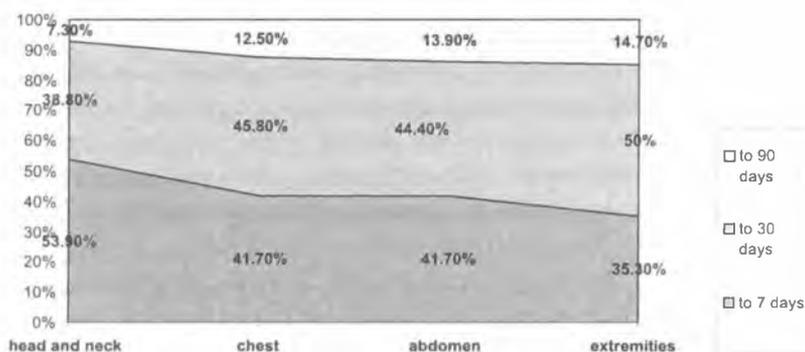


Fig. 3. Location of injuries and hospitalization

Table 1. The length of hospitalization and surgical treatment ($p < 0.001$)

The start of surgical treatment	to 7 days	%	to 30 days	%	to 90 days	%	over 90 days	%	total
to 6h	4	11.8	25	73.5	5	14.7	0	0	34
	%	57.1		75.7		35.7		0	
to 24h	2	16.7	5	41.7	4	33.3	1	8.3	12
	%	28.6		15.2		28.6		100	
more than 24h	1	11.1	3	33.3	5	55.6	0	0	9
	%	14.3		9.1		35.7		0	
total	7	12.7	33	60	14	25.5	1	1.8	55

What is of great importance for the reduction of death rate, the results of treatment and shortening of hospitalisation seems to be the lapse of time from the moment of injury till the moment when the professional medical aid is applied (9). Surgical intervention was usually applied up till 6 hours after an accident, which allowed for much shorter period of hospitalisation (Table 1).

RESULTS OF TREATMENT

The degree of injuries sustained by children, the level and organisation of aid applied to them may be testified on the basis of the results of hospital treatment (the effects of the following ambulant treatment and rehabilitation are not known). Injuries sustained in communication accidents often lead to complex, often very severe, persistent consequences. Among 243 patients a large majority recovered - 220 (90.5%); 14 (5.8%) sustained a considerable hypofunction. 9 (3.7%) persons died.

Among persons who suffered from a persistent health damage there were 8 pedestrians, 4 cyclists and 2 passengers. The majority of them were children above 7 years old. Persistent consequences of sustained injuries resulted mainly from impairments of motor and nervous systems (peripheral and central). In accidents they sustained most of all head injuries (78.6%), then limbs (71.4%), abdomen (21.4%) and chest injuries (7.1%).

Table 2. Results of surgical treatment ($p < 0.001$)

surgical treatment		complete cure	%	disability	%	death	%	total
to 6 h		31	91.2	3	8.8	0	0	34
	%	70.5		37.5				61.8
to 24 h		7	58.3	3	25	2	16.7	12
	%	15.9		37.5		66.7		21.8
more than 24 h		6	66.7	2	22.2	1	11.1	9
	%	13.6		25		33.3		16.4
total		44	80	8	14.5	3	5.5	55

A very frequent result of severe injuries in road accidents is death. In the research material 9 (3.7%) patients died. In the paper, deaths that happened within one hour after an accident were not taken into consideration. Hospital documentation does not include that. Among children who died there were 8 pedestrians and one passenger. Each of the

dead victims suffered head lesions, in 5 cases - limbs injuries, in 2 cases - chest injuries and in 1 case - an abdomen injury were recorded. Only in 1 case the cause of death was an isolated head injury. 7 in 9 children died after undergoing the intensive care treatment, 6 died after conservative therapy. Among those who underwent only surgical treatment (without being treated in the Intensive Care Unit) there were no cases of death. We can conclude that those who were mostly exposed to death were pedestrians, age above 7, with head and neck injuries as well as those who required previous intensive care treatment.

A complete recovery was observed in 91,2% of children operated on within 6 hours, 58,3% within 24 hours and 66,7 % within more than 24 hours after an accident. (Table 2). The opinion that the later surgical intervention is the smaller chance of recovery may be expected, is confirmed once again (2).

CONCLUSIONS

1. The victims of communication accidents are most often male pedestrians at school age. The largest number of victims was recorded in summer months, especially in June; among the days of the week - on Saturday.

2. The most frequently occurring were head and neck injuries, then limbs, chest and abdomen injuries. In 60,2% of cases injuries concerned only one organ, in 29,2% - two regions of the body, and in 11,1% - three regions of the body.

3. To 77,4% of the examined population a conservative therapy was applied; 22,6% underwent surgical intervention. In case of multiorgan injuries the number of surgical interventions increased as well as traumatic death-rate. 6,2% of the victims required intensive care treatment.

4. In 90,5% of the cases a complete recovery was observed, 5,8% suffered persistent health damages and 9 (3,7%) persons died mainly of head injuries. Interdependence of short period from the moment of an accident till the surgical intervention and better results of treatment as well as shorter period of hospitalisation was indicated.

5. Immediately undertaken preventive activities, school education about safety on the roads, immediate arrival to the spot of an accident, early application of professional aid are the ways of avoiding the most negative effects of road accidents among children (deaths, crippledness).

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STRESZCZENIE

Celem pracy była analiza przyczyn i charakteru urazów, doznanych przez dzieci w wypadkach drogowych, ich skutków oraz wyników przeprowadzonego leczenia szpitalnego.

Wśród 243 badanych osób obrażenia głowy i szyi były obserwowane najczęściej i wystąpiły w 191 przypadkach (78,6%). W populacji badanej 24 osoby (9,9%) były hospitalizowane z rozpoznaniem uszkodzenia klatki piersiowej. Urazy brzucha rozpoznano u 36 osób (11,8%).

Pourazowe uszkodzenia kończyn u dzieci należą, obok urazów głowy, do najczęściej występujących. W badanej populacji dotyczyły 116 pacjentów (47,7%). Urazy jednej okolicy ciała wystąpiły u 146 osób (60,1%), a więc u większości pacjentów. U 71 osób (29,2%) stwierdzono urazy dwóch okolic. W 27 przypadkach (11,1%) rozpoznano uszkodzenia trzech okolic ciała. Co do okoliczności wypadków okazało się, że najliczniejszą grupę stanowili piesi (110 osób - 45,3%), następnie podróżujący pojazdami jednośladowymi (72 - 29,6%) i pasażerowie (61- 25,1%). Urazy dwóch i trzech okolic ciała częściej dotyczyły

piesznych i pasażerów, jednej – rowerzystów. 122 (50,2%) dzieci było leczonych w czasie krótszym niż 7 dni, 102 (42%) – do 30 dni, 18 (7,4%) – do 90 dni, jedna osoba przebywała w szpitalu dłużej niż 90 dni. Wśród najkrócej hospitalizowanych 84,4% doznało urazów głowy, 33,6% kończyn, 12,3% brzucha i 8,2% klatki piersiowej. 49% stanowili piesi, 27,5% rowerzyści, a 23,5% pasażerowie. 77,4% badanej populacji leczono zachowawczo, 22,6% chirurgicznie. W przypadku urazów wielonarządowych wzrastała liczba interwencji chirurgicznych oraz śmiertelność pourazowa. 6,2% poszkodowanych wymagało opieki w OIOM. W 90,5% przypadków po zastosowanym leczeniu uzyskano pełny powrót do zdrowia, 5,8% doznało obniżenia sprawności, a 9 (3,7%) osób zmarło, głównie po urazie głowy. Wykazano zależność pomiędzy krótkim czasem od wypadku do interwencji chirurgicznej a lepszymi wynikami leczenia, krótszym czasem hospitalizacji.

