COMPARATIVE STUDY OF POLYTRAUMA WITHIN A GROUP OF 2004 PATIENTS (PEDIATRICS AND YOUNG ADULTS)

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Abstract

Globally, there are many efforts to reduce the incidence of road accidents. However, the number of patients hospitalized with polytrauma is still high, with approximately 5.8 million deaths associated with traumatic injuries annually. Among the young, active age population, trauma is the current domain and timing a major cause of severe illness.

Therefor we aimed by this study to evaluate comparatively the incidence of polytraumas among young adult patients presented in the Emergency - department (information obtained from the archive of the Emergency Clinical Hospital Sfântul Apostol Andrei Galați – 129 young patients) and pediatric subjects from a group of 710 children.

The data obtained following the anamnesis, the clinical and paraclinical examination of the patients, were entered into the IBM SPSS Statistics 24 and Excel 2019, then sorted and filtered according to different criteria. In both groups, the incidence of male patients is statistically noticeable and also aspects regarding high frequency according to definite spring seasonality, and paraclinical, clinical, and sociodemographic elements.

Key words: pediatrics, polytrauma, sociodemographic, seasonality, incidence

Introduction

Globally, there are many efforts to reduce the incidence of road accidents. However, the number of patients hospitalized with polytrauma is still high, with approximately 5.8 million deaths associated with traumatic injuries annually. Clinicians around the world are faced with a difficult problem, that of distinguishing the severity and complexity of traumatic injuries. To succeed in decreasing morbidity and mortality rates, advanced health care methods are needed. [Chrysou, 2017].

Among the young, active age population, trauma is the current domain and timing a major cause of severe illness. Within numerous societies, trauma system availabilities, new hospital certification strategies, and didactic materials have been performed to establish how to care for trauma.

The main physiological aspects that must be followed when the trauma patient is admitted to the hospital are hypothermia, acidosis, and coagulopathy. Physiological changes following multiple injuries require the investigation of several parameters necessary for their management, it is also necessary to involve specialists in emergency medicine, general surgery, ATI, orthopedic surgery, vascular surgery, etc. [von Ruden, 2017].

The authors describe the concept as better representing the principle of medical ethics "do no harm" (Primum, nonnocere) in polytrauma patients, to achieve the best possible outcome for a given patient, hospital, and trauma center [Giannoudis, 2017].

Material and method

Purpose and objective.

The purpose of the study was to evaluate comparatively the incidence of polytraumas among young adult patients presented in the UPU (information obtained from the archive of the Emergency Clinical Hospital Sfântul Apostol Andrei Galați) and pediatric subjects from a group of 710 children.

The objectives of the study included highlighting all the distinct elements found in both adult and pediatric patients, defining risk factors, and negative prognosis. To

expose these differences, variables of demographic type, calendar risk factors, and polytraumas were used. The obtained data were entered into a proprietary database, by statistical data reported through the reporting protocols of the two health units: the County Hospital, respectively the Children's Hospital.

Study lot

The study group includes a total number of 710 pediatric patients and 129 young subjects. The information was obtained from the presentation sheets of the CPU/UPU of the St. Ioan Emergency Clinical Hospital in Galati and the St. John's Emergency Clinical Hospital. Andrei", Galati.

Inclusion and exclusion criteria for pediatric patients:

✓ The inclusion criteria were children under the age of 18 presented in the CPU, with the diagnosis of polytraumatism, in the period 2015-2018.

✓ Exclusion criteria included age over 18 years, incomplete records, and other diagnoses not included in the updated polytrauma case definition.

Inclusion and exclusion criteria for young subjects:

✓ The inclusion criteria were the age between 18 and 30 years, considered the young adult age group, as well as the diagnosis of polytrauma.

✓ Exclusion criteria include other age groups and countries with other diagnoses. Demographic data such as residence in other counties were not considered exclusion criteria.

Statistical methods.

The data obtained following the anamnesis, the clinical and paraclinical examination of the patients, were entered into the IBM SPSS Statistics 24 and Excel 2019 work program, then sorted and filtered according to different criteria. For the graphic representations, we used pie, bar, boxplot, and histogram graphs, and the statistical analyzes were performed using dedicated software applications SPSS and Excel.

Crude descriptive statistical parameters were initially calculated for all variables for which this type of calculation approach was considered potentially useful. Among them, we mention average value, standard deviation (SD), the minimum and

maximum value for continuous numerical variables, the frequency for categorical variables, average value, and mode.

For continuous data, simple bivariate correlations were analyzed with the calculation of Pearson's correlation coefficient (r – linear correlation coefficient) and determination factor (R2). If data were of the categorical or ordinal type, the Kendall-tau (rs) correlation test with two-tailed statistical significance testing was applied. Pearson's correlation coefficient provides information on the direction and strength of the laws when the variables are numerical.

Regarding the study of statistical significance, the "p" value was calculated, more precisely the probability of accepting the formulated null hypothesis, i.e. the situation in which there is no association between the variables (so to accept that there is an association, its value needs to be small than a fixed threshold of 5% or 1%).

The software used was SPSS version 23, respectively Excel 2019. The results of the different analyzes were considered statistically significant when a value of $p < 0.05$ error probabilities was obtained. For values of the p index <0.01, the existence of a better statistical significance is considered, and in the case of the association of values below 0.005 or below 0.001, these results are statistically significant.

Results

To detect the differences between the two groups, a comparative study will be carried out between the two populations present at the level of the group of polytraumatized patients. Thus, reference will be made both to the group of adult patients (several 1294 patients) and the pediatric group (n=710).

The differences between these batches will be studied from the point of view of paraclinical, clinical, and sociodemographic elements. At the level of the whole batch consecutively, the elements that influence the unfavorable evolution will be tried, if they prove to be significant from a statistical point of view.
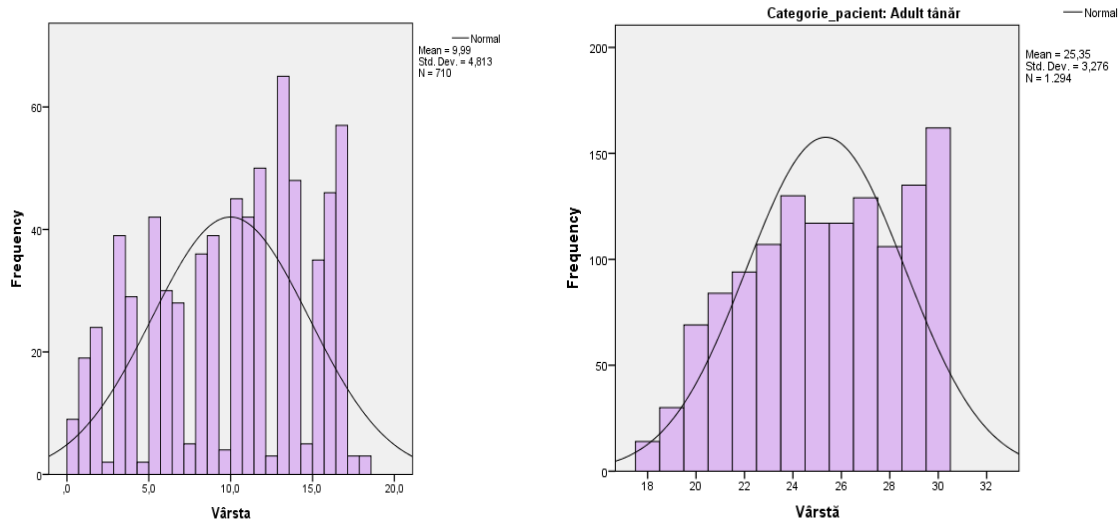
Figure 1. Classification According To Age Distribution

From the point of view of the ages detected in the patients at the time of presentation to the CPU/UPU, distinct arrangements of the Gaussian curves were highlighted as follows:

- In pediatric patients, a Gaussian-normal histogram curve with a slight shift to the left was observed. The age under 18 years is predominant, the average being 9.99 years with a standard deviation of ± 4.81 years. The maximum incidence was highlighted within the 15-18 years threshold.

- The group consisting of young adults presented a distribution curve with a normal Gaussian appearance, without deviations, with the extreme values presenting an approximately equal arrangement. The average age of this batch is 25.35 years, the standard deviation is ± 3.24 years. The highest incidence is around the age of 30.
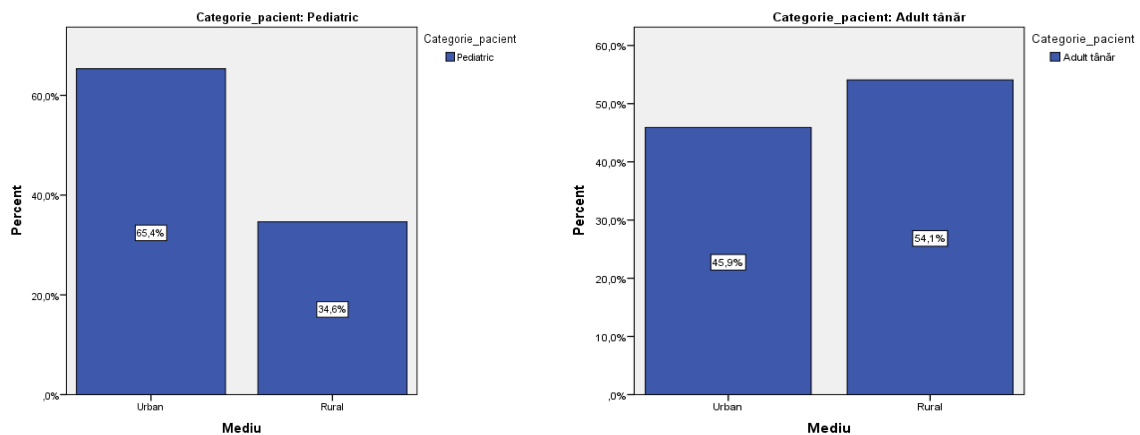

Figure 2.Classification According To Socio-demographic Factors

According to figure 2, the following differences could be observed according to socio-demographic factors:

- pediatric patients mainly come from the urban environment, while the group of adults mainly comes from the rural environment

- from the point of view of the gender distribution of patients, both groups are represented by the male gender in the largest proportion.
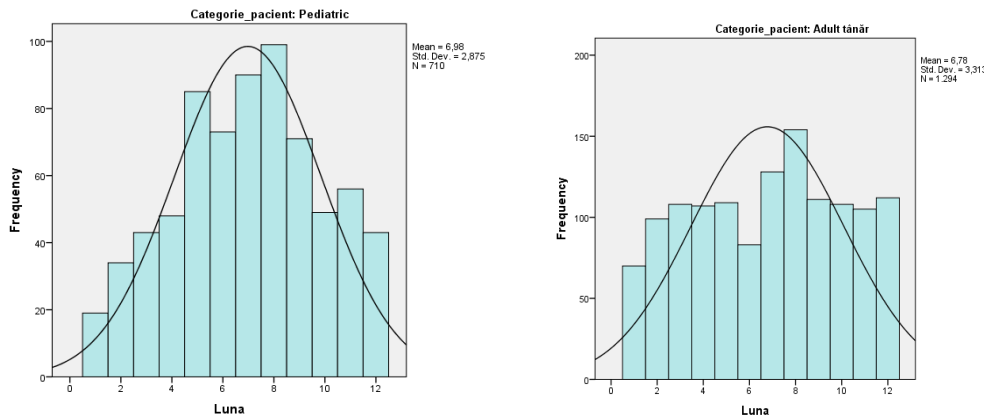

Figure 3. Classification according to the months in which they occurred

According to figure 3, after making the histograms showing the maximum incidence of the months of presentation, it was concluded that both lots have a maximum incidence in August, the peaks of maximum incidence being in the summer months (August, July), especially at the end of the week.

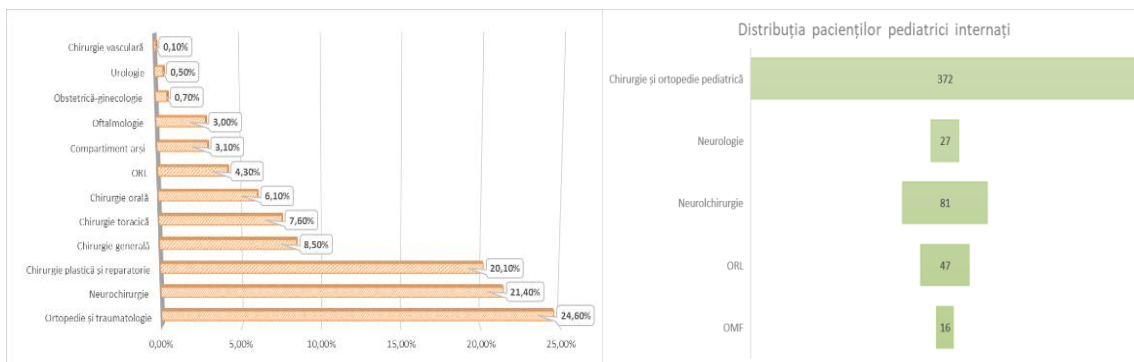Figure 4. Comparative analysis of the distribution of patients according to the department

From the point of view of the wards where the patients were admitted, it can be seen from figure 4, which means that the orthopedics ward has the largest share of admissions, whether it is pediatric orthopedics or that specific to young adults. in second place in identifying pediatric patient admissions is the pediatric

neurology/neurosurgery department, while second place in young adults is occupied by plastic and reconstructive surgery closely followed by neurosurgery, thoracic surgery, oral surgery, and surgery general. AndNT(Otorihinolaryngology).As we mentioned above, for both groups, male patients are predominant even in the case of those who died.

The figure below shows a series of bivariate correlations, using the Pearson index (with a threshold of very strong statistical significance at values of p <0.01). Conclusions in what differences are found between the two groups were created using the variable "patient_category". We can admit that the month in which patients presented themselves at the CPU/UPU as well as the condition outside was influenced by their age, a determining factor of the two population groups.

Correlations		_pacient	Mediu	Sex	Vârstă	Luna	Externare	n_CPU
Categorie _pacient	Pearson Correlation	1	,238**	-,247**	,813**	-,004	-,479**	.b
	Sig. (2-tailed)		,000	,000	0,000	,848	,000	0,000
	N	2346	2346	2346	2346	2346	2346	1051
Mediu	Pearson Correlation	,238**	1	-,056**	,199**	,071**	,033	,146**
	Sig. (2-tailed)	,000		,007	,000	,001	,112	,000
	N	2346	2346	2346	2346	2346	2346	1051
Sex	Pearson Correlation	-,247**	-,056**	1	-,207**	,004	,170**	,020
	Sig. (2-tailed)	,000	,007		,000	,843	,000	,527
	N	2346	2346	2346	2346	2346	2346	1051
Vârstă	Pearson Correlation	,813**	,199**	-,207**	1	,015	-,327**	-,112**
	Sig. (2-tailed)	0,000	,000	,000		,458	,000	,000
	N	2346	2346	2346	2346	2346	2346	1051
Externare	Pearson Correlation	-,479**	,033	,170**	-,327**	,021	1	,204**
	Sig. (2-tailed)	,000	,112	,000	,000	,300		,000
	N	2346	2346	2346	2346	2346	2346	1051

**. Correlation is significant at the 0.01 level (2-tailed).
b. Cannot be computed because at least one of the variables is constant.

Correlations

			_pacient	Mediu	Sex	Vârstă	Luna	Externare	_CPU
Kendall's tau_b	Categorie _pacient	Correlation Coefficient	1,000	,238**	-,247**	,697**	-,001	-,358**	
		Sig. (2-tailed)		,000	,000	0,000	,935	,000	
		N	2346	2346	2346	2346	2346	2346	1051
	Mediu	Correlation Coefficient	,238**	1,000	-,056**	,157**	,060**	,051**	,115**
		Sig. (2-tailed)	,000		,007	,000	,001	,010	,000
		N	2346	2346	2346	2346	2346	2346	1051
	Sex	Correlation Coefficient	-,247**	-,056**	1,000	-,177**	,004	,141**	,002
		Sig. (2-tailed)	,000	,007		,000	,805	,000	,935
		N	2346	2346	2346	2346	2346	2346	1051
	Vârstă	Correlation Coefficient	,697**	,157**	-,177**	1,000	,005	-,219**	-,100**
		Sig. (2-tailed)	0,000	,000	,000		,734	,000	,000
		N	2346	2346	2346	2346	2346	2346	1051
	Luna	Correlation Coefficient	-,001	,060**	,004	,005	1,000	,015	,019
		Sig. (2-tailed)	,935	,001	,805	,734		,387	,432
		N	2346	2346	2346	2346	2346	2346	1051
	Externare	Correlation Coefficient	-,358**	,051**	,141**	-,219**	,015	1,000	,180**
		Sig. (2-tailed)	,000	,010	,000	,000	,387		,000
		N	2346	2346	2346	2346	2346	2346	1051
Spearman's rho	Categorie _pacient	Correlation Coefficient	1,000	,238**	-,247**	,836**	-,002	-,371**	
		Sig. (2-tailed)		,000	,000	0,000	,935	,000	
		N	2346	2346	2346	2346	2346	2346	1051
	Mediu	Correlation Coefficient	,238**	1,000	-,056**	,189**	,071**	,053**	,127**
		Sig. (2-tailed)	,000		,007	,000	,001	,010	,000
		N	2346	2346	2346	2346	2346	2346	1051
	Sex	Correlation Coefficient	-,247**	-,056**	1,000	-,212**	,005	,147**	,003
		Sig. (2-tailed)	,000	,007		,000	,805	,000	,935
		N	2346	2346	2346	2346	2346	2346	1051
	Vârstă	Correlation Coefficient	,836**	,189**	-,212**	1,000	,007	-,269**	-,136**
		Sig. (2-tailed)	0,000	,000	,000		,736	,000	,000
		N	2346	2346	2346	2346	2346	2346	1051

**. Correlation is significant at the 0.01 level (2-tailed).

Disccusions

A polymerized patient presents multiple traumatic sites, with an increased risk of developing an immediate reaction, late complications from the body, with an evolving potential towards multiple organ failure. .[Mann, 2006],[Roşu, 2010]

One can try to avoid most of the negative prognostic factors by making a comparative system of trauma care dependent on age groups, this is helpful in early determination of possible subsequent complications and reduction of the mortality rate.

The approach strategy for the polytraumatized patient must begin with the identification of the factors that can influence the injury that occurred after the polytrauma.

Polytrauma is an integral part of the activity of the CPU, of the Emergency Clinical Hospital for Children "Sfântul Ioan" in Galati.

The comparative analysis of the sociodemographic factors of the two groups highlighted the following characteristics:

- the origin of pediatric patients is mainly from urban areas compared to adult patients from rural areas.

- both the group of pediatric patients and that of young adults are characterized by the highest proportion of males.

Presentation months at CPU/UPU are influenced by the backgrounds of origin. Outdoor activities increase during the summer holidays, a fact that may justify the increase in the incidence of polytrauma at that time of the year in children.At the international level, numerous specialist studies have been carried out, through which three main elements causing road accidents have been highlighted:

- preschoolers are not supervised enough

- educating the insufficiency of children in what prudence is used

- inattention and excessive speed of drivers

A common conclusion between the two groups is that the increased incidence of polytrauma cases is in August.

Conclusions

- the average age of the pediatric population is 9.98 ± a standard deviation of 4.82 years, while for the population aged between 18-30 years it is 25.35 ± a standard deviation of 3.28 years.

- in both groups, the incidence of male patients is noticeable.

- the urban environment of origin increased in incidence in pediatric patients compared to the second group where the rural environment is predominant.

- the summer months present an increased incidence both at. the pediatric group as well as the adult group.

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