

Severe head injuries in the elderly

Ciężkie urazy głowy u osób starszych

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Poddano prospektywnej analizie 100 kolejnych pacjentów w wieku powyżej 70 lat, przyjętych do oddziału neurochirurgii z powodu ciężkiego urazu czaszkowo-mózgowego z GCS przy przyjęciu poniżej 9 punktów. Analizowano wiek, płeć, rodzaj urazu, oraz obecność wewnątrzczaszkowego procesu uciskowego. Wyniki leczenia oceniano według GOS. 58 pacjentów poddano leczeniu operacyjnemu z powodu wewnątrzczaszkowego procesu uciskowego w ciągu 2 godzin po przyjęciu. Spośród 58 pacjentów z wewnątrzczaszkowym procesem uciskowym zmarło 52 (90%); u pacjentów leczonych zachowawczo śmiertelność wyniosła 80%. Wydaje się, że w tej grupie wiekowej leczenie powikłań ciężkich urazów czaszkowo-mózgowych może być ograniczona do farmakologicznego obniżania ciśnienia wewnątrzczaszkowego i ochrony przed powikłaniami płucnymi i krążeniowymi, bez wdrażania agresywnego leczenia operacyjnego.

Słowa kluczowe: ciężkie urazy głowy, skala śpiączki Glasgow, ludzie starzy

100 consecutive patients over 70 years of age, admitted directly after a severe head injury, with initial GCS less than 9 points, were analyzed. Age, gender, type of injury, the presence of intracranial space-occupying lesion were taken into account as the most important prognostic factors. Treatment results were assessed according to GOS. 58% of the patients with space-occupying lesions were treated surgically within the first two hours after admission, 52 (90%) of them died. Mortality in patients with non-surgical lesions reached 80%. It can lead to the conclusion that in patients over 70 years of age therapy can be limited to a pharmacological reduction of elevated ICP and potential cardiac and pulmonary complications, without aggressive surgical treatment.

Key words: severe head injuries, Glasgow Coma Score, old people

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Introduction

Head injuries remain the leading cause of death and disability in young adults, but they have also become a significant cause of death or disability in older population [1,2,3]. Elderly people exhibit a high mortality rate after head injuries, because age is one of the most important predictors of the treatment results [1,2,3]. Multiple independent risk factors affecting an outcome from severe head injuries have been pointed out; age, Glasgow Coma Score (GCS), pupils reactivity and the presence of intracranial space-occupying lesion being the most important ones [1,2,3,4,5,6,7,8]. In elderly people, if the space-occupying lesion is noted, a favorable outcome is exceptional, and in spite of aggressive treatment almost all patients die [4,5,6,7,8]. If the concomitant extra-cranial injury exists, the prognosis worsens [3,5,6], and in almost all

patients death is inevitable [4,5,6]. In isolated head injuries in old patients with low GCS on admission mortality exceeds 80%, and good results of treatment are unusual [2,3,4,7,8].

This paper analyzes a prospective clinical outcome in people over 70 years of age who were victims of a severe head injury.

Aim and scope

The results of treatment of 100 consecutive patients, admitted directly after a severe isolated head trauma, were prospectively analyzed. All patients were admitted with GCS [9] of 8 or less. Age, gender, type of intracranial lesion, type of treatment, and outcome in Glasgow Outcome Scale (GOS) [10] were analyzed. The outcome was analyzed at the 90th day after admission to the hospital.

Material

100 consecutive patients over 70 years of age admitted to neurosurgical department directly after a head injury were prospectively analyzed. All patients had initial GCS of 8 or less. There were 68 men and 32 women, aged between 71-89 years. Table I shows age and gender of the analyzed group of patients.

Table I. The distribution of age and gender in the analyzed group of 100 patients

Age[years]	Male	Female	Total
71-75	45	20	65
76-80	17	3	20
81-85	5	6	11
>85	1	3	4
Total	68	32	100

On admission 52 patients had GCS of 3-5 points, 48 patients – of 6-8 points. Immediately after admission all patients underwent an emergency CT scanning, and the patients who required surgical intervention were directly transported to the operating room. 58 patients had intracranial space-occupying lesion which required rapid neurosurgical intervention. Intracranial space-occupying lesions

were evacuated, in most cases a craniotomy was performed. Only in 4 patients with a very significant brain bulk, a craniectomy was done. In 41 patients an acute subdural hematoma, in 7 an intracerebral hematoma, in 3 a cerebellar hematoma and in 1 an epidural hematoma were evacuated. 5 patients had an open skull fracture and were treated surgically. In 1 patient, with a significant cerebral contusion and extensive cerebral shift, a decompressive craniectomy was performed. Intracranial pressure monitoring was performed routinely in all patients. All patients, despite the kind of treatment – surgical or conservative, were intubated, sedated, with head elevated at 30°, enteral feeding was started 12 hours after admission, and the patients were kept euvolemic and isothermic. When ICP monitoring showed elevated ICP, a barbiturate coma was induced.

In 42 patients intracranial lesions were treated conservatively. 5 patients had intracranial hematomas, 2 of them subdural, and 3 intracerebral ones. Midline shift was not extensive in these patients and we decided not to operate these patients. Figure 1 shows bilateral cerebral contusion without midline shift. Table II shows the types of lesions in patients treated surgically and conservatively.

Table II. Diagnosis and type of treatment in the analyzed group of patients

Type of treatment	Diagnosis		
	Surgical	Conservative	Total
Subdural hematoma	41	2	43
Intracerebral hematoma	7	3	10
Epidural hematoma	1	0	1
Intracerebellar hematoma	3	1	4
Open skull fracture	5	0	5
Cerebral contusion	1	36	37
Total	58	42	100

Results

In 52 patients the injury was caused by a motor vehicle accident, in 40 by falls, and in 8 by assaults.

From among 100 patients, 86 died. From among 58 patients treated surgically 52 (90%) died, from among 48 patients treated conservatively 34 (80%) died. All patients with subdural and intracerebellar hematomas died; a good result of treatment – group I or II in GOS - was achieved in 6 patients only. Figure 2 shows CT examination of acute subdural hematoma. An extensive midline shift is noted. Such lesion leads to unfavorable prognosis – all patients with such a lesion died. Table III shows the results of treatment assessed according to Glasgow Outcome Scale.

From among 52 patients with GCS of 3 to 5 points on admission all died, from among 48 patients with GCS of 6-8 points 14 (29%) survived, but only in 6 of



Fig. 1. CT examination, transverse projection. Bilateral cerebral contusion of temporal lobes. No midline shift is noted. Prognosis is much better than in patients with subdural lesions.



Fig. 2. CT examination, transverse projection. Massive subdural hematoma of the left hemisphere with an extensive midline shift is noted. All patients with such a lesion died.

Table III. Outcome in Glasgow Outcome Scale /GOS/ in regard to clinical diagnosis

Diagnosis	GOS					Total
	I	II	III	IV	V	
Subdural hematoma	0	0	0	0	43	43
Intracerebral hematoma	0	0	1	1	8	10
Epidural hematoma	0	0	0	1	0	1
Intracerebellar hematoma	0	0	0	0	4	4
Open skull fracture	1	2	1	0	1	5
Cerebral contusion	1	2	2	2	30	37
Total	2	4	4	4	86	100

them results could be assessed as satisfactory – I or II grade in GOS. All patients, except one who presented nonreactive dilated pupils on admission, died; that patient persisted in the vegetative state.

We did not find any difference in the results of treatment between males and females.

Discussion

In the USA, an annualized head injury-associated death rate is 16.9 per 100 000 residents, and death rates peak at 15-24 years of age and at 75 years and over (11). In Poland in 2008 7407 deaths occurred in people over 70 years of age (12), caused by injuries, 70% of them due to head trauma.

The most important prognostic factors in head-injured patients are age, the presence of intracranial space-occupying lesion, Glasgow Coma Score on admission, and the type of eventual coexistent extracranial injury [1,2,3,5,6,13]. The presence of acute subdural or intracerebral hematoma leads to almost a 100% of mortality rate in people over 65 years of age (14, 15). In elderly people an impact of coexisting diseases, of lungs and heart especially, is extremely important and leads to unfavorable results. The number of victims of motor traffic accidents increases and in our material road accidents were the prevailing cause of head injuries. In previous studies [3,7], the most frequent cause of head injuries in this age group were falls, while in this study we found that traffic accidents predominated. Elderly people are not only pedestrians but also often car drivers and in a significant number of cases their faults lead to an accident. It seems rational to give elderly drivers annual health check-ups. Such system exists in many European countries and should also be introduced in Poland. Falls still remain a very significant cause of head injuries in the elderly. In some patients it is difficult to say whether a head injury is the primary cause of a disease, or it is secondary to myocardial or cerebral infarction. Similarly to other studies, we also found a very high percentage of unfavorable treatment results. All our patients were diagnosed very quickly and an appropriate type of treatment was introduced within the first two hours after trauma. If the patient had a space-occupying lesion, the removal in almost all patients was performed within the first 60 minutes. However, despite the aggressive treatment, the results achieved were unsatisfactory. From among the patients requiring surgery, 90% died. It must be pointed out that almost all of them were admitted in a very poor condition; out of 58 patients, 46 with GCS below 6 points, which is always a very bad prognosis, despite the age of the patients. The results of treatment were identical in all age groups. It can be concluded that in patients over 70 years of age the results are similar to those in slightly younger or older people. We noted a very low incidence of epidural hematoma, in 100 patients such a lesion occurred in one case only, but it is known that this type of lesion is unusual in old people. Figure 3 shows an epidural hematoma in our patient.

In this age group an epidural hematoma appears only in patients with multiple cranial fractures, in victims of extremely severe head injuries, and the majority of these patients die within minutes after trauma, before the admission to the hospital. In our material, the most common injury complication was a subdural hematoma – in 43% of the patients, and such diagnosis leads to an unfavorable prognosis [3,16,17,18]. All



Fig. 3. CT examination, transverse projection. Extensive epidural hematoma of the left hemisphere is noted. Such a lesion gives a better prognosis, but in old age groups such a posttraumatic lesion is very unusual, in our material appeared in 1% of patients.

our patients with an acute subdural hematoma died, similarly to other clinical studies [3, 16,17,18].

Out of 100 patients 86 (86%) died, only 14 survived, most of them had an open skull fracture or a cerebral contusion, the latter not requiring surgical intervention. The presence of intracranial hematoma led to an unsatisfactory result – almost all patients died. 3 patients survived, but 2 of them in the vegetative state, and the last one with severe neurological deficit.

The treatment results of patients with a very low initial GCS score are bad, although one new study showed a significant improvement. In this series, reported by Chamoun et al. [13], the mortality was 50%, while

in other series 80% to 97% [2,3,7,8, 14,16,18]. However, some important discrepancies can be seen in this study, for example the analysis of the reaction of pupils. More reliable studies reveal a high mortality rate, exceeding 80%. In our previous studies, performed almost 20 years ago, the results of treatment were similar to those reported in this study [3,4]. It shows that the extreme development of medical sciences within the last 20 years, including a perfect and rapid diagnosis, and a safe and effective intensive therapy of intracranial lesions has not affected the therapy of a severe blunt head trauma. It leads to the conclusion that the most important measures should concentrate on prophylactic actions, which could diminish the number of trauma accidents.

Our results, as well as the results obtained by other authors, lead to the questions about the necessity of surgical treatment of space-occupying lesions in elderly people. It is well known that evacuation of epidural hematoma, if performed early, before the development of brain stem insufficiency, often leads to perfect treatment results, but this type of lesion is very rare in elderly patients [2,3,4,13]. However, especially in older age groups, in cases of acute subdural hematoma we face a different problem, because despite the kind of treatment – conservative or surgical, the results do not differ, and practically all patients die [3,7,16,17,18]. Similar results have been also shown in this study. Despite ethical problems [19], it should be seriously taken into account that in these patients we should limit or even stop all surgical activity and reduce medical treatment only to conservative measures.

An accurate prediction of survival and functional outcome is of utmost importance, both for physicians and the family of the victim. Such studies help to decide the aggressiveness of treatment as well as allow for informed counseling of relatives. Even if the patient survives, the residual disability is severe, and many patients persist in the vegetative state [20, 21]. Physicians can play a very important role in primary prevention of a head injury through careful prescribing of medications, patient counseling, and advocacy of safe driving rules.

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