

1. SUMMARY

Introduction. Epilepsy has been known to mankind since ancient times. The suddenness of its symptoms associated with a sudden, unpredictable loss of consciousness, falling, strains and convulsions, combined with the lack of knowledge about the causes of its occurrence for centuries, was explained as the influence of various supernatural forces. Epilepsy is one of the most common neurological illnesses. According to the World Health Organization, 1% of the world's population suffers from epilepsy. In contrast, up to 10% of people worldwide have one seizure in their lifetime.

Aim. The main purpose was to analyze the intervention of emergency medical teams with patients with seizures and to create the concept of the epileptic chain of survival.

The specific objectives of this paper covered the following issues:

1. Is there a correlation between the occurrence of seizures and the patient's sex and age?
2. Is there a correlation between the occurrence of seizures and time and place variables?
3. Does the EMT at the moment of receiving emergency call have knowledge about the nature of the event (convulsions)?
4. What are the most common medical emergency procedures undertaken by EMTs in a patient with convulsions?
5. What factors influence the decision to transport a patient with convulsions to the ER?
6. Was the ICD-10 diagnosis made by the EMT regarding the occurrence of convulsions confirmed in the ER?
7. Did the result of the test for the Sars-CoV-2 virus affect the patient's state of consciousness and the decision to admit the patient to the hospital ward?
8. What factors predispose the transfer of a patient with convulsions previously transported by EMT to the Emergency Department to another hospital ward?

Materials and methods. The study was conducted based on a retrospective analysis of the data contained in Travel Order Cards, Medical Cards for Rescue Activities, and collected in computer systems operating in the Independent Public Health Care Center RM-MEDITRANS Ambulance and Sanitary Transport Station in Siedlce and the Mazowiecki Wojewódzki Szpital im. st. Jana Pawła II in Siedlce, i.e., the State Medical Rescue Command Support System (SWD

PRM) and Asseco Medical Management Solutions (AMMS). The study covered the period from January 1, 2020, to December 31, 2021.

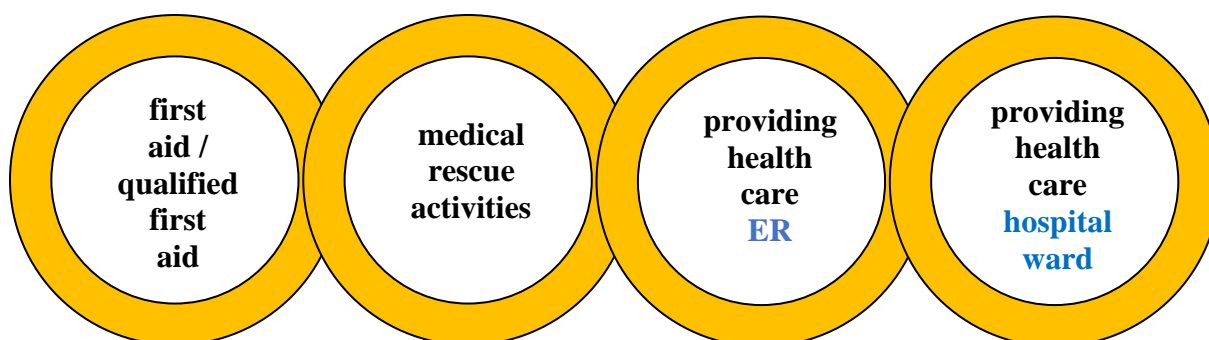
Analyzed were EMTs stationed in the Siedlce powiat, Grodzki powiat and Siedlce County powiat. Out of all EMT interventions (n=24852), 853 (3.43% of all EMT interventions) were selected, in which the diagnosis of *G40-Epilepsy* (n=447), *G41-Status epilepticus* (n=9), or *R56-Convulsions, not elsewhere classified* (n=397) and on this basis analyzes of EMS interventions in patients with seizures were performed. Then, based on the data obtained from the Mazowiecki Szpital Wojewódzki im. Jana Pawła II in Siedlce regarding patients who were transported to the emergency department by EMTs with diagnoses of *G40-Epilepsy*, *G41-Status epilepticus*, or *R56-Convulsions, not elsewhere classified* (n=613), further analyzes were made regarding the activities of EMTs and patient management in the ER.

Data on time variables (season, month, day of the week, hour range), intervention area (urban, rural), reason for the call, patient's sex and age (age group), performed ICD-9 medical procedures, were obtained from the SWD PRM Administrator Module, diagnosis made according to the ICD-10 codification of the applied pharmacotherapy, end result of the intervention. The above data was supplemented with data from KZW and KMCR concerning the urgency code, place of the call (home, public place, prison, workplace, etc.), Glasgow scale (GCS).

However, data from the AMMS program operating at the Mazowiecki Szpital Wojewódzki in Siedlce included information on admission or non-admission to the ward, performed tomography test, ethanol content in the blood, glucose level, body temperature, GSC scale, SARS-CoV-2 antigen test result, diagnoses based on ICD-10 codification.

By compiling data on EMT interventions and medical services performed in the ER, analyzes were made comparing the diagnoses made by EMTs and ER and the results of GCS.

Results. The concept of the epileptic chain of survival (Figure) is an attempt to systematize rescue activities undertaken in patients with seizures, starting from the assistance provided by witnesses of the event to health services provided in hospital wards. Rescue procedures in the event of their occurrence have several common activities, including first aid, qualified first aid, medical rescue activities and health care services. The presented concept is inscribed in the currently functioning systems of the State Medical Rescue and health care.



witnesses own safety
 patient safety prevention, secondary injuries, especially head area
 ensuring airway patency in a manner adequate to the patient's condition and the competence of the rescuer
 after cessation of convulsions: assessment/examination of consciousness, airway, breathing and signs of circulation
 medical interview
 treatment of possible injuries
 ensuring safe position

EMT call

physical and subjective examination
 determination of SpO₂, RR, HR, blood glucose level, body temperature measurement, ECG
 consider anticonvulsants

consider transport to the ER

performing laboratory tests, including determining the level of alcohol
 consider CT, MRI, etc.
 surgical treatment of injuries

consider ward admission

consider extending EEG diagnostics, etc.
 post-hospital recommendations and implementation or possible change of therapy

Figure. The epileptic chain of survival

Out of all interventions of Medical Rescue Teams (n=24852), dispositions in which a diagnosis was made involving a seizure constituted 3.43%. The 853 cases of seizure calls analyzed included diagnoses such as *G40-Epilepsy* (52.40%), *R56-Convulsions not elsewhere classified* (46.54%) and *G41-Status epilepticus* (1.06%). 81.59% of the patients with seizures were men, and the age of the patients ranged from 0 to 93 years.

EMTs were most often called in code 1 (77.37%), and the most frequently indicated reason for the call was convulsions (74.33%). The place to which EMTs were most frequently dispatched was the patient's home (66.80%). In 53.58% of cases, EMTs did not use pharmacotherapy, while if a drug was administered, it was most often diazepam (32.12%). In most cases, transport to a health care facility took place (73.27%) and most often it was the ER of the Mazowiecki Provincial Hospital in Siedlce (72.10%).

EMTs performed ICD-9 medical procedures (International Classification of Medical Procedures) including mainly **89.602-Pulse oximetry (99.30%)**, **89.61-Monitoring of systemic blood pressure (97.07%)** and **89.79-Other physical examination (94.37%)**.

In 37.07% of patients transported to the hospital, ethanol in the blood range from 0.01 mg/ml to 4.52 mg/ml was detected. The blood glucose content of these patients ranged from 55.00 mg/dL to 561.00 mg/dL, and their body temperature ranged from 35.0°C to 39.7°C. high scores on the Glasgow scale were noted (M = 13.90; SD = 2.41).

The most common diagnoses made in the ER included such diagnoses as *G40-Epilepsy* (29.11%), *S00-Superficial injury of head* (16.91%), *F10-Mental and behavioral disorders due to use of alcohol* (15.61%), *R56-Convulsions not elsewhere classified* (11.26%) and *Z03-Medical observation and evaluation for suspected diseases and conditions, ruled out* (3.43%).

Patients with diagnosis made in the ER including *G40-Epilepsy* (35.57%), *R56-Convulsions not elsewhere classified* (14.77%), and *S06-Intracranial injury* (11.41%) were admitted to the department significantly more often, while patients with *S00-Superficial injury of head* (21.67%) and *F10-Mental and behavioral disorders due to use of alcohol* (20.39%) were admitted to the ward significantly less often.

The analysis showed that patients admitted to the wards had significantly lower GCS scores ($p < 0.001$) than non-admitted patients, moreover, people with Sars-Cov-2 virus identified had significantly lower GCS scores compared to patients without the pathogen ($p = 0.044$).

Of the patients who were transported to the hospital, 24.23% were admitted to the wards, most often the Neurology Ward with the Stroke Sub-Ward (10.89%), the Children's Ward (4.88%) and the General and Vascular Surgery Ward (3.74%).

Conclusion. The epileptic chain of survival systematizes the treatment of a patient with convulsions at all stages of medical care.

EMTs in the case of seizures most often help men and patients aged 30-49, and the most frequent interventions take place at the patient's home and in public places. On the other

hand, the main reasons for calling EMTs for a seizure are defined as convulsions, fainting and unconsciousness.

When performing medical rescue activities for patients with seizures, the teams perform procedures related to medical history and physical examination. On the other hand, the administration of drugs and the urgency code are the factors that affect the transportation of a patient after a seizure to the ER.

It was also found that the diagnoses made by EMTs in patients with seizures differ from the diagnoses made in the ER. The state of consciousness of the patient with seizures was lower in the case of a positive Sars-CoV-2 test result.

The main factors influencing the admission of patients with convulsions to hospital wards are low GSC scores and coexisting injuries.