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THE NEED TO INTRODUCE COMPUTERIZED MEDICAL TRIAGE SCALES

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ABSTRACT

The article discusses the importance of introducing computerized medical triage scales (CMTS) into modern healthcare systems. Their advantages over traditional triage methods, impact on diagnostic speed and resource allocation in emergency departments (EDs) are analyzed. Particular attention is paid to the algorithms CAP-SORT, TS, RTS, CRAMS, SORT and MEES. Data on the impact of automated triage on mortality, waiting time and clinical outcomes are presented.

Key words: Computerized medical triage scales (CMTS), medical triage, emergency department (ED), automated diagnostic algorithms, artificial intelligence, CAP-SORT, TS, RTS, CRAMS, SORT, MEESIntroduction.

INTRODUCTION

Despite the measures taken to improve the healthcare system of the Republic of Uzbekistan, a number of systemic problems and shortcomings remain in the sphere of emergency medical care, which prevent the full implementation of the set tasks.

In particular, to this day, the republic has not achieved the results of the repeatedly adopted decisions to create an automated management system for the emergency medical care service. The organization of reception and servicing of calls is carried out by outdated, manual mechanisms [1].

Conducting medical triage of patients, both at the pre-hospital and hospital stages, requires the development of precise standard criteria for clinical and economic efficiency, safety, and availability of timely medical care. Each of the world-known triage systems (French Triage - sorting) has its own characteristics, but almost all analyzed triage methods use an approach according to which all

patients are divided into specific categories, depending on which the time and scope of medical care is determined [3].

A unified approach to medical triage at all stages of medical care allows minimizing delays in providing medical care, and also increases the effectiveness of clinical decisions [2].

Since the task of triage is to identify all existing injuries and life-threatening conditions, assess their severity in order to determine the nature, scope and order of assistance in the shortest possible time, in the conditions of the resuscitation and operating unit of the admission and diagnostic department, it is carried out simultaneously by several specialists - surgeons, traumatologists, neurosurgeons with the involvement of specialists in radiation diagnostics (ultrasound, X-ray, CT) [5].

Modern medicine is faced with an increasing load on emergency departments (ED), an increase in the number of patients with serious conditions and a shortage of medical personnel. In these conditions, traditional methods of medical triage based on a subjective assessment of the severity of the patient's condition are becoming insufficiently effective [4].

Computerized medical triage scales (CMTS) are algorithms that allow automatic classification of patients by the severity of their condition, reduce the time for triage and minimize errors associated with the human factor.

Research materials and methods. In most modern EDs, patient triage is performed manually based on clinical protocols such as ESI (Emergency Severity Index), CTAS (Canadian Triage and Acuity Scale) and MTS (Manchester Triage System). However, such methods have a number of disadvantages:

1. High subjectivity

• Assessing the severity of a patient's condition depends on the experience of the medical staff.

• Different specialists may interpret the same symptoms differently.

2. Long decision-making time

• In emergency situations, medical staff need several minutes to assess each patient.

• In conditions of an overloaded ED, the triage process may slow down.

3. Limited computing capabilities

• A doctor cannot instantly analyze all the patient's parameters, especially in conditions of a mass influx of patients.

• The lack of digital data processing reduces the effectiveness of diagnostics.

4. Human factor

• Errors associated with fatigue, stress and lack of time can lead to an incorrect assessment of the patient's condition.

• Delays in providing care to critically ill patients are possible.

Computerized triage algorithms solve the above problems by automated data processing, reducing subjectivity and increasing diagnostic accuracy.

Let's look at the key benefits.

1. Increased diagnostic accuracy

• KSMS algorithms analyze physiological parameters (heart rate, blood pressure, respiratory rate, level of consciousness) and conduct a multiparametric assessment of the patient.

• Systems based on artificial intelligence (AI) can identify hidden pathologies that are difficult to diagnose manually.

2. Reduced triage time

• Automated algorithms process patient data in seconds, while traditional methods require 3-5 minutes.

• Rapid triage is especially important during mass patient arrivals (emergencies, pandemics, traffic accidents).

3. Reduced workload on medical staff

• KSMS free doctors from routine tasks by providing preliminary triage of patients.

• Medical workers can focus on providing care to the most seriously ill patients.

4. Minimization of errors

• The subjective factor and staff fatigue are eliminated.

• Algorithms analyze objective data, which reduces the likelihood of incorrect triage.

5. Integration with electronic medical records (EMR)

• KSMS can automatically download patient data from the EMR, speeding up diagnostics.

• Triage decisions are based on the full medical history, not just current symptoms.

Based on these advantages and their functionality, we will conduct a comparative analysis of widely used KSMS (Table 1).

Table 1. Comparative analysis of the SHMS.

Scale	Purpose	Evaluation method	Key Benefits
CAP-SORT	Military medicine, emergency situations	Categorical (4 groups)	Rapid resource allocation in the field
TS (Trauma Score)	Traumatology	Point scale (0–12)	Simple, high-speed assessment
RTS (Revised Trauma Score)	Emergency medical care, injuries	Weighted scale (consciousness, respiration, blood pressure)	Improved survival prognosis
CRAMS	Prehospital triage	5 physiological parameters	Assessment of severity without laboratory data
SORT	Mass incidents	Classification scale	Suitable for emergency situations
MEES	General emergency medicine	Point system	Used in the ED and ambulance

Traditional triage methods based on subjective assessment of medical personnel often lead to errors, uneven distribution of resources and delays in providing medical care. In response to these challenges, computerized medical triage scales have been developed, including CAP-SORT, TS, RTS, CRAMS, SORT and MEES.

Result and discussion. The computer program is designed to distribute victims and patients into groups based on the urgency and homogeneity of the necessary measures (treatment, preventive, evacuation) in a specific situation (from natural disasters, military actions or road accidents) [6].

The program was created in the object-oriented Delphi environment and is launched by double-clicking the left mouse button on the SHMS.exe file. A form will appear on the screen - Splash screen (Fig. 1).

Fig. 1. Splash screen of the computer program SHMS

After pressing the button 

, the victim's map window will appear on the screen (Fig. 2).

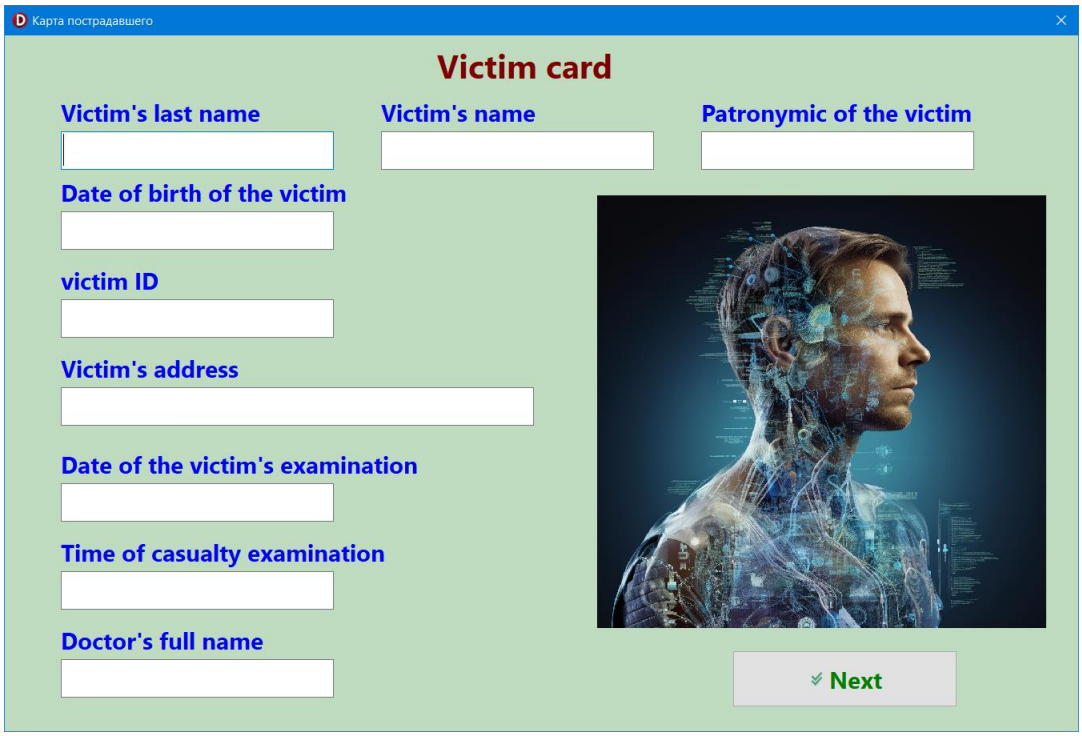

Fig.2. Victim's map

After filling out the victim's card and pressing the key 

, we move on to the scales for its appropriate sorting (Fig. 3).

Fig.3. Sorting scales

Using the mouse, select the scale option and by clicking the left mouse button, go to the window of this scale (Fig. 4).

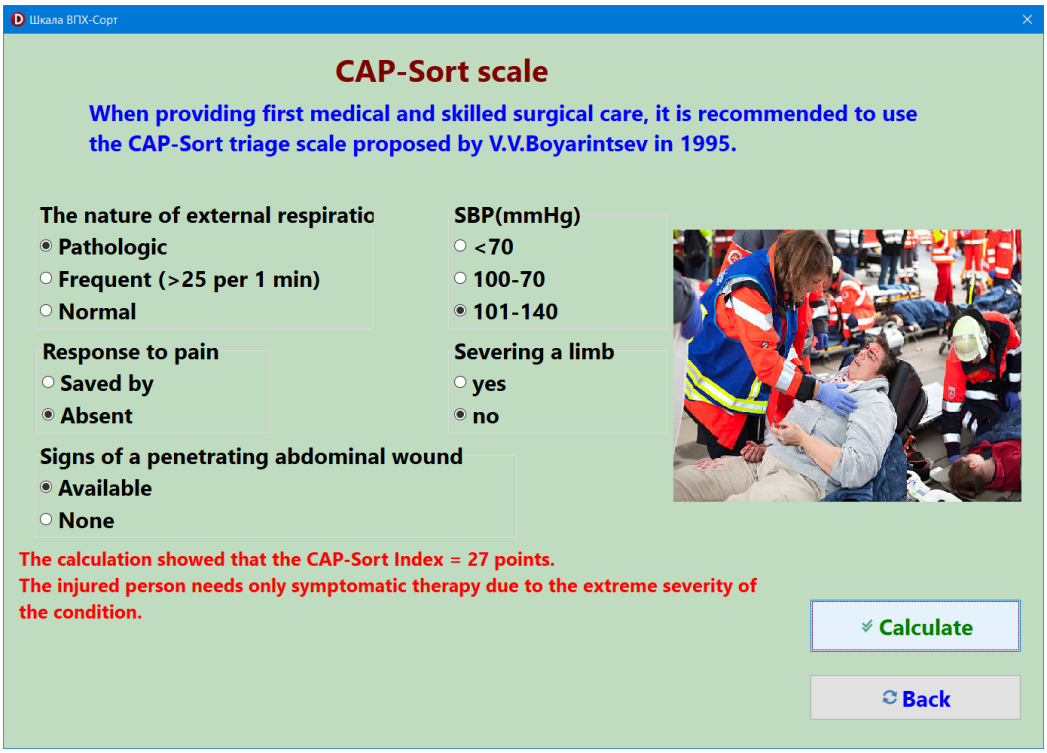

Fig.4.KShMS CAP-Sort

By selecting the options of the requested criteria and pressing the calculation button, the doctor evaluates the condition of the victim and plans further actions.

The computer program demonstrates high efficiency in automated data processing, which emphasizes the need for implementation in modern medical institutions.

Thus, studies show that the implementation of the KShMS allows:

1. To reduce the waiting time in the ED;
2. To improve the prediction of outcomes;
3. To effectively distribute resources.

Conclusions. The introduction of computerized medical triage scales is a necessary step to improve the efficiency of emergency medical care.

Computerized medical triage scales have a significant impact on the accuracy and speed of diagnosis in the ED. Their use allows:

- To reduce triage time, reducing delays in patient admission.
- To increase the accuracy of diagnosis, reducing the likelihood of medical errors.
- To standardize medical triage, excluding the influence of subjective factors.
- To allocate resources more efficiently, reducing the workload on staff.

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