J. Cardiovasc Disease Res., 2020; 11(2): 184 – 188
A Multifaceted Peer Reviewed Journal in the field of Cardiology
www.jcdronline.org | www.journalonweb.com/jcdr
P – ISSN: 0975 – 3583 Online: 0976 – 2833

Forensic Medical Analysis of Omissions in the Provision of Emergency Medical Care to Residents of a Large City: Experience, Trends and Prospects (Clinical and Expert Interaction of the Universities and Health Institutions)

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ABSTRACT

Objective: Due to the continuous concern of society and the increasing attention of the investigating authorities to the errors made by medical workers it is necessary to run a comparative analysis of defects in emergency medical treatment for the 24-year period, determine the most typical causes and sources of errors, as well as obtaining data for developing practical recommendations to improve the quality of emergency medical care.

Methods: The article presents the results of a 24-year experience of clinical and expert analysis describing defects of emergency medical response to residents of Krasnodar that was carried out by the academic teaching staff of the Department of Forensic Medicine.

Results: Based on the study and comparison of medical records with the results of subsequent autopsies of deceased patients, we managed to identify and systematize the most typical flaws made by medical staff while responding to emergency medical care.

Conclusions: The most important factors that make it difficult to carry out forensic research after intensive resuscitation and surgical measures have been taken. We have also outlined ways to address the identified shortcomings and elaborate recommendations in solving this modern health problem.

Keywords: Flaws in Medical Care Response, Forensic Medical Research, Clinical and Expert Analysis, Emergency Medical Care.

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Submitted: 30-04-2020
Revision: 30-05-2020
Accepted Date: 30-06-2020

DOI: 10.31838/jcdr.2020.11.02.31

INTRODUCTION

Increase of negative environmental and socio-economic trends caused a significant increase in the number of sick and injured entering the country's health institutions [1,2].

The increased workload among medical staff, increase in the number of severe and emergency patients, a decrease in budget funding and the commercialization of health care affect the volume and quality of guaranteed medical care [3,4,5] and, as a result, the performance of health institutions [6-8].

Not only the diversity of existing and developed methods and evaluation criteria [9-12], but also the increasing activation of law enforcement agencies to identify flaws of improper health care, as well as stricter responsibility for "medical practices" speak of the exceptional public importance of the problems of quality and safety of medical care [13-16].

Thus, according to the data of the Russian Investigative Committee, in 2017, citizens received 6,050 reports of iatrogenic crimes, as a result of which 1,791 criminal cases were filed against medical workers, which is twice as many as in 2016 and 3 times if to compare with the year 2012. In 2018, there was a continuous increase in the number of criminal cases against doctors, which is 1,029 cases in the first half of the year (Fig. 1, Fig. 2).

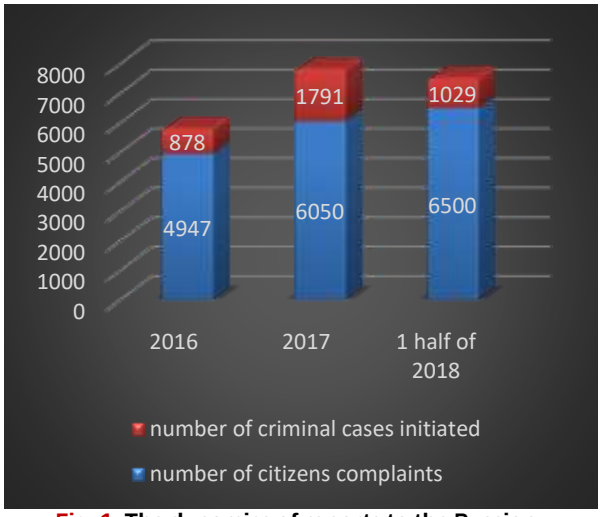

Fig. 1: The dynamics of reports to the Russian Investigative Committee for poor treatment and initiated criminal cases

Fig. 2: The growing level of public mistrust of doctors

Despite the urgency of the problem, the flaws in addressing emergency medical care for many decades have not had a clear downward trend [17-20].

Along with that, there is lack of works on their in-depth analysis, examples of coordination of joint activities of

medical institutions, the forensic medical service, the scientific community and law enforcement authorities to analyze the causes and sources of medical errors [7,21-24]. For example, poisoning has been a matter of serious concern globally, accounting for over a million deaths every year, particularly in low and middle-income countries [25]. The choice of poisoning agents depends upon the socio-economic factors, demographic factors and individual medical factors which greatly varies from country to country [26]. Harm, pain and even death of patients are the results of omissions in the provision of emergency medical care. In the United States, medical errors have been reported to be responsible for 7,000 injuries to patients per year, with a similar incidence and consequences reported in the United Kingdom and worldwide. The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP), which includes 27 national organizations, suggests that medical errors are preventable. Though their prevention can be rather challenging [27].

MATERIALS AND METHODS

The object for the study became supplementary sheets of emergency medical setting and medical records of 1019 in patients who died at the Krasnodar City Clinical Emergency Hospital (hereinafter referred to as the Emergency Hospital) from various types of violent and non-violent death, the results of their subsequent post-mortem autopsies, as well as annual statistical reports of the forensic medical service of Krasnodar Region.

The main evaluation method was a comparative phased analysis and clinical expert evaluation of the dynamics of data obtained during four consecutive monitoring periods from 1992 to 2015. In the course of the research, the list of evaluation criteria was expanded due to the forensic medical analysis of medical care addressed to deceased patients at the prehospital phase, as well as the additional introduction of criteria allowing to evaluate the impact of therapeutic measures on the quality of further forensic research.

RESULTS

First stage

The first attempts of the scientific and practical analysis of fatal outcomes in the emergency hospital were undertaken by the employees of the department in 1993. Back then, at a joint meeting with the administration and hospital staff, the results of 219 autopsies of deceased patients with various types of violent and non-violent death were reported and an attempt was made to address ways for joint efforts to improve the quality of emergency medical care for the city dwellers. It was decided analyze in several areas: the identification of typical flaws in emergency care, the determination of the most frequent flaws in the diagnosis of injuries and diseases, the timeliness and quality of pre-hospital and consulting assistance, and managing the medical records.

The result of the research done during the year was the identification of a significant number of discrepancies in clinical and post-mortem diagnoses in cases of diseases, injuries and poisonings, and many design and maintenance flaws in medical records. The comments and suggestions made on the results of the clinical and expert analysis were understood by both the administration and the healthcare staff. 164 medical records of deceased patients and the results of their subsequent autopsy were studied to compare the analysis of the changes that took place one year after the start of the study.

As for *the positive changes* there was a positive evolution in the quality of diagnostics of some types of violent death (damage with sharp weapons, exposure to extreme temperatures, etc.), a faster response between the moment patient's admission to he's being examined and the beginning of therapeutic measures, and decreased waiting time for consulting physicians to study the case. Considering the request of department staff, they began to invite teachers to the clinical and anatomical conferences for a joint analysis of fatal outcomes in cases of death of patients and their subsequent forensic autopsy. On the other hand, the doctors who wished to attend the autopsy, based on the agreement between the department and law enforcement authorities, were allowed to be present during the examination of their deceased patients.

Along with positive changes, experts noted a number of *negative trends* as well. So, since there is no neurosurgical department in the hospital, they have witnessed repeated cases of non-core hospital admission of the injured, whether it is a combined trauma or a severe isolated traumatic brain injury (up to 80%) that requires emergency surgery. The clinicians noticed a slight increase in the number of discrepancies between clinical and postmortem diagnoses in somatic diseases, while retaining the same objective reasons and subjective factors that were mentioned a year ago: the presence of background concealing state and diseases (coma – brain, hypoglycemia, alcohol, etc.), unreasonable state hypo- and overdiagnosis, etc. It was particularly noted that none of the analyzed observations seized any vomit mass; no wash water, no blood test forms were sent for toxicity study when establishing the diagnosis of poisoning.

Second stage

In 2000, 436 inpatient medical records and forensic examination reports of corpses were subjected to a comprehensive comparative analysis and examined the qualification characteristics of consulting physicians involved in medical and diagnostic activities. According to the results of the analysis, experts noted the outlined reduction (by 8.5%) of clinical and postmortem diagnoses in cases of diseases, which still marked the largest number of errors made by both aspiring doctors and experienced ones. At the same time, there was an increase in defects in the medical record management, which were quite similar and mostly led to the lack of indications of dates and time of reviews (70%), careless and/or unreadable handwriting of doctors and consultants (25%). Rough corrections (strikethrough, sticking) were noted in 5% of all medical records. Analyzing the counselling for the specified period, it was established that up to 27-30% of patients needed consultations of various specialists in the hospital conditions, but in fact, only 15-17% of patients were assigned to receive a consultation, and only 10-13% indeed received it. Thus, about 50% of therapeutic patients needed

counselling, and in fact, only 13-15% received advice; in the surgical departments — 25 and 13.5% respectively. Up to 30% of patients required a surgical consultation, and the highly-specialized departments (like neurotrauma, psychiatric, etc.) required by up to 60% and more. About 3.5% of patients waited for consultation for 3.5 days. The main reasons for the late consultation were: in 64.3% — late appointment by attending physician, 35.7% — the unsatisfactory organization of in-patient counselling. 18.3% were not fully examined; approximately 1/4 passed through specialized departments needed additional consultations but did not receive them. As a rule, consultations were carried out without the attending physician.

Third stage

In 2005, at the meeting of the Society of Forensic Physicians, together with representatives of the emergency hospital, examined the flaws affecting the quality of subsequent forensic medical examinations. They noticed an insignificant decrease in the values of various types of violent death, while the number of cold injury deaths is increased twice. They draw attention to the continuing defective description of injuries by various specialists, regardless of their years of experience and qualifications. The analysis of all medical records received for examination showed that doctors did not have a single generally accepted approach and a clear algorithm for drawing up a "local status", which led to the fact that only 5% of the observations contained instructions of the injuries, ¼ did not have an indication on wound sizes, and the nature of edges, ends, and other characteristics were only indicated in less than 1% of all cases. The doctors did not include a description of the clothes worn by the victims when they were delivered to the hospital. In cases of death from acute poisoning, 57% of the medical records studied indicated taking a blood test and sending it for chemical and toxicity examination, 12% of blood and urine, and 3% of wash water. However, only 27% of medical records contained the results of the research. When experts tried to figure out the fate of the other objects of examination, it turned out that the analysis data were obtained from the chemical-toxicological laboratory of the drug clinic, where the studies took place from 7-10 days or more, and by that time patients delivered to the hospital with various types of poisoning either died or were discharged recovered.

Fourth stage

A selective study of 100 medical records of inpatients in comparison with clinical and forensic diagnoses that took place at the beginning of 2015, it did not have significant flaws in age and sex composition, the structure of death types, time of hospital admission and errors in addressing medical care. However, the greatest difficulty in the diagnosis of emergency conditions is caused by somatic diseases (up to 50%) and poisoning (up to 15%), the low quality of diagnostics which was noted throughout the complete study period. Among the objective reasons, the most frequent remain: late admission and critical condition (over 90%), while the subjective reasons included overestimation or underestimation of the case history (45-50%), non-core hospital admission of patients with traumas (up to 50%), non-profound examination and incomplete disclosure of all injuries (25%). The number of various defects in the management of medical records remains significantly high (up to 70%) (Fig. 3). The latter type of flaws is of particular importance for further forensic examinations.

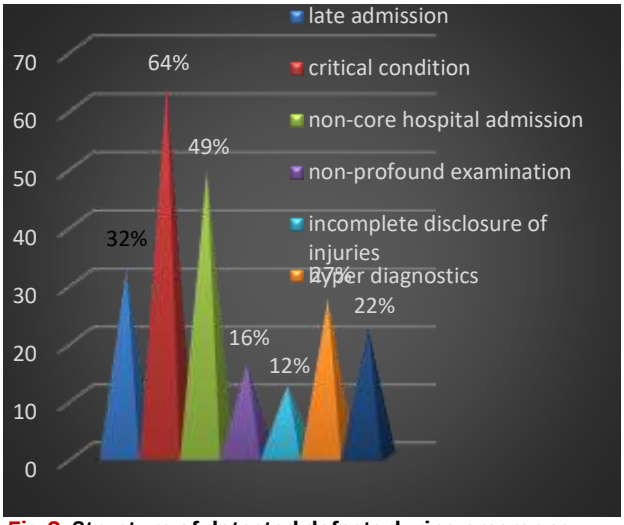

Fig.3: Structure of detected defects during emergency medical care for inpatients

Analyzing the flaws in addressing medical care at the prehospital in the last analyzed period, it was noted that the differences in the diagnoses of ambulance doctors with the clinical diagnoses reached up to 12.1%, while the differences with the forensic are 6.9%. The simultaneous mismatch of the specialized care and clinical and forensic diagnosis occurred in 81% of cases. The fluctuations noticed in misdiagnosis were significant depending on the cause and type of death. So, in cases of fatal outcomes from non-violent deaths, the mismatch of the diagnosis of the emergency doctor with the post-mortem diagnosis occurred in 31.2%, while in the case of violent death, only in 13.1% of cases. It is interesting that in 2.8% of cases, the diagnosis established by the doctor of the ambulance crew was unreasonably withdrawn upon admission to the hospital, and later confirmed by a post-mortem forensic autopsy. In 82.8% of cases, the diagnosis was confused by finding patients in a severe (38.8%) or unconscious state (61.2%).

DISCUSSION

According to the results of the analysis of the activities carried out by the ambulance crews, we consider it necessary to note that more than a third of cases (30.5%) were limited only to inspecting and transporting injured people to medical institutions, while 18.1% of victims with various signs of poisoning who needed stomach pumping, were only able to be taken care of upon arrival in the hospital.

Analysis of the work of the ambulance crews was significantly hindered by various defects in the filling of the accompanying sheet, like in the hospital, among which the most multiple were unreadable records, which is 83.3% of all observations. Strikethroughs were found in 66.6% of cases, adding and/or editing records with a correction fluid - in 38.8%, corrections were noted in 22.2%.

Attaching great importance for future doctors to build a habit of vigilance and prevent medical errors, the Department of Forensic Medicine of the Kuban State Medical University is actively working to attract students to scientific and clinical expertise to analyze the quality of medical care to residents of Krasnodar. To do this, they have established their own forensic dead house with all the necessary stuff and is operating based on the Department of Forensic Medicine of the University. For 2000 to 2014 alone, 3,204 corpses were delivered to the forensic dead house of the department for autopsies, 1,638 of which are corpses of patients who died in medical institutions of the regional centre from various types of violent and non-violent death (Fig. 4).

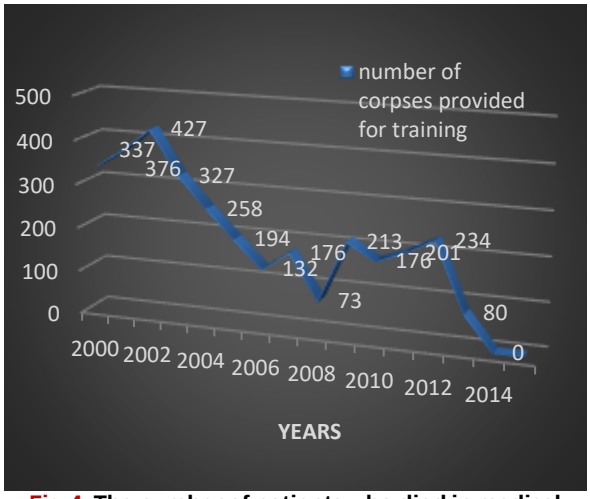

Fig.4: The number of patients who died in medical institutions of Krasnodar and delivered for a forensic autopsy to the department of forensic medicine FSBEI of Higher Education Kuban State Medical University of the Ministry of Health of Russia for the period 2000-2015

During this period, more than 9,000 students of the medical, pediatric and dental faculties were involved in the autopsies, the study and analysis of medical records in cases of fatal outcomes. Particular attention was paid to autopsies of flaws in addressing medical care. Before autopsy, students studied medical records of the inpatient and evaluated the nature, extent, timeliness, and adequacy of medical measures at all stages of medical care. In cases of any flaws and discrepancies of clinical and post-mortem diagnoses, the nature of the flaws, the causes and sources of occurrence, they determined the possibilities to prevent these situations.

CONCLUSION

The results of our research lead to the following conclusions.

The evaluation of the causes and sources of errors made by medical staff is complex, diverse, and has not yet been clearly defined. The number of cases of defective diagnosis of emergency conditions over the past twenty years remains at a high level.

When carrying out clinical expert analysis of deaths that occurred after the emergency medical care, there is a high, about 30%, level of diagnostic errors. The most frequent ones, over the past few years, are errors in the diagnosis of somatic diseases.

Defects in medical care that affected the adverse outcome were associated with an erroneous interpretation of anamnestic data, incomplete clinical examination of victims, insufficient dynamic observation, delayed therapeutic measures, etc. In some cases, the diagnosis was hampered by the delayed hospital admission of the victims and the intercurrent state.

The organization of counselling assistance in a hospital requires adjustments. Consultations required up to 30% of patients were appointed only to 15-17%, and only 10-13% indeed took place, and often without attending physician's presence. The reasons for the delayed consultations, up to 60% of patients had delayed appointment set by the attending physician, about 30% had the unsatisfactory organization of the in-patient consultation. Over 18% of patients were examined incompletely; 1/4 of the patients who were examined in specialized departments needed additional consultations but did not get them.

As expert practice shows, the errors and shortcomings encountered in analyzing such cases are not unique and are inherent not only to young specialists but also to experienced and qualified doctors. This conclusion demonstrates both their inadequate training in forensic traumatology and, to a large extent, inadequate scientific and methodological guidance from the administration, heads of departments and methodological departments. Now the question arises regarding the need to continue comprehensive developments aimed at further improvement of clinical and expert research to identify flaws in providing emergency aid to the population, improving medical staff at all levels of training, from educational institutions to postgraduate training teaching programs.

The results obtained were highly evaluated and were taken into consideration by the leadership of medical institutions, medical practitioners, as well as law enforcement officers who have repeatedly noted the high level of forensic medical examinations performed by the teaching staff.

The presented work, in our opinion, is not only a vivid example of effective interaction of educational and medical institutions aimed at improving the quality of medical care and prevention of flaws, but also valuable experience in active scientific and practical and forensic medical expert activities carried out by educational institutions on their personally prepared and equipped clinical base, which is, unfortunately, inaccessible to many Russian universities at this moment.

CONFLICT OF INTEREST

The authors declared that they had no conflicts of interest concerning their authorship or the publication of this article.

AUTHORS CONTRIBUTION

All the authors have contributed to the article preparation and editing of the manuscript.

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Cite this article: Gamir Tulendinov Forensic Medical Analysis of Omissions in the Provision of Emergency Medical Care to Residents of a Large City: Experience, Trends and Prospects (Clinical and Expert Interaction of the Universities and Health Institutions). J. Cardiovascular Disease Res. 2020; 11 (2): 184 – 188

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