

Emergency Medical Service Protocols for Triaging Calls and Patients with Non-urgent Medical Conditions Acil Sağlık Hizmeti Gerekmeyen Durumlarda Alınan Hasta Çağrılarındaki Acil Sağlık Hizmetleri Protokolleri

Slavoljub Živanović¹, Suzana Stanković²

¹ Dr., Emergency Medical Centre, Belgrade, Serbia

² Dr., Health Care Center, Pirot, Serbia

Summary

Objective: Until 2006, Belgrade Emergency Medical Services (EMS) were handling calls to the "194" emergency call center without definitive study protocols. However, since 2006, calls from emergency call center operators "194" have begun to be processed depending on the INDEX protocols. The most important tasks of the operators in the emergency call center are based on the urgency of incoming calls. Emergency health services should also determine when calls are more or less important. When most EMS teams intervene, some patients do not need acute or chronic treatment. These cases are referred to the health records as "Not Emergency Disease" medical diagnosis. The purpose of the study is to look at the intensity of the "Not Emergency Disease" diagnosis in the EMS records to assess the effect of the use of INDEX protocols.

Material and Methods: According to a retrospective analysis, a medical doctor and a team were involved in 6546 EMS interventions during the period from 14 May 2003 until 19 January 2012. All interventions leave 3 periods; before using INDEX protocols, immediately after the start of use of protocols, and regular usage period of protocols. In all three periods, the intensity of the diagnosis "Not Emergency Disease" in the health records was followed.

Results: Before using the INDEX protocols, 183 cases (8.7%) were diagnosed as "Not Emergency Disease". Immediately after the initiation of the protocols, 119 cases (6%) were diagnosed as the same. After the regular use of the protocols in the third period, 82 cases (3.9%) were diagnosed as "Not Emergency Disease".

Conclusion: With the regular use of INDEX protocols, the number of non-emergency calls decreased and there was a visible effect in situations where EMS teams did not intervene. As a result of the operators using the questions in the INDEX protocols, better triage was obtained in calls to the "194" emergency call center.

Key words: Belgrade, more urgent call (red response), less urgent call (yellow response), content, protocol, triage

Özet

Amaç: 2006 yılına kadar Belgrad Acil Sağlık Hizmetleri, "194" acil çağrı merkezine gelen telefonları kesin çalışma protokolleri olmaksızın işleme alıyordu. Ancak 2006 yılından itibaren "194" acil çağrı merkezi operatörleri gelen çağrıları INDEX protokollerine bağlı olarak işleme almaya başladılar. Acil çağrı merkezindeki operatörlerin en önemli görevleri gelen çağrıları aciliyetine göre değerlendirmeleridir. Acil sağlık hizmeti gereken durumlarda aramanın az veya çok önemli olduğunu da belirlemeleri gerekir. Çoğunlukla EMS ekipleri müdahale ettiğinde bazı hastaların akut veya kronik tedaviye ihtiyacı yoktur. Bu durumlar sağlık kayıtlarına "Acil Hastalık Değil" tıbbi teşhisi olarak geçer. INDEX protokollerinin kullanımının etkisini değerlendirmek için EMS kayıtlarındaki "Acil Hastalık Değil" teşhisinin yoğunluğuna bakılması çalışmanın amacıdır.

Gereç ve Yöntem: Retrospektif analize göre bir sağlık doktoru ve ekibi 14 Mayıs 2003 den 19 Ocak 2012 ye kadar olan sürede 6546 EMS müdahalesinde bulunmuştur. Bütün müdahaleler 3 periyoda ayrılırlar; INDEX protokollerin kullanımından önce, protokollerin kullanılmaya başlamasından hemen sonra ve protokollerin düzenli kullanıma periyodu. Her üç periyotta da sağlık kayıtlarında "Acil Hastalık Değil" teşhisinin yoğunluğu takip edildi.

Bulgular: INDEX protokollerini kullanmadan önceki dönemde 183 vaka (8.7%) "Acil Hastalık Değil" teşhisi gösterdi. Protokollerin kullanılmaya başlamasından hemen sonra 119 vakaya (6%) aynı teşhis kondu. Üçüncü periyotta protokollerin düzenli kullanılmaya başlamasından sonra 82 vakada (3.9%) "Acil Hastalık Değil" teşhisi bulundu.

Sonuç: INDEX protokollerinin düzenli kullanılması ile acil olmayan aramaların sayıları azaldı ve EMS ekiplerinin müdahalesi gerekmeyen durumlarda gözle görülür bir etki oldu. Operatörlerin INDEX protokollerindeki soruları kullanması sonucunda "194" acil çağrı merkezine gelen aramalarda daha iyi triyaj elde edildi.

Anahtar kelimeler: Belgrad, daha acil çağrı (kırmızı yanıt), daha az acil çağrı (sarı yanıt), içerik, protokol, triyaj

Kabul Tarihi: 12.09.2015

Introduction

Telephone number for calling EMS in Serbia was changed from '94' to '194' in year 2013. Up until 2006 emergency medical service (EMS) Belgrade has been handling '194' calls without firm work protocols. The only guideline was several pages long printed document signed by the EMS Director which described the object of EMS work as 'dealing with sudden and grave health problems that could possibly lead to serious health consequences including patient's death'. As of year 2006 EMS operators have been using INDEX protocols which in essence are practical instructions on how to talk with callers. INDEX protocols define operators' work methods and leave little space to free interpretation. Operators ask mandatory questions according to INDEX protocols for each of the 38 question groups and based on the answers obtained they decide whether or not they need to dispatch an EMS team or they can provide a caller with an appropriate medical advice only. Medical diagnosis of "sine morbo urgente" (SMU) (*Latin* for 'no urgent illness') has been recorded in our medical records for patients in which it was subsequently established that emergency medical care was actually not needed as there was no immediate acute or chronic illness to be treated at the time of the EMS team intervention.

To establish whether the use of INDEX protocols has had an impact on the frequency of "sine morbo urgente" diagnosis recorded in the EMS Belgrade

records as it relates to before and after the introduction of the new protocols, is the aim of the study.

Methods

Restrospective analysis of 6546 EMS interventions of one medical doctor and his team in the period from 14 May 2003 until 19 January 2012. We have used a database organized in an Excel document and have obtained our basic statistical data from it. The material has been divided into three sections. The first monitored period was from 14 May 2003 until 10 March 2006 and it was based on 2182 interventions conducted by one EMS team before the introduction of INDEX protocols into daily use by EMS operators. The second monitored period was from 10 March 2006 until 11 September 2008. It was based on 2182 interventions conducted by an EMS team immediately after the introduction of INDEX protocols. The third monitored period was from 11 September 2008 until 19 January 2012 and was based on 2182 interventions conducted after INDEX protocols had been in use for quite some time by EMS operators. Of importance is to mention that each EMS team in Serbia has a medical doctor onboard an ambulance. We have searched our database for 'sine morbo urgente' diagnosis. Statistical analysis has been done in X² test, a chi-squared test.

Results

Table 1. SMU diagnosis in each monitored period

| Period | SMU diagnosis | % in 2182 interventions |
|--------|---------------|-------------------------|
| 1 | 183 | 8.681 |
| 2 | 119 | 5.785 |
| 3 | 82 | 3.908 |

X²=40.796 (5.991 – 9.210) p<0.01 which is a very significant statistical difference. When comparing the first and third period, i.e. the period before the use of INDEX protocols and the period of regular use of the protocols, the following was obtained.

Table 2. Distrubution of red response

| Period | Number of SMU diagnosis | Number of red response (i.e. most urgent) | % of red response out of all SMU diagnosis |
|--------|-------------------------|---|--|
| 1 | 183 | 2 | 1.093 |
| 2 | 119 | 37 | 31.092 |
| 3 | 82 | 4 | 4.88 |

Table 2 indicates that, in the first monitored period only 1% of SMU diagnosis have been marked as red response calls (i.e. most urgent), in the second period 31% and in the third it was 5%.

Discussion

In cases of sudden illnesses or injuries and in circumstances where patients' lives are at risk, a chain of survival is activated by calling EMS Belgrade. At the EMS Belgrade dispatch centre, we have medical doctors, or nurses under direct supervision of doctors, taking patients' calls as operators/dispatchers. The most important task of the operators at the dispatch centre is to evaluate correctly whether or not a patient is in need of urgent medical care. In a case where it has been determined that urgent medical care is needed, they also have to evaluate if the call is more or less urgent. EMS teams are then dispatched based on their evaluation and most urgent calls have priority over less urgent ones which can further affect EMS response times.

Until 2006 handling of calls depended on previous experience and specific skills, judgement and medical knowledge of each individual operator and their ability to obtain correct information from each caller regarding patient's current symptoms and medical history. With the introduction of INDEX protocols in 2006 we have achieved a firmer work structure of our operators in the dispatch centre. INDEX protocols have been introduced in all EMS dispatch centres in Serbia and are based on a Norwegian EMS model of dispatch protocols with slight variations applied to the circumstances in our own country.

INDEX protocols comprise of different groups of questions for 38 health conditions, i.e. unconscious patient, injured patient, chest pain, abdominal pain etc. Each condition has a number of corresponding questions that an operator has to ask and the caller needs to answer respectively. After asking all of the assigned questions for each specific health condition from the INDEX protocols, the operator then decides based on the answers obtained, or the lack thereof, if the call should be dealt with an appropriate medical advice only or if an EMS team should be dispatched with an appropriate level of urgency.

If a call has been marked at the most urgent level, i.e. red response, EMS team should get to that patient as urgently as possible. A yellow response signifies an intervention that can accommodate for a more or less short period of wait time. At dispatch centres worldwide, there are different protocols at operators' disposal that assist them in evaluating how urgent each intervention is. These protocols are more or less successful in distinguishing more urgent from less urgent conditions. Zakariassen E, Burman RA, Hunskaar S, 2010 says that "in most of patients, their conditions are not life-threatening". Price TG, Hooker EA, Neubauer J 2005 explains in his study that providers of emergency medical services correctly recognize most of the patients that need to be discharged from Emergency Departments. Vertesi L., 2005 states that in spite of being labelled "non-urgent" by *Canadian Emergency Department Triage and Acuity Scale (CTAS)* criteria, 7.3% of all patients requiring admission came from this group. Khorram-Maneshand et al, 2011 state that ambulance transport staff indicate that according to their protocols many calls have been received as urgent when they in fact are non-urgent cases.

In their research of a number of protocols, Feldman MJ et al, 2006, (7) state that recognizing the level of urgency on the telephone of the medical dispatch centre is more a matter of chance. Hjalte L Suserud BO, Herlitz J Karlberg I and co-authors, 2007 (8) indicate that among the conditions marked as most urgent there are 17% and 18% that did not require the ambulance service, as assessed by the ambulance staff. They further state that most of the patients without obvious medical needs had been allocated an ambulance response for non-urgent conditions and transported to hospitals. Also, as a result from this study authors conclude that the majority were transported by a fully equipped emergency medical ambulance to an emergency medical department at a hospital, without requiring any prehospital interventions either at the scene or during transportation (8). Therefore it is very difficult to evaluate through a telephone call whether a caller is actually in need of emergency medical services and at which level of urgency.

In a research conducted by Fourny M. et al (9) it is stated that 'the initial dispatcher's decision is

inappropriate for 30% of EMS users with ST-elevation myocardial infarction (STEMI) and results in substantial delays in time to reperfusion therapy. Inappropriate decisions included referring the patient to a family physician' At the EMS Belgrade dispatchers only have to consider territorial distribution of EMS teams and they dispatch the calls through radio or telephone calls. It is difficult to evaluate through a telephone call whether a patient's condition at all requires dispatching of an ambulance. Level of urgency is sometimes hard to evaluate by trained medical personnel even when they are by the patient's side. This is also stated in a Canadian research by Vertesi L, 2004 (5) where it is said that 'in spite of being labelled "non-urgent" by "Canadian Emergency Department Triage and Acuity Scale" (CTAS) criteria, 7.3% of these patients still required hospital admission'.

Dispatcher's evaluation also depends on appropriateness of the questions they ask as well as on the answers obtained from callers. Is the caller capable of answering the questions about the patient on whose behalf they are calling? Can they observe the patient and recognize what is important? A very hard question for callers to answer is also if the patient is breathing or is the patient conscious. Very often the caller does not want to or is afraid to approach the patient or even touch him/her. Very often they do not know how to answer the questions appropriately or they become aggressive on the telephone. When the caller is unable to describe the condition they are calling about or the caller is the person in need of medical attention, on those occasions it is often impossible to obtain the necessary information about patient's level of consciousness, breathing, type of pain etc. and this represents an issue for dispatchers as they are unsure how to classify these.

It is especially difficult for an operator to make an appropriate decision if the caller is an elderly patient who may have speech problems or hearing issues or they may not even understand the questions. These are also instances when operators are unsure how to classify the calls, whether to dispatch an ambulance or not. On those occasions operators may rely on the caller's attitude or may try to evaluate the emotional input of the caller. Another big issue is when operators receive calls from public places especially from passersby that may notice someone lying on the ground across the

street. On occasion they do not even approach the patient, however they believe that the person looks like he/she is not feeling well and may be unconscious and is in need of medical help.

Sometimes when a patient calls EMS they give false and misleading information on purpose by over-exaggerating their symptoms out of fear for their health or because it is just so convenient to have an ambulance come to their home to deal with their non-urgent medical condition. Also, on occasion, when the ambulance arrives at the given address, it happens that no one is to be found or the patient refuses to be treated. EMS Belgrade has limited resources in terms of how many ambulances they have at their disposal and we never know when and where we may need one. Every EMS team onboard an ambulance consists of a medical doctor, a nurse and a driver trained in first aid and CPR.

Our data further shows that in the period before the introduction of INDEX protocols we had 8.7% of interventions where a medical doctor was not able to find any urgent illnesses in patients that would require emergency medical services. Sometimes patients with chronic illnesses call '194' because they are not satisfied with their current medications and are hoping they would be able to find a better solution for their non-urgent symptoms. In the period immediately after the introduction of INDEX protocols in our daily work the number of patients with non-urgent medical conditions has been decreased to below 6%. Furthermore, in the 3rd period of regular use of INDEX protocols this number went even further down to 3.9% which is two times less than what it used to be before the introduction of INDEX protocols.

When comparing the 1st and 3rd monitored period of use of INDEX protocols we obtained a very significant statistical difference. When using the INDEX protocols the number of SMU diagnosis has been significantly reduced statistically speaking. In the 2nd monitored period when we first started using INDEX protocols the number of 'red response' calls that had SMU diagnosis has been significantly higher than in the 1st monitored period. This was because in the 2nd period operators were still getting used to using the protocols. However, we have achieved much better results

in the 3rd period and the number of interventions with SMU diagnosis that qualified as urgent was 5% and this can be considered a success. We believe this was the case because by that time our dispatchers have acquired the necessary experience and routine in their work with new protocols.

During the whole study we haven't noticed any changes in EMS Belgrade operations that would be of importance, except for the introduction of new protocols and their application in practice. We find that INDEX protocols are directly responsible for better triage at the '194' dispatch centre and this is mostly due to all the questions that a dispatcher needs to ask as part of their work duties. However, Lidal and Holte HH, Vist GE. (10) state that 'we lack evidence for those claims'. There hasn't been any official nor systematic training provided for the dispatchers on how to work with INDEX protocols, except for a very small group of staff who were available at the time of INDEX introduction. It has all been up to the personal responsibility of each individual dispatcher and their willingness to learn and apply what they have learned in practice.

Even though a large number of medical doctors and nurses have been employed as dispatchers, they have improved their skills significantly by talking to each other and discussing their experiences. Results are clearly visible in the decrease of number of SMU diagnosis. If we consider the fact that EMS Belgrade has about 80000 to 100000 interventions yearly, then it would be easy to calculate how much time and resources were saved so far. However, it should be stated that there is also a reasonable number of missed diagnosis on an institutional level, as per Vertesi, 2004, (5) 'in spite of being labelled "non-urgent" by Canadian Emergency Department Triage and Acuity Scale (CTAS) criteria, 7.3% of all patients requiring admission came from this group'.

Having considered all of these, it should be noted that we do have to be careful and accept even those calls where it may be difficult to justify the validity behind a call. As per Hjalte L, and co-authors 'among patients reported by the emergency medical dispatch centre as having chest pain or other heart symptoms or trauma/accidents, respectively, only small percentages (18%) and (17%) did not require the ambulance service, as assessed by the

ambulance staff.' Therefore, when triaging calls we have to not only consider patients' potential health outcomes, but also medico-legal implications in relation thereof.

One of the practical problems of INDEX application that we have encountered in our daily work is also the fact that in Norway, where INDEX protocols originate from, EMS dispatch centres do not have medical doctors taking the calls nor do they have doctors on-board ambulances when going out to interventions and these are big differences from how EMS Belgrade operates. Perhaps with slight adjustments INDEX protocols could become more applicable to our own circumstances and become more helpful in assisting us better in how we differentiate between valid and non-valid calls for urgent medical care.

Potential objections to the study

One could arguably say that a potential cause for a reduced number of SMU diagnosis is that our dispatch staff have triage criteria that are too strict, so that along with non-valid calls we potentially reject some valid ones that should really be accepted. Another reason could be that dispatchers are under a pressure to only accept a very limited number of calls and as a result in the total number of calls accepted there is going to be a decreased number of calls with SMU diagnosis. Diagnostic criteria for assigning SMU diagnosis could also be questioned as there was only one medical doctor collecting data during the research period. These would need to be further explored.

Conclusion

By having INDEX protocols as firm practical instructions in our daily work we have achieved better triage consistency. As a result there is less space for independent evaluation by the operators at the '194' dispatch centre. In our regular use of INDEX protocols at the EMS Belgrade we have attained better quality of work in terms of decreasing the number of non-urgent interventions which are outside of our scope of practice.

Suggestions for further improvements in relation to INDEX protocols use: systemic and regular training of all dispatch staff on INDEX protocols

system at the dispatch centre. Regular quality assurance of work performed by staff at the '194' dispatch centre and modifications of INDEX protocols in accordance with EMS Belgrade operations.

References

1. Zivanovic S. Difference in time on hold between calls of first and second level of triage emergency, for patients with chest pain at Emergency medical service in Belgrade. *General Medicine Journal* 2011;17(3-4):136-40.
2. Zivanovic S. Challenges with INDEX protocols in EMS Belgrade of the City of Belgrade. *General Medicine Journal* 2014;20(1-2):18-24.
3. Zakariassen E, Burman RA, Hunskaar S. The epidemiology of medical emergency contacts outside hospitals in Norway - a prospective population based study. *Scand J Trauma Resusc Emerg Med* 2010;18(1):Article number 9.
4. Price TG, Hooker EA, Neubauer J. Prehospital provider prediction of emergency department disposition: Implications for selective diversion. *Prehosp Emerg Care* 2005;9(3):322-5.
5. Vertesi L. Does the Canadian Emergency Department Triage and Acuity Scale identify non-urgent patients who can be triaged away from the emergency department? *CJEM* 2004;6(5):337-42.
6. Khorram-Manesh A, Montán KL, Hedelin A, Kihlgren M, Örtengren P. Prehospital triage, discrepancy in priority-setting between emergency medical dispatch centre and ambulance crews. *Eur J Trauma Emerg Surg*. 2011;37(1):73-8.
7. Feldman MJ, Verbeek PR, Lyons DG, Chad SJ, Craig AM, Schwartz B. Comparison of the Medical Priority Dispatch System to an Out-of-hospital Patient Acuity Score. *Acad Emerg Med* 2006;13(9):954-60.
8. Hjalte L, Suserud BO, Herlitz J, Karlberg I. Why are people without medical needs transported by ambulance? A study of indications for pre-hospital care. *Eur J Emerg Med* 2007;14(3):151-6.
9. Fourny M, Lucas AS, Belle L, Debaty G, Casez P, Bouvaist H, François P, Vanzetto G, Labarère J. Inappropriate dispatcher decision for emergency medical service users with acute myocardial infarction. *American Journal of Emergency Medicine* 2011; 29(1):37-42.
10. Lidal IB, Holte HH, Vist GE. Triage systems for pre-hospital emergency medical services - a systematic review. *Scand J Trauma Resusc Emerg Med* 2013;21:28.

Correspondence:

Dr. Slavoljub Živanović
Mrakovicka 25, 11000 Belgrade Srbija
Tel: +381.642939324
[E-mail: Slavoljubz3@open.telekom.rs](mailto:Slavoljubz3@open.telekom.rs)