Conference Paper

Tools for Process Optimizing in Emergency Departments

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Overcrowding is a universal challenge in emergency departments (ED). In (re)organizing an ED, experience from other “industries” could be taken into consideration. The recommendations are to ensure standardization and focus on flow and logistics. Examples that can be taken into consideration are described. One of the most important things to focus on is to keep the patients, who are not seriously ill, in flow at all times. They are a great challenge to overcrowding, and one has to use skilled staff to deal with this particular group.

1. Introduction

Emergency departments have three global challenges: overcrowding [1], high percentage of absenteeism (8–10%), and work-related stress [1]. There are no universal solutions on how to deal with the challenges, but it is, however, possible to adapt and adjust solutions from other “industries” so that they can be applied to the ED. Examples of such solutions could be to focus on flow, logistics [2], and standardization. Some of these solutions are already known [3] and are applied to many EDs in the world, while others are relatively new and are only used on experimental basis.

In (re)organising an ED the most important thing is to make clear how many examinations should be done in the ED before the patient can leave the area. Can the patient leave the ED after registration, primary evaluation and blood samples are taken? Or do you want a diagnosis based on results of blood samples, ECG and radiology, evaluation by a senior doctor, a complete file, and initiation of treatment? If you have not agreed on such a basic issue in the organization, the ED will be in danger of meeting resistance in the rest of the organization.

2. Standardization

Standardizations are mandatory in organising an ED. Without standardization of various procedures, it is almost impossible to make any planning of the everyday life concerning staffing, physical surroundings, and other facilities. However, if one does not deal with standardization, then an obvious opportunity to deal with overcrowding will be missed.

There are many examples on which topics could be relevant for standardization.

First of all triage: primary evaluation on how serious a sudden patient condition is and how fast he/she should be attended. There are many different triage systems, and most of them have in common that they are evaluated and found suitable, whether they are based on colours or digits. There are, however, two things that one should remember when using triage. First of all triage should start in the prehospital area where the patient is picked up and the result of the triage should be transmitted to the hospital as soon as possible. Secondly, triage should be systematically applied to *all* patients upon arrival. Having patients in the ED where triage has not been performed can lead to serious mistakes.

FIGURE 1: Example of simulation-program to be used in planning logistics in an ED. By adding the number of patients arriving on an hourly basis, you can calculate the number of different rooms and the staffing needed to avoid overcrowding. By the courtesy of FleXsim.

In the following i will refer to a triage system based on five colours: red: immediate attention. orange: should be attended within 30 minutes, yellow: should be attended within 1 hour, green: should be attended within 2.5–3 hours, and blue: should be attended within 4–5 hours.

Standardization on logistics can also be applied to patient tracks. The standard logistics describe which procedures every patient should pass in order to reach a tentative diagnosis and visualise that they require from 12 to 18 different professionals to reach a diagnosis on an acutely admitted patient. They also describe who does what and how long time every procedure must take. Finally, standard protocols can also define the maximum time it should take until a patient is admitted or referred. Many countries have introduced a 4-hour rule as maximum time the ED (e.g. England and Denmark). If the patient track is standardized on logistic then the planning of the ED can be put into computer-simulations in order to staff the unit 24/7/365. Such simulation-programs are available commercially, Figure 1.

3. Standardization of the Professional Response

In some EDs, standardized numbers of blood samples and even radiology are applied to a number of symptoms and can be ordered along with triage. In other words predefined diagnostic packages that can be ordered by for example, the receiving nurses. In my own department we have 34 somatic packages covering 95% of all our patients for example, “Fever”, “Dyspnoea of cardiac genesis”, “Abdominal pain”.

In calculations it isn’t more expensive than having a doctor order all diagnostic examinations and the method facilitates flow.

4. Standardization on Symptoms

Many EDs do not know the clinical presentation of their population upon arrival. They probably know numbers, sex, age and so forth, but they do not know much anything

FIGURE 2: Example of logistic system for ED. The electronic board gives the staff an overview over the number of patients in the ED and it also provides information’s on how well the flow in the department is running. By the courtesy of Cetrea Flow.

about frequency and distribution of symptoms. The main reason for this is that most statistics are based on diagnosis upon discharge. The tentative diagnosis upon admittance is not compared to the diagnosis upon discharge. Attempts are made to standardize the way the patients are reported from the prehospital area, and the system is based on symptoms rather than on diagnosis. There is evidence that 34 somatic symptoms cover more than 95% of all patients evaluated for admittance. Introducing symptoms along with prehospital triage makes sense to the general practitioner and also to the paramedics. In other words, the communication to the hospital can be standardized from the main symptom along with a triage colour/digit [5].

5. Logistics

Having more than 200 patients in an ED calls for a solution concerning where the patient should stay and which examinations should be done before he/she leaves the ED. Several solutions can be applied, but the performance of the different systems is very different and should be thought through very carefully before choosing a system.

The more advanced systems (Figure 2) keep track of the patient, they monitor time for different procedures, they tell the staff who is next in line to keep the patient in flow, and they even keep track of where a defined staff member is located and whether he/she is available. You can keep track of waiting time, and time in the ED, and you can elucidate bottlenecks in your setup. The options are numerable and should be carefully selected. A solution where symptom-based visitation and the applied diagnostic packages are shown is under development in some of the systems.

Using logistic systems as suggested has one big challenge; that is, they have to be used by every staff member in order to give a true picture of what is going on in the ED. So one has to be very strict on education programs to the system and no staff member can ignore his/her obligation to use the system because it makes sure that the overview shows a true picture at all times. Some EDs have even established a “play-ground”

where the staff members can use a hands-on model of the system.

Keeping the patient in flow in the ED is very challenging. More than 85% of the patients arriving at the ED for evaluation by ambulance are blue, green, or yellow in triage. They do not need immediate attendance, but they take up space and should be dealt with continuously. Many EDs use the youngest doctors to handle the less complicated patients. This model has to be reconsidered because even simple problems can take hours to be solved by inexperienced physicians. In some departments, the more experienced doctors and nurses are manning these patients in a “see-and-treat” setup and various point-of-care systems can support the functions. In other words, it makes good sense to use skilled doctors and nurses to deal with these often simple patients in order to keep up the flow in the ED.

Whether one can use point-of-care systems or not is discussed in many EDs. There is no doubt that many of the blue, yellow and green patients can be dealt with sufficiently by point-of-care systems. The big challenge seems to be to get sufficient support from the official laboratory so that calibration and quality of the various systems are under professional surveillance. One could get the impression that the issue of point-of-care systems is a very sensitive agenda based on history rather than eagerness to improve the work in the EDs.

6. Conclusions

In dealing with the organization of emergency departments, there are various issues to attend to. New tools from other “industries” are ready to be applied. In (re)organising an ED, one has to take flow, logistics, and standardization into consideration. There is no doubt that these ways to address work in the ED will be challenged by more conventional ways of thinking. However, the number of tools to be incorporated in the organisation of EDs is growing, and there is evidence in pipe line to document the effects of these changes.

Conflict of Interests

The author of the paper does not have any direct financial relation with the commercial identities mentioned in the paper that might lead to a conflict of interests.

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