

The physician as a necessary participant in triage in the Emergency Department of a tertiary hospital

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Aim: To assess the need of a physician on the ED triage, with the aim of identifying high-complexity patients using Manchester Triage System (MTS) at an Emergency Department.

Methods: Prospective observational study which enrolled all patients classified as very urgent (level 2 or orange) and urgent (level 3 or yellow) by the MTS in the First Assistance Unit (FAU) of the Emergency Department during a period of 12 hours, to be assessed by an experimented physician who decided the immediate location in an acute care or FAU area based on medical criteria. The validity of the decision was established according to the destiny of the patients once visited and measured by the admission index.

Results: The study included 100 patients, 45 of whom were eligible for the study, 10 (22.22%) placed by the MTS in acute care area as very urgent or orange and 35 (77.78%) in FAU area as urgent or yellow. The admission index of patients placed in acute care area by MTS was 40% (N=4) and in those placed in FAU area was 20% (N=7) (p=0.23). The triage physician placed 12 patients (26.67%) in an acute care area, 4 (8.89%) due to technical procedures and 8 (17.78%) due to their complexity and 33 patients (73.33%) in a FAU area. According to the physician criteria, the admission index of the patients placed in an acute care area due to their complexity was 87.5% (N=7) and of those placed in FAU 12.1% (N=4) (p<0,000).

Conclusions: The low capacity of the MTS to detect patients with potential high-complexity, makes the assessment of the physician necessary to guarantee the immediate location, adapting available services to individual necessities and therefore, optimising the resources. [Emergencias 2008; 20: 41-47]

Key words: Triage. Emergency Room. Manchester Triage System.

Introduction

As a consequence of the progressive increase in the demand for emergency care that often causes overcrowding in Hospital Emergency Departments, the development of a number of triage scales in recent decades has been justified as they provide order in the provision of attention.

At present, there are a number of five-category classification models adapted to the emergency department such as: Australian Triage Scale (ATS), Canadian Emergency Department Triage and Acuity Scale (CTAS), Manchester Triage System (MTS), Emergency Severity Index (ESI) and Andorran Triage Model "Model Andorrà de Triatge"

(MAT). The latter was adopted as the standard model for the Spanish Triage System "Sistema Español de Triaje" (SET)¹.

Structured triage systems are created to classify patients according to the level of urgency, in order to prioritise attention. Besides this, as an inherent quality to the classification process, systems should have the capacity to define the most adequate placement and to predict clinical evolution and resource needs of patients, as this would contribute to the management of the emergency department (ED)^{1,2}.

Some authors have documented a good correlation between the level of triage and the rate of admissions to hospital, the length of stay in the

ED, the requirement in consumption of diagnostic resources^{3,4} and even the survival rate after 6 months⁵.

In relation to admission to hospital, the existing scales have a high negative predictive value in non-emergency levels (levels IV and V), although the positive predictive value in urgent patients (levels I to III) is more moderate. In fact, it has been reported that the percentage of expected admissions according to the triage level is of between 15% for level III patients and 90% for level I patients, with significant variation intervals within the levels¹. Therefore, at present, there are difficulties to detect highly complex cases at the most urgent levels, which are defined as "those patients that have to be admitted or referred after assessment or that die in the emergency department"².

In some hospitals, triage is multidisciplinary. This means that an experienced physician assesses patients after they have been triaged by a nurse. This circuit is aimed mainly to resolve the problem or to refer the patients who do not need emergency care to primary care. This has proved to reduce the length of stay in the ED¹.

Currently, we do not have data about the capacity of MTS to immediately or definitively place urgent level patients on their arrival in the ED. Neither do we have data about whether the presence of a triage physician within a multidisciplinary triage model can offer any advantages in comparison to a decision based on the MTS.

Therefore, this study was carried out with the aim of validating the capacity of MTS to predict the complexity of patients with a high level of urgency and to show if the introduction of a multidisciplinary triage system would improve the identification of patients with a high level of complexity among those with urgent level, according to the MTS, on their arrival to the ED.

Method

This was an observational prospective study was carried out in the First Attention Unit (FAU) of the ED of Hospital Clínico San Carlos (HCSC).

HCSC is a tertiary university hospital located in the Southwest of Madrid, Spain, that provides care for 22 healthcare sectors from the districts of Chamberí and Latina and with a reference population of approximately 51,5000, an average of between 400 and 600 patients seen per day in the ED and a number of emergency admissions of nearly 24,000 in 2006.

The ED is currently divided into a classification area, a resuscitation room (1 bed), an acute patient area (18 beds), an ambulatory patient area or FAU (6 assessment rooms), a specialties area (trauma, paediatrics, psychiatry, gynaecology, ophthalmology, ear nose and throat and treatment room) and an observation area (29 beds). In this hospital, the short stay unit (16 beds) is part of the ED.

Currently, all patients that are stable and that arrive to the ED by their own means are sent to the FAU, except for those belonging to certain specialties (trauma, gynaecology, paediatrics, ophthalmology, ear, nose and throat and psychiatry). The work carried out at the FAU constitutes approximately 40% of the total activities in the ED.

MTS is a triage scale that includes 52 reasons for attendance and that turns the concept of sentinel symptom into presentation category. It introduces the concept of key discriminators to determine the classification level. This classification level includes 5 colours within a system of clinical flow charts. MTS assigns a maximum waiting time according to the level of urgency: red (immediate or level I) 0 minutes; orange (very urgent or level II) 10 minutes; yellow (urgent or level III) 60 minutes; green (standard or level IV) 120 minutes; blue (non-urgent or level V) 240 minutes. MTS has proved to be a sensitive tool for the detection of patients that are potentially seriously ill in EDs⁶. MTS is in use in the United Kingdom and it has been working in the ED of the HCSC since 2006.

We selected all patients that had been sent to the FAU in the ED of HCSC during a 12-hour period (3pm-3am). Patients classified as urgent (level orange or yellow) were assessed by an experienced physician from the department (triage physician) who decided their immediate destination (acute patient area or FAU). The patients classified as non-urgent (level green or blue) were placed directly in the FAU, without being previously assessed by the physician.

Patients immediately placed in the acute patient area are those defined as having high complexity. The criteria for direct placement in that level are, from the physician's point of view, based on general medical criteria (alteration of the level of consciousness, vital signs, age or co-morbidity) or specific criteria related to the symptoms leading to attendance to the ED.

The variables considered were demographic aspects, level of urgency, immediate destination, diagnosis and final placement. In addition, we identified the group of patients that were placed

in the acute patient area for requiring technical procedures or for severe mobility impairment that did not allow appropriate management in the FAU.

Statistical analysis was carried out using SPSS 12.0. Quantitative variables were expressed as median and percentiles 25 (p25) and 75 (p75) and qualitative variables were shown as percentages. Qualitative variables were analysed with the Fisher's exact test, with a level of statistical significance of $p < 0.05$.

Results

The study included a total number of 100 patients with a median age of 65 years (p25: 33.5-p75: 78), 69% being women. The most frequent reasons for attendance in the sample were dyspnoea and exanthema (11%) followed by abdominal pain, urinary problems, back pain and problems in the lower limbs (6%) (Tables 1 and 2).

The group of patients classified as urgent, and therefore assessed by the triage physician, consisted of 45 individuals (10 orange and 35 yellow). Among them, 12 were placed immediately in the acute patients area (4 for requiring technical procedures and 8 due to critical decision specifically related to their problem) and 33 were sent to the FAU. The final placements of patients were the following: 11 (24.4%) were admitted and the remainder, that is, 34 (73.33%), were discharged (30 conventionally and 4 leaving voluntarily) (Figure 1).

If the criteria of the triage physician had not been considered in the analysis and patients had been placed according to the MTS levels of urgency, the 45 participants would have been placed in the acute patient area. Among those classified as orange (10), 4 (40%) would have been

admitted and 6 (60%) would have been discharged. Among those classified as yellow, 7 (20%) would have been admitted and 28 (80%) would have been discharged (Figure 2), with no statistically significant differences between the level of seriousness and the final placement ($p = 0.23$).

If we consider the participants placed in the acute patients area by the physician and we exclude the 4 patients that were sent there only for requiring technical procedures (as in the hospital there are no specific rooms to do these), a total of 8 (17.77%) high complexity patients remain. Among these, 7 (87.5%) were admitted and 1 (12.5%) was discharged. Among the patients placed in the FAU, that is, low complexity, 4 (12.2%) were admitted and 29 (87.9%) were discharged. In this case, the classification carried out by the triage physician in the acute patients area or in the FAU was significantly associated with a different probability of admission ($p < 0.001$) (Figure 1). Among the 8 patients with potentially high complexity, 3 were classified as orange and 5 as yellow by the MTS and no statistically significant differences were found between the level of urgency and the immediate destination decided by the triage physician. Even when considering participants placed in the acute patient area due to requiring technical procedures, 7 out of the 11 (64%) patients there required admission, which entails a significantly higher probability of admission ($p < 0.01$) than that of patients placed in the FAU by the physician (4 out of 29, 12% of admissions).

Discussion

In EDs where there is a high number of attendances, a limited number of beds and a long waiting time for an admission bed, it is essential to determine the destination of patients immediately

Table 1. Patients (n = 10) classified as MTS level II (orange)

Syndromic diagnosis	Immediate placement	Placement criteria	Final placement	Diagnosis on discharge
Chest pain	Acute patients area	Medical	Transfer	Atrial fibrillation
Back pain	FAU	Medical	Discharge	Low back pain
Headache	FAU	Medical	Discharge	Migraine
Adult with general malaise	FAU	Medical	Discharge	Dizziness
Dyspnoea	Acute patients area	Medical	Admission	Pneumonia
Gastrointestinal haemorrhage	Acute patients area	Medical	Transfer	UGH
Exanthema	FAU	Medical	Discharge	Exanthema
Adult with general malaise	FAU	Medical	Discharge	Vertigo
Chest pain	FAU	Medical	Admission	Atypical chest pain
Back pain	FAU	Medical	Discharge	Low back pain

FAU: First Attention Unit UGH: Upper gastrointestinal haemorrhage.

Table 2. Patients (n = 35) classified as MTS level III (yellow)

Syndromic diagnosis	Immediate placement	Placement criteria	Final placement	Diagnosis on discharge
Abdominal pain	Acute patient area	Medical	Discharge	Ascites
Urinary problems	Acute patient area	Technical	Discharge	Haematuria
Vomiting	Acute patient area	Mobility	Discharge	Vertigo
Urinary problems	Acute patient area	Technical	Discharge	AUR
Dyspnoea	Acute patient area	Medical	Transfer	Heart failure
Problems in limbs	FAU	Medical	Discharge	Chronic ischaemia
Back pain	FAU	Medical	Discharge	Cervical pain
Exanthema	FAU	Medical	Discharge	Urticaria
Exanthema	FAU	Medical	Discharge	Exanthema
Dyspnoea	FAU	Medical	Transfer	Heart failure
Urinary problems	FAU	Medical	Discharge	Renal colic
Problems in limbs	FAU	Medical	Admission	Acute ischaemia
Urinary problems	Acute patient area	Technical	Discharge	AUR
Diarrhoea	FAU	Medical	Discharge	AGE
Problems in limbs	FAU	Medical	Discharge	Cellulitis
Dyspnoea	FAU	Medical	Discharge	Respiratory infection
Vomiting	FAU	Medical	Discharge	AGE
Haematological problems	FAU	Medical	Discharge	Microcytic anaemia
Back pain	FAU	Medical	Discharge	Low back pain
Exanthema	FAU	Medical	Discharge	Exanthema
Problems in limbs	Acute patient area	Medical	Admission	Lacunar infarct
Problems in limbs	FAU	Medical	Discharge	Bone and muscle
Dyspnoea	Acute patient area	Medical	Admission	Prosthetic valve dysfunction
Urinary problems	FAU	Medical	Discharge	Epididymitis
Chest pain	FAU	Medical	Discharge	Atypical chest pain
Diabetes	FAU	Medical	Discharge	Decompensated diabetes
Abdominal pain	Acute patient area	Medical	Admission	Intestinal obstruction
Abdominal pain	FAU	Medical	Admission	Epiploic appendicitis
Dyspnoea	FAU	Medical	Discharge	Respiratory infection
Headache	FAU	Medical	Discharge	Headache
Abdominal pain	FAU	Medical	Discharge	Unspecific
Exposure to chemicals	FAU	Medical	Discharge	Toxic substance inhalation
Urinary problems	FAU	Medical	Discharge	Haematuria
Chest pain	FAU	Medical	Discharge	Sinus tachycardia
Exanthema	FAU	Medical	Discharge	Exanthema

FAU: First attention unit. AUR: Acute urine retention. AGE: Acute gastroenteritis.

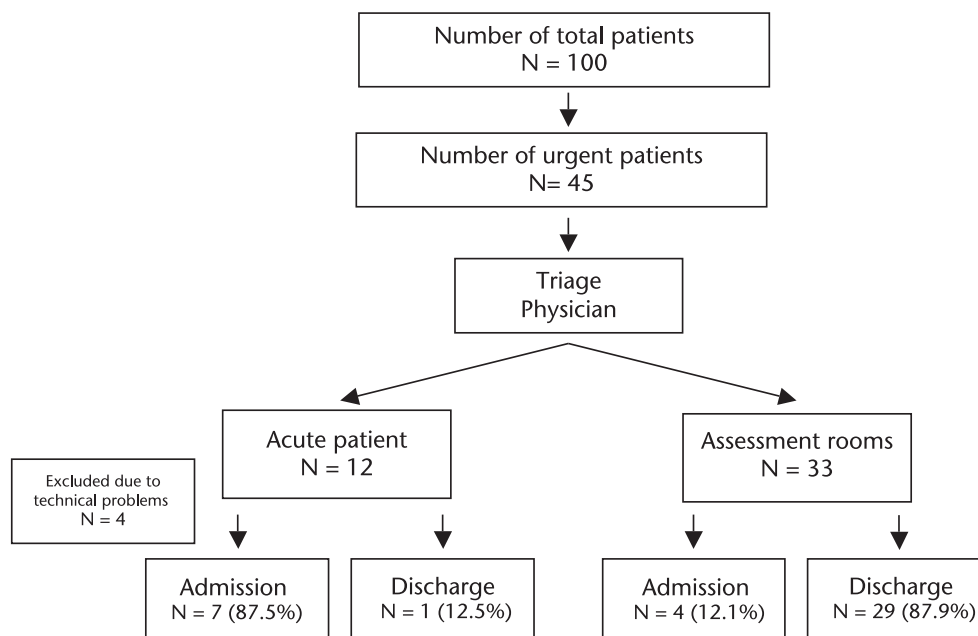


Figure 1. Immediate and final placement according to Triage Physician ($p < 0.001$ on comparing admission probabilities of both branches: acute patient area and assessment rooms).

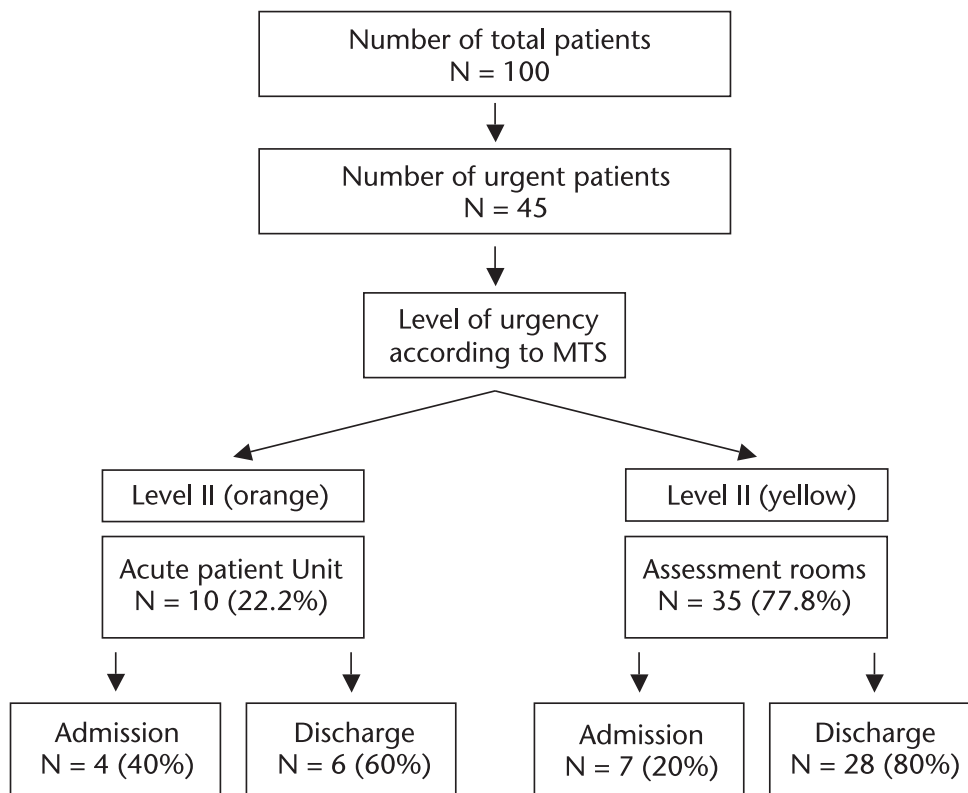


Figure 2. Immediate and final placement according to MTS level of urgency ($p = 0.23$ on comparing admission probabilities of both branches: orange level and yellow level).

since, when considering resource management, it would not be appropriate to immediately place low complexity patients in an acute patient area on a general basis.

A triage system should provide valid information to enable correct immediate placement of each patient, according to their level of urgency and their complexity^{1,2}. MTS does not seem to meet these expectations, as we have not been able to prove significant differences in the admission rates of urgent patients classified with MTS according to their possible destination.

Although the study does not analyse the ability of nursing staff to detect the complexity of patients, recent studies suggest that with the adequate tools, nurses can estimate reliably and properly triage the number of procedures, tests or consultations that patients will undergo⁷, as well as their destination, especially for the patients who could be discharged or seen quickly. On the contrary, there are more difficulties when detecting complex patients with low urgency and with certain pathologies⁸ that should be treated in the acute patient area. One of the possible reasons for these results is that a patient's complexity is not conditioned exclusively by the level of urgency

but also by different variables, such as age, reason for attendance and co-morbidity^{2,9}.

The role of the physician within the dynamics of multidisciplinary triage has been assessed in several series. Some authors have documented that multidisciplinary triage is more efficient than an isolated nursing triage, as it reduces times in first medical assessment¹⁰, the average length of stay in the ED^{10,11} and the decrease in patients that are discharged without medical assessment¹².

In the present study, we observed that the presence of a physician in triage plays an important role when detecting patients with high complexity from among patients classified as urgent with the MTS (levels II and III). In fact, in our sample, the triage physician identified 17.8% of urgent patients as being potentially of high complexity, which was confirmed in 87.5% of cases, while in those identified as low complexity (73.33%), this was confirmed in 87.9% of cases.

Considering the above mentioned results, MTS triage should be, from our point of view, a double classification system. This would consist of a first quick triage done by nursing professionals that would sift urgent from non-urgent patients and a second triage extended by a physician that would

include prescription of immediate treatment, request of complementary tests and detection of patients with potentially high complexity, placing them immediately in the appropriate healthcare level, which would enable to anticipate, with an acceptable degree of certainty, the final placement of each patient from the initial moment of their arrival at the ED (multidisciplinary triage).

The total percentage of admissions in our series was of 11%. This percentage is in agreement with those of other series in Spain, that range from 5% to 20%, depending on the autonomous community or on whether the ED provides paediatric care. The percentage of patients classified as urgent by the MTS was of 24.4%, which is lower than that obtained in other series published that used other triage scales¹. This can be due to these series including the total number of patients in the ED and not only those of the FAU, and also to the fact that they used other classification scales that have shown a good relation between the level of urgency and the admissions rate^{1,3,4}. We have not found any previous studies about the relation between the level of urgency and the admissions rate (validity) in adults using the MTS.

This study has an important number of limitations. In the first place, the series is small and the results must be considered with caution. On the other hand, the intervention of the physician took place only in cases with an urgent level, as the percentage of non-urgent patients that are admitted is of approximately 2%¹.

In the third place, we do not have data about the reliability of the triage system used in our study. Previous studies have confirmed the reproducibility of other triage scales^{3,4,13,14}, but there are currently no data to validate the concordance of MTS. As previously mentioned, MTS is the classification system used in our centre and therefore, in order to know the need of applying our conclusions in other centres, validation studies with this triage system are required.

In the fourth place, the data was gathered exclusively from the patients sent to the FAU, which does not contemplate the red level of urgency or certain specialties and besides, they were collected in a time interval of 12 hours (3pm-3am), which coincides with 2 of the 3 attendance peaks. This means that conclusions can not be generalised to any patient in the ED or to other time intervals.

In the fifth place, a possible confounding factor was the fact that the triage physician knew the level of urgency of each patient, did not influence in the decision of immediate destination.

Nonetheless, although we are making efforts to define the variables involved in the complexity of patients in EDs⁹, the criteria to identify potentially complex patients based on the need for admission are not clearly defined and can not be generalised, as there is a great variability in the decision to admit among different physicians¹⁵.

Further studies including a larger number of patients, different classification systems, all the levels of urgency and a longer period of observation time are needed in order to know the true role of physicians in the capacity for detecting high complexity patients, as well as the need for creating validated criteria that allow identifying this profile in triage.

Overall, MTS does not seem to be a useful tool to identify the need for admission in patients classified as highly complex. The intervention of a physician in MTS triage in patients with such a profile, seems to be necessary to ensure immediate placement of patients and to adjust available services to suit individual needs and to thereby optimise resources.

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El facultativo, un elemento necesario en el *triaje* de un Servicio de Urgencias en un hospital terciario

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Objetivo: Evaluar la necesidad de intervención de un facultativo en el *triaje*, para identificar al paciente potencialmente de alta complejidad en un servicio de urgencias que tiene implantado el sistema de *triaje* de Manchester (MTS).

Método: Estudio observacional prospectivo, que seleccionó a los pacientes clasificados como muy urgentes (nivel 2 o naranja) y urgentes (nivel 3 o amarillo), según el MTS, en la Unidad de Primera Asistencia (UPA) del Servicio de Urgencias (SU) durante un periodo de 12 horas, para ser valorados por un médico adjunto con experiencia que decidió la ubicación inmediata según criterios médicos en una sala de agudos o en consultas de la UPA. La validez de la decisión fue establecida por el destino de los pacientes una vez visitados y medida por su índice de ingreso.

Resultados: Se incluyeron un total de 100 pacientes, de los que 45 se seleccionaron para el estudio: 10 (22,22%) ubicables por el MTS en la sala de agudos como muy urgentes o naranjas y 35 (77,78%) ubicables por el MTS en la consulta de la UPA como urgentes o amarillos. El índice de ingreso de los pacientes ubicables en sala de agudos según el MTS, fue del 40% (N = 4) y el de los ubicables en consulta de la UPA del 20% (N = 7) (p = 0,23). El facultativo de *triaje* ubicó 12 pacientes (26,67%) en sala de agudos, 4 (8,89%) por requerir procedimientos técnicos y 8 (17,78%) por su complejidad y 33 pacientes (73,33%) en consulta de la UPA. El índice de ingreso de los pacientes ubicados, según criterio del facultativo, en sala de agudos por su complejidad fue del 87,5% (N = 7) y el de los ubicados en consulta de la UPA del 12,1% (N = 4) (p < 0,001).

Conclusiones: La escasa capacidad del MTS para detectar los pacientes potencialmente complejos hace necesaria la intervención de un facultativo que asegure la ubicación inmediata de los pacientes, adecuando los servicios disponibles a la medida de las necesidades individuales y, por tanto, optimizando los recursos. [Emergencias 2008; 20: 41-47]

Palabras clave: *Triaie*. Servicio de Urgencias. Sistema de *Triaie* Manchester.