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Prehospital and hospital indicators of severity in patients with multiple injuries: value as predictors of survival

Valor de los indicadores de gravedad prehospitalarios y hospitalarios en la predicción de la supervivencia en pacientes politraumatizados

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Introduction: Trauma is the leading cause of death in the first four decades of life. With the objective of more accurate analysis severity, mortality and related factors, different scales of prediction of severity, both physiological and anatomical, have been developed, including: Glasgow Coma Scale (GCS), Revised Trauma Score (RTS), Abbreviated Injury Score (AIS), Injury Severity Score (ISS), New Injury Severity Score (NISS) etc.

Objectives: The aim of this study was to compare the predictive capability of different scales of severity in relation to survival in a sample of multiple trauma patients in the Community of Navarra.

Method: Since two years ago our community has had a "Major Trauma Registry"; using this and following the recommendations of the "Utstein style", we prospectively studied all patients injured by external agents regardless of intention and with a NISS value > 15. It was therefore an observational prospective cohort study. We compared independent group means and performed ROC curve analysis using SPSS v 17.0. Differences with p values <0.05 were considered significant.

Results: We included 248 patients treated during the years 2010 and 2011. Of these 170 survived (68.5%) and 78 (31.5%) died. In the comparative analysis of means, the average prehospital GCS was 13 in survivors and 7 in those who died; RTS was 7.3 and 5 and the RTS 11 and 9, respectively. In anatomical terms, survivors had a mean ISS of 19 points and NISS 24 versus 33 and 40 respectively in patients who died. In all cases the differences were statistically significant. With survival as the outcome variable, ROC curve analysis showed that the area under the curve was 0.80 in the case of prehospital RTS and 0.83 in the case of ISS. Using a cutoff of 24 points for ISS (85% sensitivity and 80% specificity) and classifying patients with scores >24 as "high risk of death" and those with ISS scores <24 as "low risk of death", we obtained a relative risk (RR) of 5.6 for those scoring >24 on the ISS scale, i.e. the risk of death was almost 6 times higher in these patients compared to those scoring <24 on the same scale.

Conclusions: All the scales showed good capability to predict death or survival. In the prehospital setting, GCS and RTS are the most strongly recommended. In the hospital setting, ISS values higher than 24 reliably identified patients at high risk of death.

Destination of patients with mild-moderate community-acquired pneumonia on discharge from the emergency department

Destino desde urgencias de las neumonías leves-moderadas adquiridas en la comunidad

Introduction: The choice of destination for the treatment of pneumonia varies widely, especially in mild-moderate cases, and there are no uniform guidelines on assessing the risk of morbidity and mortality. To standardize the different approaches and avoid unnecessary hospitalizations, prognostic indices have been developed (Fine scale and CURB-65); the destination of the patient is decided according to the predicted risk. The implementation of these scales in the emergency department (ED) reduces variability, improves admission decisions and cost-effectiveness without compromising safety. However, these indices have limitations and some authors have questioned their utility.

Objectives: To describe the characteristics of patients with mild to moderate pneumonia treated in a hospital ED; analyze destinations and compare decisions on admission versus discharge using recommendations of the Fine scale; evaluate adherence to a computer application that establishes the destination according to the Fine scale.

Method: We performed a retrospective observational study of patients diagnosed with pneumonia in the ED of Galdakao-Usansolo Hospital between 1/01/2003 and 31/07/2009 and classified in Fine categories I, II and III. An application included in our ED computer system indicates the destination and treatment according to category. Epidemiological, clinical and laboratory data were collected. We analyzed destinations (discharge/observation/ admission) of ED patients with mild to moderate pneumonia. Quantitative variables are expressed as mean and standard deviation, and qualitative variables as absolute values and percentages. The association between variables was analyzed using t-test for continuous variables and chi-square or Fisher's exact test for categorical variables. Multivariate analysis was performed using a logistic regression model. The level of significance was set at $p < 0.05$. Statistical analysis was performed using the SAS program.

Results: 3,604 patients were included, of whom 2,432 were diagnosed with mild to moderate pneumonia, distributed according to Fine risk groups as follows: group I, 46.09%, group II 25.90% and group III 28%. Mean age was 53.19 years and 57.24% were men. Destinations were: discharge from the ED 44.70%, transfer to the observation area 25.20%, and hospital admission 30.10%. Old age and fever, tachycardia, hypoxia, acidosis and / or alterations of urea and sodium were significantly more common in those admitted. The percentage of admissions by Fine scale risk groups was: 22.30% in group I, 36.80% in group II and 65.49% in group III; 34.5% of group III were discharged (9.10% from the ED and 25.4% after being admitted for observation), the rest were admitted to hospital. As for the differences between discharge and admission by groups: groups I and II showed increased probability of admission when the following were present: pleural effusion, oral intolerance, aging, tachypnea, hypotension, tachycardia and hypoxia. In group III we also found a higher probability of admission if there was oral intolerance, tachypnea, hyponatremia and elevated urea, but not pleural effusion, age, blood pressure, heart rate or hypoxemia which did affect the decision to admit those with milder forms of pneumonia.

Conclusions: A high proportion of admissions was found in patients with mild pneumonia, as in other series, and there was a significant percentage of direct discharges from the ED in group III patients, which does not correspond with indications based on the Fine scale. Not all the variables of this index equally influenced the decision on destination in our sample (age was associated with fewer admissions while hypoxia, laboratory alterations and vital signs were associated with more admissions). Other factors that are not included in these risk scales (oral intolerance, social problems, failure of empirical treatment, laboratory markers of sepsis) are deemed by physicians as reasons for admission. Low adherence to the computer application that calculates the Fine index may overestimate risk and increase admissions. Other simpler prognostic indices that include the risk of sepsis or need for mechanical ventilation, in addition to mortality risk, could favor adherence to protocols to determine the destination of patients with pneumonia diagnosed in the ED.

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Living wills: success or failure?

Instrucciones previas: ¿éxito o fracaso?

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Introduction: A living will (LW) is a legal instrument, in the context of patients right to autonomy, whereby a person can leave express instructions on treatment options before the situation arises where he/she is no longer capable of expressing his/her wishes. Its regulation in Spain began in Catalonia in 2001.

Objectives: To determine whether the existence of such documents is known by patients with chronic illness who consult the emergency department (ED), whether they would be willing to make a LW, and, finally, compare the findings with all LW documents finally submitted to the hospital.

Methods: An observational, descriptive, non-interventional study, with prospective and consecutive inclusion of eligible patients during 6 months in 2010. We included patients with chronic disease who consulted our third level hospital ED for decompensation of the disease. We excluded those with cognitive impairment and those unwilling to participate. After clinical stabilization and before hospital admission or discharge, we recorded clinical and demographic data then carried out oral interview and anonymous survey on the patient's knowledge about LW and willingness to write one. The participating patients had previously been briefed by the interviewer, following an agreed protocol, about LWs, their purpose and how they should be elaborated. The study was approved by the hospital clinical research ethics committee. Subsequently, the data were compared with LWs actually presented in the hospital users care department in recent years.

Results: The study included 319 patients (196 men, 123 women). Only 17.3% had prior knowledge of LWs and only 6% had received the information through their regular doctor. After the briefing on LWs, 40% had no clear opinion, 45% had a favorable opinion and 15% rejected the idea of making a LW. Finally, on reviewing actual LWs provided to the hospital, we found a total number of 150 cases in 11 years (27 in 2010 and 20 in 2011).

Conclusions: Our results, in line with previous studies, confirm that LW documents are little known and little used in clinical practice, which highlights the lack of physician involvement in disclosure. The reasons are probably multi-factorial but after 11 years since their legalization changes and actions should be undertaken to improve penetration of LWs in our society if we really intend that, someday, these documents become an effective tool to reflect patient wishes about death and planning for the last phase of life, thus helping make clinical decisions and adapting measures and health resources to the patient's will.

Validation of the acute heart failure severity scale of the Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure (OPTIMIZE-HF)

Validación de la escala OPTIMIZE-HF para la valoración de la gravedad de la insuficiencia cardiaca aguda descompensada

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Introduction: There are no validated scales to analyze the severity of decompensated acute heart failure (AHF) in the setting of our emergency departments (ED). Recently, new markers of the severity of heart failure (HF) have emerged.

Objectives: To determine the predictive validity of the scale OPTIMIZE-HF in a sample of patients treated at three hospitals in Osakidetza and whether troponin T level has greater predictive capacity than this scale.

Methods: We performed a prospective observational cohort study of 293 adult patients presenting at hospitals in Galdakao-Usansolo, Basurto and Donosti between April and December 2011 for AHF and decompensated chronic HF. The variables included in the OPTIMIZE-HF score are: age, heart rate, systolic blood pressure,

re, sodium, creatinine and presence of left ventricular dysfunction. In addition, we collected sociodemographic variables, the presence of cardiovascular risk factors, the existence of heart disease and the level of troponin T. The primary outcome was death within seven days after the ED visit. For the analysis we created two models: a logistic regression model in which death was the main dependent variable and the OPTIMIZE-HF variables were independent, and another with these same variables plus troponin T level. C-statistic was calculated to assess the predictive capability of these models and used Hosmer-Lemeshow (HL) test to evaluate the calibration of the models. All analyzes were performed using SAS v9.2 for Windows.

Results: Half (50.85%: 149) the sample were men, mean age was 79.14 years. Almost two thirds (62.20%: 181) were attended for acute exacerbation of chronic HF. Hypertension was present in 83% (242), DM in 34.13% (100), obesity in 39.41% (67), cardiopathy in 67.92% (199) and renal failure in 7.85% (23). The C-statistic for the OPTIMIZE model was 0.872 (HL = 0.34) and for the OPTIMIZE + TnT model it was 0.982 (HL = 0.99).

Conclusion: Adding troponin T level to the OPTIMIZE-HF scale variables appears to provide it with greater predictive capacity. This tool can be useful to ED professionals in the decision-making process.

Emergency department management of patients with implantable defibrillators: multidisciplinary analysis of adequacy and suggestions for improvement from the GEDAIUR study

Manejo de las urgencias en portadores de un desfibrilador automático implantable: análisis multidisciplinario de su adecuación y propuestas de mejora. Estudio GEDAIUR

Introduction: The implantable cardioverter defibrillator (ICD) is a recent therapeutic modality for the prevention of sudden cardiac death, but there is little information on its management in the emergency department (ED). It is essential that management in daily practice is made known to establish strategies for improving care of this disease in the acute phase.

Objectives: To analyze the management of ICD patients presenting at the ED and to propose strategies for improvement.

Method: We performed a national, multicenter, cross-sectional, observational study. We included ICD patients aged >14 years seen in 27 hospital EDs (21 third-level hospitals) during 27 months. We analyzed both ICD-related emergencies (arrhythmic or not) and non-related emergencies, but in which the fact of bearing an ICD could condition the medical procedure or surgery. We prospectively collected clinical variables, ICD characteristics, management and evolution. No recommendations were made on management. The adequacy of management was established according to the SEMES-SEC document on ICD management in the ED [Emergencias. 2005;17:180-96]

Results: We included 781 patients (85.6% male, mean age 64 ± 13 years). Most (83.4%) had structural heart disease (52% ischemic heart disease, 31% dilated cardiomyopathy) and 70% had left ventricular dysfunction, moderate or severe. Two thirds (66%) consulted for arrhythmia or problems related to the underlying heart disease. Over two thirds (69%) were on beta blockers, 55% ACE inhibitors and 26% amiodarone. ECG was performed in 93% of patients, ECG monitoring in 65%, laboratory tests in 90% and chest radiography in 83%. The ICD memory chip was read while in the ED in 33% of patients and the cardiology and / or arrhythmia unit was consulted in 52%. Sedation was administered in 9%, beta-blockers in 15%, antiarrhythmics in 27% and external electrical cardioversion was used in 3%. The device was deactivated in 4% of cases (70% with a magnet and only 30% with a programmer). Symptoms leading to the ED visit were controlled in 77% and the main problem was considered to have been resolved in 76%. Evolution: admission 53%, observation unit 13%, direct discharge from the ED 34%. There were 9 (1.2%) deaths, only 1 caused by cardiac arrhythmia. In patients with structural heart disease not already receiving beta-blocker therapy, this was prescribed in the ED for 15% of them.

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Conclusions: 1) the majority of ICD patients attending the ED underwent basic complementary tests. However, the arrhythmia unit specialists were not consulted in half the cases and device interrogation was rare. 2) Almost half of the ICD patients were managed by ED professionals themselves, without hospitalization. 3) Although control of symptoms was achieved in most cases, management clearly presented areas for improvement. It is therefore necessary to establish joint management strategies with cardiology services to increase device interrogation and prescription of beta blockers in the ED, in order to optimize the management of this complex and growing group of patients.

Shocks from automated implanted defibrillators: characteristics and analysis of emergency department management

Descargas en pacientes portadores de un desfibrilador automático implantable (DAI): características y análisis del manejo en los servicios de urgencias. Estudio GEDAIUR

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Introduction: Shocks from an implantable cardioverter defibrillator (ICD) are a true medical emergency associated with increased mortality and have serious impact on quality of life. However, no information is available in the literature on their characteristics and how they should be managed in the emergency department (ED), nor the level of care required for ICD patients with acute complications.

Objectives: To analyze the relative frequency of shocks in all ICD patients visiting the ED, their causes and management in the ED.

Method: We performed a national, multicenter, cross-sectional, descriptive study of all ICD patients treated in 27 hospital EDs (21 third-level hospitals) during 27 months. We prospectively collected patient and ICD characteristics, and analyzed the relative frequency of device shocks, their causes, and the management of these cases in the ED. No management recommendations were made.

Results: We included 781 patients (85.6% men, mean age 64 ± 13 years). Most (83.4%) had structural heart disease (52% ischemic heart disease, 31% dilated cardiomyopathy) and 70% had moderate or severe left ventricular dysfunction. Of all these patients, 233 (28.6%) visited the ED because of ICD shocks: multiple in 134 (60%) and occasional shocks in 89 (39.8%). ICD memory chips were read in the ED in 65% of patients with multiple shock and in 57% with occasional shocks. In patients with occasional shocks, 38% reported that this was the first time they had had this complication. In 88 patients (66%) the multiple shocks were in fact appropriate (due to the presence of VT / VF) and in 39% inappropriate (supraventricular arrhythmias or device fault). Multiple shocks were secondary to VT in 65% of cases, SVT or AF in 16%, device fault in 12% and VF in 7%. Secondary prevention ICDs showed a higher incidence of appropriate multiple discharges (OR = 3.29, 95% CI 1.76 to 6.17, $P < 0.05$). The treatments most often used to treat multiple discharges were sedation (68%), beta-blockers (25%) and amiodarone (39%). Hospital admission was required for 72% of patients with multiple shocks and 28% of those with occasional shocks. There were no deaths in the ED for this reason.

Conclusions: 1) ICD shocks are the main reason for ED visits associated with the device. 2) 60% of the shocks were multiple and mostly appropriate, properly managed in the ED and required hospitalization. 3) It is feasible and necessary to implement strategies in all EDs for early and adequate management of patients attending for ICD shocks, in particular to establish circuits for device memory reading, to limit the serious consequences for the prognosis of these patients.

Emergency department register and protocol for sepsis cases: assessment after a year of implementation

Evaluación de la implementación del registro-protocolo sepsis en un servicio de urgencias tras un año de experiencia

Introduction: The sepsis register and protocol is based on a study of Profiling. Various studies have demonstrated that early identification and treatment in the first hour and the first six hours reduces mortality. Based on therapeutic clinical guidelines derived from the Surviving Sepsis Campaign and adapted to our setting, we implemented the sepsis protocol.

Objectives: To determine the work load and therapeutic adherence to the guidelines; to monitor results and perform patient follow-up, cooperate with other hospital services and promote knowledge about management; code the sepsis process and include it in the integrated management system of Hospital Manacor; and create a sepsis protocol.

Method: Through computerized medical records, GesHdoc®, HCSS and our hospital intranet enabled establishing a data record in HTML format. Administrative data, quantitative variables (vital signs, laboratory parameters defining severe sepsis) and qualitative variables (type and source of infection, antibiotic prescribed, vasoactive drugs, diagnosis and destination) were exported in Excel format for subsequent analysis and of the variables and their inter-relationships. The study period was from October 2010 to January 2011.

Results: The total number of emergency medical and surgical patients aged >14 years attended between October 2010 and October 2011 was 35,690; 132 cases were valid registers. The incidence of severe sepsis was 65 cases per 100,000 inhabitants per year and of septic shock 12 cases per 100,000 inhabitants per year. Severe sepsis was diagnosed in 95 patients (71%), 17 septic shock (12.7%), 20 non-encoded (20%) and 1 multiorgan dysfunction (0.7%). Distribution by site of infection was: 24% abdominal, 34% respiratory apparatus, 30% urological, 7.5% skin and soft tissue, 4% unknown and 1% CNS. Regarding time to administration of the first dose of antibiotic: 39.84% in less than an hour, 15.15% between 1 and 2 hours, 19.8% between 2 and 3 hours and 5.3% > 3 hours. The determination of the microorganism responsible sensitive to antibiotic-correlation site antibiotic was: urological 100%, respiratory apparatus 87%, abdominal 100%. Regarding laboratory tests performed: lactic acid and procalcitonin were determined in the first hour in 100%, in the first six hours 90%; in the first twelve hours 50%, and in the first 24 hours 30%. Hospital mortality after 24 hours: for severe sepsis 18% and for septic shock 35%. Average ED stay was 27 hours. Final destination: 68.18% of cases were admitted to a hospital ward and 20.21% to ICU. As for the variable costs (including 3 laboratory tests + antibiotic + central line + fungibles costing €193.44 per patient) the total was €25,727.

Conclusions: After a pilot period, implementation of the sepsis protocol allowed early identification of patients, improved therapeutic action, knowledge of causal microorganisms in our population and antibiotic sensitivity. It reduced antibiotic administration time and mortality compared with the pilot period. Follow up of these patients over time allowed us to determine mortality at six months and one year. We detected an inclusion bias after assessment, the limitation of treatment effort, which was included a posteriori in the register. Our results are in agreement with those published by other authors. Finally, we have acquired for our clinical practice a sepsis protocol of action linked to the integrated management system of our hospital.

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Emergency department register and protocol for sepsis cases: assessment after a year of implementation

Evaluación de la implementación del registro-protocolo sepsis en un servicio de urgencias tras un año de experiencia

Introduction: Morphine chlorhydrate (MC) is one of the oldest and most widely used active analgesic principles. Fentanyl, more modern, was synthesized early last century, and its analgesic effect is about 80 times higher. Many published stu-

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dies demonstrate the greater efficacy and safety of fentanyl in the treatment of pain. Fentanyl administered for the treatment of coronary pain by qualified personnel does not alter hemodynamics or oxygen consumption in patients with acute coronary syndrome (ACS). Moreover, its action is faster and its histamine release capacity is lower than that of MC. For this reason, this study analyzed the effectiveness of both these analgesics in treating coronary pain in an out-of-hospital context.

Objective: To determine the effectiveness of fentanyl for the treatment of pain in ACS patients with ST segment elevation (STEMI).

Methods: We performed a prospective, observational, analytical, longitudinal cohort study between January 2011 and January 2012 in Barcelona city and Maresme.

Results: Both study groups were similar in age and initial pain intensity. Inferior infarction was present in almost 20% of cases. The most common findings in medical history were hypertension, dyslipidemia and smoking. Fentanyl did not significantly reduce final pain compared with MC, but achieved the same analgesic effect as MC with significantly lower doses, and with less decline in mean arterial pressure.

Conclusions: Fentanyl was not shown to be more effective than MC in reducing coronary pain in patients with STEMI, but those receiving fentanyl were hemodynamically more stable than those receiving MC, and lower doses of fentanyl were required to produce the same analgesic effect.

Trauma cases in Madrid: 10-year analysis of cases and emergency response

Comparación de los pacientes con traumatismos atendidos en Madrid en 2001 y 2011: la evolución de un servicio de emergencias

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Introduction: The evolution of hospital emergency services over the last 20 years has been intense. There has been great improvement in patient attention despite the ever-increasing numbers of patients. Those with trauma have, possibly, benefited most. Survival and reduced morbidity have been the primary objectives. As the city has changed, so have emergency service attendance rates and the models of care.

Objectives: To describe and analyze changes in the etiology of the traumatic events attended by mobile outpatient emergency units in public places in the city of Madrid in the last decade.

Method: We performed a descriptive analytical study. Scope: SAMUR-PC. Madrid. Population: patients with trauma attended by SAMUR in 2001 and 2011. Variables: etiology of trauma, district, time of day, month, final pathological code, type of transfer unit. Comparison of qualitative variables was performed using chi-square test. Statistical significance was set at $p < 0.05$. Data processing and analysis: Excel and SPSS v 15.0.

Results: During the study period we attended a total of 86,259 cases, of which 36,372 (42.2%) corresponded to 2001 and 49,887 (57.8%) to 2011 (no statistically significant difference). With regard to the cases treated exclusively by mobile units of basic life support (BLS) ($n = 46,169$), the total for 2001 was 13,650 (29.6%) and in 2011 this was 32,519 (70.4%). For the type of incident: 32.4% were traffic accidents in 2001 and 29.8% in 2011, 20% street assaults in 2001 and 21.4% in 2011, 13.9% falls and injuries in 2001 and 33.9% in 2011 ($p > 0.05$). Traffic accidents increased significantly from Monday to Friday and decreased over the weekend, while assaults increased at weekends ($p < 0.05$). Analyzing seasonal variability, we found that assaults decreased in the months of November, December and January ($p < 0.01$), and falls increased in the months of December and January ($p < 0.01$). Of all patients treated for trauma, 43% were for minor bruises in both years. The injured taken to hospital accounted for 53.2% in 2001 and 46.3% in 2011 ($p < 0.05$). Transfers to children's hospitals accounted for 1% of the total, without significant differences between the two years.

Conclusions: The number of traumatic events in public places has not increased in the last decade. However we found an increase in the number of trauma pa-

tients attended by BLS units, possibly reflecting improved optimization of resources by the central communication system. We would highlight the similar distribution of events between the two study periods, and the type of event according to days of the week. The increase in population movement to and from work on weekdays logically corresponds with traffic accident attendance by our emergency service, and the increase in the number of people in public spaces at weekends corresponds with increased incidents of assault resulting in calls to the emergency services.

N-terminal fragment of brain natriuretic peptide (NT-proBNP) and ejection fraction: relationship in patients with acute heart failure in the emergency department

Relación entre NT-proBNP y fracción de eyección en pacientes atendidos por insuficiencia cardiaca aguda descompensada en los servicios de urgencia

Introduction: Clinical practice guidelines for heart failure (HF) recommend an echocardiogram (ECG) as soon as possible in patients consulting the ED for this disease. The reality is that many emergency physicians lack the training or experience to perform the ECG, which often means a delay of several days, and sometimes this is what motivates hospitalization. NT-proBNP, recently available in the ED, is well known for its diagnostic role, given its high negative predictive value and its prognostic value. This study aimed to determine whether there is a sufficiently close relationship between NT-proBNP and left ventricular ejection fraction (LVEF) to see if we could estimate the latter using the peptide values. This would be most useful in the ED since it would help determine the treatment plan, and also allow us to identify cases of HF with preserved systolic function, which is fairly common.

Objective: To determine the relationship between NT-proBNP, in patients visiting a hospital emergency department (ED) with acute heart failure (AHF), and LVEF estimated by echocardiography in these patients.

Methods: Prospective observational cohort study of 293 adult patients attending the ED of the hospitals Galdakao Basurto and Donostia between April and December 2011 for AHF and decompensated chronic HF. We recorded the following variables: sociodemographic, cardiovascular risk factors, comorbidities, history of heart disease (ischemic cardiomyopathy, valvular disease, arrhythmia), laboratory and echocardiographic data of the emergency episode and hospitalization. Analysis was performed with categorical variables expressed as frequencies and percentages and age (the only continuous variable) as median and maximum and minimum due to its abnormal distribution. We used chi-square test to measure the association between categorical variables and median test for comparison of the variable age between groups. Statistical significance was set at $p < 0.05$. We used a general linear model where the dependent variable was the percentage of ejection fraction and the independent variables were age, the presence of heart disease, renal insufficiency, diabetes mellitus (DM), hypertension (HTN), obesity and NT-proBNP values. All analyses were conducted using SAS v9.2 for Windows.

Results: Half (50.85%; $n = 149$) the sample were men, mean age of the whole sample was 79.14 years. The reason for the ED visit was chronic HF decompensation in 62.20% ($n = 181$). Most (83%) had hypertension (242), 34.13% DM (100), 39.41% (67) obesity, cardiopathy 67.92% (199) and renal failure 7.85% (23). NT-proBNP level was related to LVEF after adjusting for other variables included in the model ($p = 0.0085$). Age ($p < 0.0001$) and the presence of cardiopathy ($P = 0.0026$) were also linked with the ejection fraction. Finally, 32% of the variability was explained by the model (R^2).

Conclusion: The results are promising and we can say there is a relationship between NT-proBNP and LVEF. However the relationship is not linear, and therefore one cannot deduce one value from another. Nevertheless, we believe that the in-

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formation obtained may be relevant; increasing the sample size and including more variables could increase the predictive capacity of the model.

Profile of the patient over 80 years of age with hypercapnic respiratory failure treated with noninvasive ventilation in an emergency department: Are we giving them a chance?

Perfil del paciente mayor de 80 años con insuficiencia respiratoria hipercápnica tratado con ventilación no invasiva en un servicio de urgencias: ¿le damos una oportunidad?

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Introduction: In recent decades, non-invasive ventilation (NIV) has become an effective tool to treat acute hypercapnic respiratory failure (AHRF). Many of these patients are elderly and included in the group with an order of non-intubation (ONI) where NIV may only be used as the last resort in AHRF treatment.

Objective: To describe the clinical and epidemiological profile of elderly AHRF patients over 80 years of age treated with NIV in the emergency department (ED), the percentage of failures, early mortality and associated factors, clinical and gasometric parameters at 60-120 minutes of NIV, the ventilatory mode, complications and destination.

Method: Prospective observational study including 80 patients over 80 years of age requiring NIV in the ED of a third-level hospital. We analyzed the causes, destination, clinical blood gas parameters at admission, at 60 and 120 minutes of NIV, ventilatory mode, complications, mortality, failure and related factors, and number of patients with ONI. We calculated comorbidity (Charlson) and dependence (Barthel Index, BI). During the follow up, we evaluated mortality: in the ED, in the hospital, or month and year after discharge.

Results: More than half (56.25%) were women, mean age was 85 ± 4 years, with high comorbidity (65% had a Charlson index ≥ 3), and frequently associated pathologies included hypertension (HTA), chronic heart failure (CHF), diabetes mellitus (DM) and obstructive pulmonary disease (COPD). Most (67.5%) patients were highly dependent for basic activities of daily life (ADL) with a BI < 60 , and 90% of the patients were considered to have an ONI (12% living will, 10% family and 78% ordered by the clinician). The most common causes of AHRF were acute pulmonary edema (APE, 42.5%), exacerbated COPD (25%) and pneumonia (12.55%); 17.5% had AHF associated with exacerbated COPD. The ventilatory mode most used was bi-level pressure (bilevel-PAP: 65%), especially in those with COPD exacerbation. Constant positive airway pressure (CPAP) was used in 28 patients, especially in those with APE. Some patients (6.25%) needed a change of ventilatory mode (CPAP to bilevel-PAP). Heart rate (HR) at baseline and 120 minutes into NIV was 103 ± 22 and 87 ± 18 beats per minute, respiratory rate (FR) 35 ± 7.6 and 26 ± 7.3 , arterial oxygen pressure (PaO_2) 87.7 ± 18 and 64.6 ± 19.8 mmHg, carbon dioxide blood pressure (PaCO_2) 70.9 ± 11.6 and 58 ± 16.5 mmHg, pH 7.25 ± 0.11 and 7.30 ± 0.08 and O_2 saturation (SaO_2) 80 ± 15 to 93.6 ± 6.79 . The oxygenation index ($\text{PaO}_2/\text{FiO}_2$) at baseline was 208.01 ± 83.4 . Mortality was 52.5% (42): 1.25% (1) in the emergency department, 16.25% (13) on admission (10 for poor outcome and 3 infectious complications), 3.65% at one month and 26.25% at one year. The percentage of readmissions before one month after discharge was 7.23%. Factors associated with mortality were: systolic blood pressure < 120 mmHg, urea > 45 mg / dl, pH < 7.25 , pneumonia and the use of bilevel-PAP as ventilatory mode. The technique failed in 12.5%, and the most frequent cause was mask rejection due to discomfort. The most frequent destinations were the short stay unit (SSU, 65%) and internal medicine (23.55%), no patient was admitted to the intensive care unit.

Conclusions: The typical profile of patients older than 80 years treated with NIV for AHRF in the ED is a woman with high comorbidity and high ADL dependence. The etiology and NIV mode for AHRF coincide with those of other series without age limits (APE, exacerbated EPOC, bilevel-PAP). Mortality was low in the

ED, medium on hospital admission and high during the year after discharge (age, comorbidity, dependence). There were few complications and failures. The most frequent destinations were Internal Medicine and the SSU, where patients with the above profile are regularly treated: in our case the SSU is dependent on the ED, so it is essential that emergency physicians receive training courses in NIV.

Application of simulation and optimization techniques to identify resources and procedures that reduce hospital emergency department wait times

Uso de las técnicas de simulación y optimización para determinar recursos y procedimientos que permitan reducir los tiempos de espera de los pacientes en una unidad de urgencias hospitalaria

Introduction: The management of hospital emergency departments (ED) must be concerned with efficiency, understood as attending the same number of patients with the same quality of care and lowering costs. Simulation techniques and optimization of processes in these units can be helpful in planning.

Objectives: To propose improvements in the planning and operation of an adult ED in an urban hospital through the development of a simulation model and dynamic optimization, aimed at reducing patient waiting time.

Method: Initial definition of processes, analysis of material and human resources, formalize and model the ED. We carried out several meetings and an analysis by unit physicians and specialists under simulation. Analysis of the ED database for the years 2007-2012. We then performed a discrete event simulation for 90% and 150% of the care demand for 3 months to develop a dynamic mathematical model to optimize and improve system efficiency. We used SPSS 17 for the study of descriptive variables and Arena statistical package to develop the simulation and optimization experiments.

Results: The ED human resources were: 2 administrative clerks for admission, 1 triage nurse, 12 nurses, 7 physicians, and 12 nursing assistant. Material resources included: 1 triage box, 6 specialties boxes, 9 level 2-3 boxes, 1 level 4-5 box, 4 critical care beds and 13 observation beds. Simulation of original resource utilization considering 90% and 150% of demand: triage box, 72%, 65% and 100% respectively; triage nurse 72%, 65% and 100% respectively; level 4-5 boxes 97%, 87% and 100% respectively, and critical care beds 64%, 69% and 72% respectively. The remaining resources were below 50%, 40% and 60% respectively. Average original waiting time (hours) was 4.97 h, at 90% 2.44 h, with the model for 150% demand the system was saturated. 28,456 patients were seen by nursing staff in the original model; at 90% 25,716 and at 150% more than 35,000. 23,356 patients were attended by physicians in the original model, 21,070 at 90%, and at 150% more than 25,000. Resource optimization and adjustment yielded: admission staff 3 (+1), nurses 13 (+1), auxiliary nurses 6 (-6), observation beds 12 (-1), level 4-5 boxes 5 (+2), with the remaining resources unchanged. With this setup the model obtained a reduction of 62% of average total time that patients would remain in the ED, satisfying the current demand and lowering the cost of operation by 21.7%.

Conclusions: Modern ED have great organizational complexity that hinders a full system analysis. The simulation indicated that the capacity of the system was limited by the triage area, nurses, low-priority care boxes and critical patient care. Mathematical optimization models can reduce the total average patient waiting time and costs by identifying a new improved configuration of resources. In general we would indicate that dynamic simulation and optimization are useful tools for analyzing the effects of increasing or decreasing resources and process changes in the ED.

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Rapid diagnostic consultation managed by emergency physicians: descriptive analysis and results

Consulta de diagnóstico rápido gestionada por médicos de urgencias: descripción y resultados

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Introduction: From the emergency department (ED), dependent functional units are emerging, such as short-stay units and high dependency units, representing a significant improvement in patient care and health management. Rapid diagnostic consultation (RDC) is needed in these new functional areas of the ED, aimed at patients who require preferential ambulatory care to avoid hospital admission.

Objectives: to describe the implementation, operating conditions and care results of RDC dependent on an ED at a third-level hospital and compare the section managed by emergency physicians against that managed by hospital ward physicians.

Methods: A single-center prospective observational cohort study conducted in the ED-dependent RDC service area which consists of two sections, one managed by ED physicians (MURG in Spanish) with one stable physician from Monday to Friday and the other by physicians of internal medicine (MINT in Spanish), with a different physician Tuesday through Friday. This study included patients seen from inauguration of the RDC in April 2010 to March 2012. We collected care times, reasons for consultation and final diagnoses. The data were processed using SPSS.

Results: During the study period 797 patients were attended, 65.7% (524) by the MURG section with five days of consultation per week compared to the four days in the MINT section. The main reasons for referral to RDC and percentages were: 27.6% constitutional symptoms, anemia of unknown origin 24.2%, and prolonged fever 11.5%. The remaining 36.7% was distributed between: lymphadenopathy, chronic diarrhea, thoracic tumor, abdominal tumor and metastatic disease of unknown primary tumor, with no differences between the two sections, nor regarding time to first appointment: 4.2 days MURG vs 4.7 days MINT ($p = 0.161$). The time to diagnosis was significantly lower in the MURG section: 14.83 days vs. 24.15 days in the MINT section ($p = 0.00001$), and total time from ED visit to diagnosis: 18.4 days MURG vs 29.3 days MINT ($P = 0.00001$). Regarding additional tests, conventional laboratory tests were performed in 84%, microbiological tests 39.5%, ultrasound 40.7%, computed tomography (CT) 33.7%, gastroscopy 26.8%, colonoscopy 29.7% and punch biopsy samples 27.1%, without differences between the two sections. Regarding final diagnoses we would highlight solid tumors 150 (18.82% of all patients), 62 colon cancers, 46 lung cancers, 6 hepatocellular carcinomas, 6 pancreatic cancers and 4 cholangiocarcinomas.

Conclusions: 1) The RDC may become a new functional unit of the ED. 2) Differentiated management by emergency physicians is possible and the unit saves hospital admissions. 3) The main processes in our setting are constitutional syndrome, anemia of unknown origin and prolonged fever. 4) The time to first consultation was 4.2 days, the time to diagnosis was 14.83 days and the total time was 18.4 days, less than that for traditional consultation.

Work-related psychological and social risk in a sample of resident physicians in an emergency department

Riesgos psicosociales asociados al puesto de trabajo en el servicio de urgencias en una muestra de residentes

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Introduction: Exposure to psychosocial hazards is one of the aspects that most affects the relationship between work environment and health. It is important to know the potential risks associated with the job for new staff joining the health system, and adequate management of these risks can help reduce potential stress or burnout problems in the future.

Objectives: To describe the most important work-related psychosocial risks in a sample of medical residents and establish correlations between the different dimensions of the measuring instrument Cop-SoQ-ISTAS21.

Method: Cross-sectional study performed in January and February 2012 at Hospital San Cecilio (Granada). The sample consisted of 20 medical residents performing shift work in the emergency department: 4 men (20%) and 16 women (80%); mean age of 26.15 ± 1.46 years; 13 were R1 and 7 were R2. Measurements were made using a validated questionnaire adapted for Spanish: the Copenhagen Psychosocial Questionnaire (CoPSoQ-ISTAS21, version 1.5). Subjects were asked to limit their responses specifically to their work in the emergency department. The questionnaire is designed to identify, measure and assess exposure to six major dimensions of risk, namely: a) psychological demands, b) double-role activity, c) control over the work; d) social support and quality of leadership; e) esteem f) uncertainty about the future. THE COPSOQ-ISTAS21 groups the scores for each dimension as unfavorable, favorable or intermediate. This criterion refers to psychosocial health risks derived from the organization of the work. Statistical analyses were performed using Shapiro-Wilk test, frequency analysis, Spearman bivariate correlations and comparisons using Mann-Whitney U-test.

Results: We found that 85% of residents reported unfavorable psychological demands; 25% have unfavorable control over the job; 65% (13 residents) indicated that they had unfavorable social support and quality of leadership, 60% indicated problems due to double-role activity and 75% unfavorable self-esteem. We found significant bivariate correlations between psychological demands and job control ($r = -0.403$, $p < 0.050$) and social support ($r = -0.557$, $p < 0.011$). No significant gender differences were found for any of the dimensions of CoPSoQ-ISTAS21.

Conclusions: This exploratory study provides evidence of psychosocial problems in medical residents performing ED shift work. These were especially due to high psychological demands of the work, low control, and low level of social support, which can lead to problems in the medium and long term for this group. Perhaps one of the strategies that could be implemented to reduce these problems is the establishment of the specialty of emergency.

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Incidence and clinical predictors of cardiogenic syncope in an emergency department syncope unit

Incidencia y predictores clínicos del síncope cardiogénico en una unidad de síncope del servicio de urgencias

Introduction: Syncope is a common symptom motivating emergency department (ED) visits. The aim of the syncope unit (SU) is to resolve the diagnosis and treatment of unexplained syncope, mainly to rule out the possibility of cardiogenic origin.

Objective: To determine the clinical findings that guide the diagnosis of syncope of cardiogenic origin, and its incidence in patients admitted to the SU at a third-level hospital.

Method: Retrospective, observational study of all patients seen in the SU of Hospital Universitario Central de Asturias from 1 January to December 31, 2011. The patients were classified according to the Manchester triage system using orange, yellow or green code. We analyzed epidemiological and clinical variables, diagnostic tests and etiologic diagnoses.

Results: The study included 103 patients, 57.4% men, mean age 70.1 ± 15.7 years (23-90 years). Morbidities included hypertension 48.5%, diabetes mellitus 23.3%, 27.2% dyslipidemia, smoking 19.4%, alcohol 15.5%, history of ischemic heart disease 15.5%, diagnosis of valvular heart disease 8.7% and atrial fibrillation 17.5%. A diagnosis of cardiogenic syncope (CS) was made for 20 patients (19.8%), and the rest non-cardiogenic (NCS). Atrial fibrillation (35% in CS vs 13.6% in CNS, $p < 0.05$)

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and age over 70 years (85% in CS vs 54.4% in NCS, $p < 0.05$) were significantly associated with the presence of cardiogenic syncope, as was the classification code orange on ED arrival (55% in CS vs 28.4% in NCS, $p < 0.05$). The difference in valvular heart disease (20% in CS vs 6.1% in NCS, $p = 0.074$), although more frequent in the cardiogenic group, was not statistically significant, probably due to the small sample size.

Conclusions: 19.8% of patients admitted to the syncope unit presented cardiogenic etiology. Cardiogenic syncope was associated with age > 70 years, atrial fibrillation and (Manchester triage) orange code classification on ED arrival.

Study-group 7 analysis of the characteristics of critically ill emergency patients at Hospital Universitario Central de Asturias

Estudio Grupo-7: características del paciente crítico del Hospital Universitario Central de Asturias (HUCA)

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Objectives: To identify demographic variables of patients in the critical care area of the emergency department, Hospital Universitario Central de Asturias (HUCA), and the different reasons and specialists who handle day to day activity in this area, in order to consolidate our importance as a service and clinical management unit within the current hospital framework.

Method: This was an observational study of patients referred to the critical care area in the period from May 1, 2011 to May 28, 2011 (inclusive). Data were analyzed using SPSS version 19.

Results: The study included 879 patients, mean age 64.6 years, 52.3% men; 87.4% were classified as orange code by the Manchester triage system. Days of the week with greatest influx of patients in this area were Monday (16.7%), Tuesday (15.9%) and Friday (15.2%). The most frequent reason for referral was chest pain (28.9%). The sum of deaths and cardiac arrests (SCA) represented 1% of patients attended in this area of the ED. The medical specialties most involved with treating these patients were emergency physicians (42%), followed by cardiologists (13.3%). Non-standard imaging tests (CT and ultrasound) were requested in 14.1% of these patients. Subsequent destination was hospitalization (45.4%), discharge (33.6%), observation unit (19.8%) and death (1.1%). Peak time of entry into this area was at 14:02:53. The two rooms of this area were occupied during 12.4% of the time. Patients were in the hallway outside for about 11.6% of the time. Mean stay time in this area was about 4 hours.

Conclusions: 1) The prototype of the HUCA emergency patient in the critical care area was a 79-year-old man consulting for chest pain. 2) As might be expected, most of these patients were classified as priority orange using the Manchester triage system. However, it is noteworthy that 10% of the patients who ended up in this area were reclassified for different reasons within the ED. 3) Emergency medicine specialists took on most of the care burden of the central region of the ED attending 42% of the patients. 4) The image of passageway collapse was true to the extent that only 11.6% occupied this space, especially during peak hours and days (Monday, 16.7% at 14:00 hours).

Shortness of breath: characteristics in patients in a short-stay unit

Rasgos de la disnea en una unidad de corta estancia

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Objective: A significant proportion of patients visiting the emergency department (ED) for dyspnea is admitted to our short stay unit (SSU). We analyzed the reasons for SSU admission, epidemiological characteristics, mean stay time and resolution at discharge.

Method: We performed a retrospective descriptive study covering the period 10/12/2010 to 11/01/2011 including all patients admitted to the SSU who visited the ED for "dyspnea / shortness of breath."

Results: 112 patients (76.19%) of the total 147 admitted during the study period had dyspnea; 50% men, mean age 75.19 years (women 78.64 years). Most (76 patients: 67.85%) had decompensation of underlying disease; 47 patients (52%) had congestive heart failure (CHF) and 44 patients (48%) had chronic obstructive pulmonary disease (COPD); 19 patients (16.7%) had both chronic conditions. Mean stay for decompensated CHF was 2.71 days and for COPD exacerbation 3.47 days; 39 CHF patients (82%) were admitted for decompensation but the reasons for this were not specified. In COPD patients, 54% were admitted for decompensated underlying disease (at least 2 Anthonisen criteria) due to non-pneumonic infection and 25% for acute pneumonic processes (mostly uncomplicated lobar pneumonia). Discharge with home hospitalization was limited for both processes: 17.1% (8 of 47) for CHF and 13.6% (6 of 44) for COPD.

Conclusion: Dyspnea remains the predominant complaint in patients with chronic cardiac or respiratory disease that generates hospital admission to our short stay unit. Resolution of the exacerbation (irrespective of its cause) is brief and appropriate, less prolonged in CHF than in COPD patients, and few require support at home for stabilization. Short stay units bear a high burden of care of patients with these diseases and provide efficient clinical response (brief and effective). Our results are consistent with those of other short-stay units, demonstrating that the staff of these units are also specialist in these diseases, and often not mentioned in clinical studies and trials.

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Register for severe trauma cases: a project implemented by the Coordinating Center for Health Emergencies in Cadiz

Afianzamiento del registro del traumatismo grave en el Centro de Coordinación de Urgencias y Emergencias Sanitarias de Cádiz

Introduction and Objectives: Introduction and Objectives: We have found, as in previous years, that 061 medical emergency teams are only involved in a small proportion of calls for help for trauma of unspecified severity; in 2011, this was 7.4%. However, priority 1 calls accounted for 86% of the total. The DCCU (units for critical care and emergencies) attend many more trauma patients: 4,246 events, 28.7%. In June 2010, in Cadiz, we initiated a protocol of hospital alerts from the coordinating center, based on physiological instability data, revised trauma score (RTS), serious injury, mechanism of injury and other relevant factors.

Objective: Our group studied out-of-hospital management of "TRAUMA GRAVE" patients, analyzing not only adherence to integrated care process by 061 teams, but also the information provided by three registers in the coordination center: type of demand (TD), RTS and pre-alert code for severe trauma (CT).

Methods: We collected data from the Empresa Pública de Emergencias (SIEPES) information system for the year 2011 in the province of Cadiz. Search criteria were TD (transport accidents, trauma and external agents), RTS and CT. We compared results with records from 2010.

Results: For the TD we added 101 cases with different TD but with registered RST which allowed us to verify them as trauma. We found 31% of records with incorrect resolution code (item that report the performance of each resource involved in the incident). In 2011 there were 142,059 demands for attention versus 172,988 in 2010. Related to trauma, there were 14,753 (10.4%) versus 21,011 (≈ 12%) in 2010: 14,608 patients were registered, 85.3% out-of-hospital. The 061 teams attended 1,093 calls (7.4%) compared to 1,040 (4.9%) in 2010. There were 144 interventions by 061 helicopter 061. In 68 cases (47%) the resource was annulled due to new information. It therefore attended 79 accidents, although only

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39 patients (27%) were attended. The hospital most used was that of Jerez Hospital, for 130 patients. 954 RST records are documented, only 6.5% of patients attended. RST was <12 in 56 cases, 54 of them attended by EE. In minors less than 15 years of age, only 9.3% had RTS associated with EE. In the last 6 months of 2010 there were 25 CT while in the year 2011 there were 90, 71 of them requested by EE. Of these, 66 had associated RTS and 23 of them had RTS <12. We note once again that the receiving hospital with most records was Hospital de Jerez: 40 (44.4%).

Conclusions: The number of cases treated by emergency teams remains reduced in recent years despite a small increase since 2010 (4.9% to 7.4%). Since 2010 we have improved the collection tool and case assessment, but we have needed to include modifications and insist on further training of DCCU medical teams, medical coordinators and tele-operators in data recording.

Rapid diagnostic test for acute sore throat in a hospital pediatric emergency department

Utilidad de un test de detección rápida en el diagnóstico de faringoamigdalitis aguda en un servicio de urgencias hospitalario no pediátrico

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Introduction: acute pharyngitis (AP) is common condition in patients visiting the emergency department (ED). Although only 5-17% are of bacterial origin, mainly group A beta hemolytic streptococcus, antibiotics are prescribed in 73% of cases. This favors increased adverse effects, health spending and resistance to antimicrobials. The use of rapid detection antigen test (RDT) may help reduce inappropriate use of antibiotics. Most studies to date have been carried out in pediatric patients or in primary care.

Objectives: To evaluate the usefulness of a RDT in patients diagnosed with AP in a non-pediatric ED; to describe the class of antibiotics prescribed, their resistance profile and the percentage of unnecessary antibiotics used.

Method: uncontrolled intervention study conducted in the ED of an urban hospital from March 2011 to March 2012. We included patients > 14 years of age attended in the morning by a selected group of ED physicians, visiting for sore throats and meeting Centor criteria (fever, tonsillar exudates, cervical lymphadenopathy or absence of cough). We excluded those who had received antibiotics in the previous week. We recorded clinical and epidemiological variables, diagnostic tests and treatment. Data were analyzed using SPSS software.

Results: The study included 34 patients, mean age 32 ± 9 (14-53) years, 64.7% women. The most frequent Centor criterion was fever (88.2%) followed by the presence of tonsillar exudates and absence of cough (70.6% in each case). Culture was positive in 11 patients (32%). No differences were observed between sexes and the incidence of strep throat. Although there were more positive cultures in younger patients < 40 years (72.7% vs. 27.3%), this difference was not significant ($p < 0.136$). Positive culture was more frequent in patients meeting a greater number of Centor criteria. The presence of exudate in the tonsils was most frequently observed in beta hemolytic streptococcus infection and this association was statistically significant. RDT was positive in 8 patients (23.5%) with a sensitivity of 54.5% and a specificity of 75%. There were 5 false negatives and one false positive. Antibiotics were prescribed for 26 patients (76.5%), and for 100% of those with a positive RDT result in the TDR, versus only 8% of those with negative RDT. The percentage of unnecessary antibiotic prescription was 44.5%. The antibiotic most often used was penicillin and its derivatives with a sensitivity of 100%.

Conclusions: Acute pharyngitis primarily affects young people. Streptococcal etiology was found in a small percentage of these cases; the incidence was higher in women, decreased with age and increased with the presence of more Centor criteria, although no significant differences were found. Although the antibiotics prescribed in this case were appropriate, overuse remains but this decreased substantially in patients with negative RDT results. No signs of resistance to penicillin observed in our setting.

Hyponatremia as a prognostic indicator in patients with acute heart failure in hospital Emergency departments

Hiponatremia como factor pronóstico en pacientes con insuficiencia cardiaca aguda atendidos en servicios de urgencia hospitalarios

Introduction: Hyponatremia is an indicator of poor prognosis in many diseases including cardiovascular disease, cancer and even rheumatic disease. In the case of acute heart failure (AHF), hyponatremia has been shown to be a negative factor for patients younger than 80 years. The final mechanism by which hyponatremia influences the prognosis is not well known. Several drugs have shown beneficial effects in promoting the correction of hyponatremia by aquaresis: they are V2 receptor antagonists of vasopressin.

Objective: To determine the short-term prognostic value of hyponatremia in patients with AHF treated at a hospital emergency department (ED).

Methods: We performed an observational, prospective, multicenter study of patients with AHF, defined using the Framingham criteria, treated in the ED of 19 Spanish hospitals. Dependent variable: mortality at 30 days of care. Independent variables: age and sex, classic risk factors (arterial hypertension -AHT, diabetes, dyslipidemia and smoking), previous diseases (ischemic cardiopathy, cerebrovascular disease, previous heart failure, peripheral arterial disease, renal failure, chronic obstructive pulmonary disease -COPD, cardiac valvulopathy or atrial fibrillation -AF), clinical characteristics of the episode, Barthel index functional impairment, NYHA baseline functional dyspnea scale, systolic blood pressure (SBP), sodium and creatinine at the time of admission to the ED and estimated glomerular filtration rate (GFR) calculated by the MDRD formula. Hyponatremia was defined as sodium less than 135 mEq / L. Statistical analysis: comparison of proportions was performed using chi-square test, means were compared using Student's t test and to control for confounding factors we used multivariate logistic regression analysis.

Results: The study included 2,172 patients, of whom 67 were lost to follow-up; 51.4% women, mean age 78.3 (± 10.1) years. Of these, 430 (20.4%) had sodium < 135 mEq / L. Hyponatremia appeared in 33.1% of those who died vs 19.3% of those without hyponatremia (OR 2.08, 95% 1.49 to 2.90) ($p < 0.0001$). With regard to medical history, patients with hyponatremia showed a higher prevalence of diabetes mellitus (48.7% vs 40.9%, $p = 0.004$), cardiac valvulopathy (29.9% vs 23.7, $p = 0.009$), previous heart failure (77.4% vs 70.5%, $p = 0.006$) and baseline NYHA grade III-IV dyspnea (30.2% vs 25.2%, $p = 0.046$). The most frequent clinical characteristics of the episode were: OPN (70.1% vs. 62.7%, $p = 0.005$), paroxysmal nocturnal dyspnea (41.6% vs 36%, $p = 0.034$), tachycardia (23.9% vs 15.7%, $p < 0.0001$), increased jugular venous pressure (19.8% vs. 13.4%, $p < 0.002$), positive hepatojugular reflux (15.2% vs 11.2%, $p = 0.023$), hepatomegaly (9.8% vs 4.1%, $p < 0.0001$), SBP < 100 (9.1% vs 4.2%, $p < 0.0001$) and anemia (61.1% vs 55.5%, $p = 0.042$). After controlling for confounders, hyponatremia remained independently associated with early mortality in these patients (OR 1.57, 95% CI 1.05 to 2.36, $p = 0.026$).

Conclusions: Hyponatremia is a factor associated with early mortality in AHF; it identifies a group of patients most at risk, after controlling for other factors associated with these deaths. For all these reasons, hyponatremia should be a therapeutic target in managing these patients.

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