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Comparison of strategies for the use of brain injury biomarkers in mild traumatic brain injury

Comparación de estrategias de uso de biomarcadores de lesión cerebral en el traumatismo craneoencefálico leve

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Introducción: SEMES published a protocol for the management of mild traumatic brain injury (mTBI) based on the use of brain lesion biomarkers (BLB). However, several strategies modifying the cutoff points of these determinations have been published with the aim of improving diagnostic performance and increasing efficiency.

Objetive: To compare the predictive values of several BLB-based strategies for the detection of intracranial lesions (ICL) in mTBI.

Method: We conducted a prospective study in patients treated for mTBI (Glasgow Coma Scale score 13-15) between June 2024 and July 2025, within the first 12 hours after trauma, in whom blood tests and cranial computed tomography (CT) were performed. GFAP (glial fibrillary acidic protein) and UCH-L1 (ubiquitin C-terminal hydrolase L1) were determined from stored samples. Each strategy defined BLB negativity according to its cutoff values, thereby identifying patients at low risk of ICL in whom CT could potentially be avoided. The presence of ICL was analyzed in each case. The strategies evaluated were as follows: (1) current TBI: SEMES protocol using laboratory reference values (35 pg/mL for GFAP and 400 pg/mL for UCH-L1); (2) TBI < 70 years: use of BLB only in patients younger than 70 years; (3) GFAP < 65: increase in the GFAP cutoff value to 65 pg/mL; (4) Greek strategy: in patients ≥ 65 years, GFAP 115 pg/mL and UCH-L1 335 pg/mL; (5) modified Greek strategy: same as the previous strategy, without modifying the UCH-L1 cutoff value; and (6) mixed strategy: GFAP 65 pg/mL in patients < 65 years and 115 pg/mL in patients ≥ 65 years. Predictive values for ICL were calculated for each strategy, including sensitivity (S), specificity (E), and area under the curve (AUC) with their 95% CI.

Results: A total of 275 patients were included, with a median age of 78 years (IQR, 58-87), of whom 53.5% were women. Overall, 65.1% (179 patients) were aged ≥ 70 years. According to the SEMES protocol, only 1.1% (3 patients) would not have required either BLB testing or CT. BLB negativity was observed in 12.4% (34 patients) under the current TBI strategy, a lower percentage than that reported in the literature (approximately 33%), probably conditioned by the age of the sample. This percentage increased to 31.3% (TBI < 70 years), 22.5% (GFAP < 65), 17.1% (Greek strategy), 24% (modified Greek strategy), and 26.5% (mixed strategy). ICL was detected in 54 patients (19.6%). The predictive values for ICL for each strategy were as follows: (1) current TBI: S = 1; E = 0.155; AUC = 0.577 (95% CI, 0.498-0.657); (2) TBI < 70 years: S = 1; E = 0.36; AUC = 0.681 (95% CI, 0.562-0.809); (3) GFAP < 65: S = 0.96; E = 0.28; AUC = 0.619 (95% CI, 0.544-0.695); (4) Greek strategy: S = 1; E = 0.22; AUC = 0.610 (95% CI, 0.535-0.686); (5) modified Greek strategy: S = 1; E = 0.31; AUC = 0.655 (95% CI, 0.585-0.725); and (6) mixed strategy: S = 0.96; E = 0.33; AUC = 0.645 (95% CI, 0.572-0.718).

Conclusions: In the present sample, a low percentage of BLB negativity (12.4%) was observed, and therefore a low potential for reducing cranial CT requests. In patients younger than 70 years, the results were similar to those of previous studies. All strategies showed high S for predicting ICL, although E was low in all of them. The strategy based on performing BLB testing only in patients younger than 70 years showed the highest overall performance and the highest percentage of negativity. The use of BLB constitutes a useful tool in the management of mTBI, although further investigation into cutoff values and applicability in different subgroups, especially older patients, is required.

Critical risk mapping in emergency departments: key activities for patient safety with transforming teams

Mapa de riesgos críticos en urgencias: actividades clave para la seguridad del paciente con equipos que transforman

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Introduction: Emergency departments are complex health care environments characterized by high pressure and the simultaneous intervention of multiple professionals within heterogeneous care pathways. Therefore, patient safety (PS) is essential and requires the application of proactive methodologies that allow early identification and mitigation of risks.

Objetive: To develop a risk map for emergency departments using the Failure Mode and Effects Analysis (FMEA) methodology, with the aim of proactively detecting critical points in health care processes.

Method: Six FMEAs were defined, corresponding to key service pathways: level 2 emergent patient care; level 3 non-autonomous urgent patient; patient with chest pain; autonomous urgent patient levels 3, 4, and 5; intoxicated patient; and level 1 emergent patient. For each of these, small working groups (maximum 8 participants) were formed, and four face-to-face sessions of 2.5 hours each were scheduled. The FMEA for each health care pathway was structured into four phases. The first phase was process description (description of subprocesses and activities for each health care pathway). The second phase involved the detection of risks and causes; existing control mechanisms were also evaluated. The third phase included calculation of the risk priority index (RPI). For each activity, the team reached consensus on the scoring of three dimensions: severity of the effect on the patient, probability of occurrence, and detection capability through existing controls. Each dimension was scored as 1, 4, 7, or 10. The RPI was obtained using the formula: Severity × Probability × Detection. Based on the values obtained, activities were classified as: very high risk (RPI ≥ 280), high risk (160-279), and low/moderate risk (< 160). The fourth phase consisted of proposing improvement actions (brainstorming). Adjusted RPI was defined as the mean RPI of all activities in each pathway. A satisfaction survey was conducted among participants.

Results: A mean of 11 ± 1 subprocesses and 49 ± 12 activities per pathway were identified. The median number of risks was 114 (IQR, 55). A total of 95 activities (32.5%) were classified as very high risk. Very high-risk activities common to all pathways, as well as others specific to each pathway, were identified. The processes with the highest number of very high-risk activities were the level 2 emergent patient pathway (51%) and the chest pain pathway (38%), whereas the autonomous patient pathway presented fewer critical activities (7%; *P* = .01). The mean RPI of the processes was 203 ± 59. Analysis of adjusted RPI again showed that the highest-risk pathways were the level 2 emergent patient pathway (239 ± 217) and the chest pain pathway (232 ± 220), while the autonomous patient pathway had the lowest risk (107 ± 97; *P* = .002). Compared with the autonomous patient pathway, the higher-risk pathways were: level 2 emergent patient pathway (OR, 13.1; 95% CI, 3.36-51.07; *P* = .0002), level 1 emergent patient pathway (OR, 10.83; 95% CI, 3.03-38.68; *P* = .0002), chest pain pathway (OR, 8.88; 95% CI, 2.36-33.35; *P* = .0012), level 3 non-autonomous patient pathway (OR, 5.51; 95% CI, 1.49-20.41; *P* = .01), and intoxicated patient pathway (OR, 4.79; 95% CI, 1.27-18.11; *P* = .02). Professionals' perception was highly positive: 62% declared themselves very satisfied; 100% considered the sessions relevant, understandable, and well structured, highlighting the value of peer exchange and the practical applicability of the FMEA methodology.

Conclusions: The implementation of FMEA enabled proactive identification of critical points, both common and specific, within health care pathways, as well as the highest-risk pathways, and facilitated the design of priority improvement actions. In addition, it consolidated multidisciplinary teams committed to continuous improvement and PS.

Outcomes in older adults with acute heart failure according to sex

Resultados evolutivos en personas mayores con insuficiencia cardiaca aguda en función del sexo

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Introduction: Episodes of acute heart failure (AHF) are a common reason for consultation in hospital emergency departments (EDs), especially among patients aged 65 years or older. There are no large epidemiological

studies comparing the baseline characteristics of these patients, as well as the need for hospital admission and in-hospital mortality according to sex.

Objetive: To investigate, among patients aged 65 years or older with AHF presenting to EDs, whether sex-based differences exist and whether these are associated with a greater need for hospital admission or in-hospital mortality.

Method: Data from the multicenter, prospective, multipurpose EAHFE registry (Epidemiology of Acute Heart Failure in Spanish Emergency Departments) were analyzed. The registry collected, during a period of 1 to 2 months between 2007 and 2023, all episodes of AHF presenting to participating EDs. For this study, patients aged 65 years or older were selected. The primary outcome variables investigated were the need for hospital admission and all-cause in-hospital mortality according to sex. OR values with their 95% CI were calculated.

Results:A total of 22,227 patients were recruited, with a mean age of 83 ± 7 years. Overall, 57.4% of patients (n = 12,750) were women. Significant sex differences were identified. Women were older, with a mean age of 84 ± 7 years vs 81 ± 7 years in men ($P < .001$), and had a greater presence of comorbidities such as hypertension, diabetes, dyslipidemia, atrial fibrillation, valvular disease, or previous heart failure. In contrast, they presented less ischemic heart disease, chronic kidney disease, stroke, chronic obstructive pulmonary disease, and peripheral vascular disease. Baseline status was also different, with greater dependence in women than in men (30.9% vs 18.7%; $P < .001$) and worse functional class, with NYHA III or IV in 25.9% of women versus 23.1% of men ($P < .001$). In contrast, men had a higher percentage of reduced left ventricular function involvement (28.8%) than women (13.5%). There were also differences in baseline treatment, such that women received more diuretic therapy and digoxin, and fewer aldosterone antagonists, amiodarone, or nitrates. The characteristics of the acute episode also differed, since women presented less frequently with orthopnea, systolic blood pressure < 100 mmHg, heart rate < 100 beats per minute, and NT-proBNP ≥ 5,000 pmol/L. In contrast, they presented more symptoms of low cardiac output, oxygen saturation ≤ 90%, and eGFR < 60 mL/min/1.73m². Women required significantly greater use of oxygen therapy in the emergency department, digoxin, and morphine than men. Hospital admission was required in 9,530 women (74.8%) and 7,051 men (74.4%) (OR, 1.020; 95% CI, 0.960-1.085). During hospitalization, 1,037 women (8.1%) and 716 men (7.6%) died (OR, 1.083; 95% CI, 0.981-1.196).

Conclusions: Significant differences exist between women and men aged 65 years or older presenting to EDs with an episode of AHF. However, these differences are not associated with a greater need for hospital admission or increased in-hospital mortality.

Patient from an endemic country as an opportunity for HIV diagnosis in emergency settings

Paciente procedente de país endémico: una oportunidad para el diagnóstico del VIH en urgencias

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Introduction: HIV screening programs in emergency departments, such as VIHgila (Catalonia) and Deja Tu Huella (Spain), are widely established, with multiple publications supporting their effectiveness from the outset. One of the program's strengths has been its capacity for self-evaluation through analysis of initial results, which has made it possible to optimize the model and expand screening criteria to 3 new indications that have shown high efficiency in detecting hidden HIV in emergency departments. These 3 indications include 2 clinical conditions (febrile syndrome and thrombocytopenia) and, for the first time, an epidemiological criterion based on origin from an HIV-endemic country. In this context, and in accordance with current recommendations, the program has incorporated systematic hepatitis C virus (HCV) serology in all patients for whom HIV serology is requested, given their shared history of risk factors.

Objetive: To describe the clinical and epidemiological profile of patients screened for HIV according to the only nonclinical indication included in the VIHgila program, origin from an endemic country, in order to assess the appropriateness of this indication. To describe compliance with the concomitant implementation of systematic HCV screening associated with the VIHgila program within this indication.

Method: Descriptive, retrospective, noninterventional study of all patients with HIV serology performed in the emergency departments of 5 of the 25 hospitals participating in the VIHgila program during 2025. Epidemiological and serological data were recorded for all patients.

Results: During the study period, a total of 4,387 serologies were performed, of which 6.9% were carried out according to the new recommendations, with 81 of them (1.8% of the total) due to origin from an endem-

ic country. The mean age of patients in whom serology was performed according to the epidemiological criterion was 40 ± 11 years, and 77.7% were men. Three positive HIV serologies were detected (3.7%), 2 of them in women. HCV serology was performed in 42 cases (51.8%), and all tested negative. When this group was compared with patients in whom serology was requested according to other criteria, those with the "endemic country" criterion were younger (40 ± 11 vs 43 ± 18 years; $P < .005$), with a predominance of women among those with positive serology (66.6% vs 14.2%), although without statistical significance ($P = .08$). HCV serologies were performed in a similar percentage in both groups (51.8% vs 56.6%; $P = .4$). In 91.3% of patients in whom the Fiebig stage was calculated (23 of 45), it was stage 5 or 6.

Conclusions: Serologies performed on the basis of country of origin are effective, with positivity greater than 0.1%. In women from countries with high HIV prevalence, performing serology in the emergency department appears particularly appropriate. The association of HIV and HCV serology still represents a major area for improvement, although its low positivity rate may call its appropriateness into question. HIV diagnosis continues to be made in late stages of the disease.

Influence of intimate partner violence on acute coronary syndrome

Influencia de la violencia de pareja en el síndrome coronario agudo

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Introduction: Cardiovascular disease is the leading cause of morbidity and mortality worldwide. Beyond classic risk factors, accumulated evidence indicates that psychosocial factors play a determining role in the development and progression of these diseases. Chronic stress, depression, anxiety, and certain adverse life experiences are associated with a greater cardiovascular risk in women than in men. In this context, intimate partner violence (IPV) could act as an additional cardiovascular risk factor. IPV not only promotes behaviors harmful to health, but also induces persistent alterations in endocrine and immune systems mediated by chronic stress. Likewise, these women show poorer self-care, suboptimal control of cardiovascular risk factors (CVRFs), lower therapeutic adherence, and delays in seeking medical care.

Objetive: To quantify the prevalence of IPV in women presenting with acute coronary syndrome (ACS) and to evaluate its medium- and long-term prognostic impact.

Method: We designed a prospective cohort study, consecutively including 295 adult women admitted for ACS between June 2020 and November 2025. Patients with cognitive impairment, language barriers, or clinical instability until death were excluded. The presence of violence was assessed through an open interview, a direct question, the Spanish version of the Partner Violence Screen (PVS), and the questionnaire from the Macro-Survey on Violence Against Women (*Ministerio de Igualdad,* 2019). Epidemiological, sociodemographic, and clinical variables were collected. The combined primary outcome included all-cause mortality, new ACS episode, stroke, or onset of heart failure (HF). Each of these events was analyzed separately as secondary outcomes. Follow-up was performed at 1 month and subsequently annually through health record review and telephone contact.

Results: The median age was 71 years (IQR, 61-80). The prevalence of IPV reached 42.0% (n = 124), and 15.9% (n = 47) continued to experience active violence. Only 21.1% explicitly acknowledged having been a victim. Clinical and sociodemographic characteristics were similar between groups. The time from onset of ACS symptoms to consultation was longer in abused women, reaching statistical significance in those with active violence (15.8 vs 6.2 hours; $P = .030$). Therapeutic adherence and control of cardiovascular risk factors were globally lower in abused women, and lower adherence was significant in diabetic patients who acknowledged abuse (40.0% vs 88.2%; $P = .05$). Regarding clinical presentation, abused women more frequently presented with dyspnea (37.2% vs 23.4%; $P = .011$). Those with active violence also showed a higher prevalence of palpitations (13.3% vs 4.9%; $P = .046$). After a mean follow-up of 3 years, the main combined outcome was twice as frequent in women with a history of IPV (20.5% vs 10.6%; $P = .029$). The risk of new ACS quadrupled (12.3% vs 2.7%; $P = .003$). This higher incidence of events was even more pronounced in women experiencing active violence.

Conclusions: IPV is highly prevalent in women with ACS. Women who experience IPV seek care later, more frequently present with symptoms other than chest pain, and have a worse cardiovascular prognosis.

Effect of beta-blockers on the diagnosis of pulmonary embolism in the emergency department

Efecto de los betabloqueantes en el diagnóstico del tromboembolismo pulmonar en el servicio de urgencias

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Introduction: Pulmonary embolism (PE) is a frequently diagnosed and potentially fatal condition. Clinical prediction rules, such as the Wells and Geneva scores, are used to estimate pretest probability, and the PESI score is used to assess severity and prognosis in patients with PE. However, these scores include heart rate as one of their scoring criteria, a variable that may be attenuated by several factors and drugs.

Objetive: To evaluate the impact of chronic beta-blocker (BB) use on clinical probability and prognostic risk stratification of PE using the Wells, Geneva, and PESI scores.

Method: We conducted a secondary analysis of the ESPHERIA registry. ESPHERIA is a prospective, multicenter cohort study that included adult patients diagnosed with PE in 53 Spanish emergency departments. Clinical characteristics, heart rate, and Wells, Geneva, and PESI scores were compared between patients with and without BB treatment. Ordinal logistic regression models were used to evaluate the independent association between BB use and the probability of classification into different risk strata, adjusting results for age, sex, comorbidities, and polypharmacy.

Results: Of the 399 patients with confirmed PE, 65 (15.2%) were on chronic BB treatment. Patients treated with BB had a significantly lower heart rate on admission (81 ± 15 vs 95 ± 21 bpm; $P < .01$). No significant differences were observed in the mean Wells score (3.5 ± 2.6 vs 3.6 ± 2.1; $P = .789$) or PESI score (97 ± 32 vs 90 ± 33; $P = .120$). However, the Geneva score was significantly lower in patients treated with BB (5.5 ± 3.1 vs 6.5 ± 3.5; $P = .046$), with a lower proportion of patients classified as intermediate risk (42.6% vs 56.4%; $P = .006$). In multivariate analysis, BB use was independently associated with a lower score on the Geneva scale (OR, 0.52; 95% CI, 0.28-0.95) and on the PESI scale (OR, 0.58; 95% CI, 0.34-0.97).

Conclusions: Chronic BB treatment is associated with a lower heart rate and lower Geneva and PESI scores in patients with PE. These findings reveal a possible diagnostic and prognostic bias when using tools dependent on heart rate.

Impact of health care reorganization on emergency process times

Impacto de una reorganización asistencial en los tiempos del proceso urgente

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Introduction: Emergency department overcrowding impacts patient safety and the efficiency of emergency care processes. One of the main determinants is the accumulation of patients awaiting hospital admission, which interrupts patient flow and prolongs care times.

Objetive: To evaluate the impact of a health care reorganization of the medical care process on emergency care times (triage time, time to initiation of care, and emergency department length of stay) and to analyze the model's ability to maintain efficiency in a context of increased activity.

Method: The medical care process of the emergency and hospitalization departments was reorganized by applying the Pharos Flow Methodology (an operational improvement model based on the Institute for Health care Improvement's Hospital-wide Patient Flow framework), the principles of operations management, Lean Healthcare, and Value-Based Healthcare, oriented toward 3 key outcomes: flow, safety, and health care capacity. Emergency department outflow was ensured through patient admission during 3 stable daily time slots (Monday through Sunday). Emergency care was structured into multidisciplinary teams organized in clusters, with 1 initial assessment bay and 3 evolution bays (with doubled capacity), direct and equitable patient assignment to teams, and adaptation of triage capacity to the pace of patient arrival. Visual management tools were incorporated to identify in real time

the operational needs of each cluster. To evaluate the impact, a retrospective descriptive study was performed comparing care times from December 1 to January 29 before (2024-2025) and after (2025-2026) the intervention. Triage time (from admission to initiation of triage), time to initiation of care (from triage to initiation of medical care), and emergency department length of stay (from initiation of medical care to completion of the emergency care process) were analyzed, expressed in minutes. Variables were described using median and interquartile range (p25-p75) and compared using the Mann–Whitney U test for independent samples. Statistical significance was established at $P < .01$.

Results: A total of 7,269 patients were analyzed, more than 70% of whom corresponded to triage priority III according to the *Model Andorrà de Triatge.* The postintervention period recorded a 9% increase in activity. Analysis of postintervention times showed a 15% reduction in triage time, with a median of 11 minutes (IQR, 8-16), compared with a preintervention median of 13 minutes (IQR, 9-20). Time to initiation of care was the indicator showing the greatest reduction, decreasing by 48%, from a median of 29 minutes (IQR, 10-82) preintervention to 15 minutes (IQR, 6-36) after reorganization. Emergency department length of stay decreased by 22%, with a median of 329 minutes (IQR, 214-508) in the postintervention period versus 422 minutes (IQR, 265-665) previously. All observed differences were statistically significant.

Conclusions: Coordinated reorganization of emergency and hospitalization processes significantly reduced emergency department care times and their variability, even in a context of increased activity. These results demonstrate that an organization centered on patient flow constitutes a key element for reducing congestion and optimizing the operational efficiency of an emergency department. In addition to the quantitative impact, the model introduced an organizational change that enhances multidisciplinary coordination and improves clinical safety during the emergency care process. This organizational innovation model is feasible and potentially applicable to other hospital emergency departments and is proposed as a strategy to improve system performance even in scenarios of high health care demand.

Pulmonary congestion assessed by ultrasound at discharge from the ED predicts early revisit or readmission after an acute heart failure episode more accurately than the MEESSI score

La congestión pulmonar ecográfica al alta predice mejor que la escala MEESSI la reconsulta o reingreso precoz tras insuficiencia cardiaca aguda atendida en urgencias

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Introducción: Early revisit or readmission after an episode of acute heart failure (AHF) treated in the emergency department is a frequent and clinically relevant event. There are no specific tools to predict this outcome. The MEESSI-AHF score predicts 30-day mortality, but its ability to predict revisit or readmission is limited. It is necessary to identify parameters that improve risk stratification at discharge.

Objetive: To evaluate the prognostic value of clinical, laboratory, and ultrasound parameters at discharge for predicting 30-day revisit or readmission (RR30) after an episode of AHF treated in the emergency department, and to compare them with the performance of the MEESSI-AHF score.

Method: We conducted a multicenter prospective pilot observational study that consecutively included 95 patients treated in hospital emergency departments with a clinical diagnosis of AHF who were discharged from the emergency department. Clinical, functional, and laboratory variables at discharge were collected, including age, sex, Barthel Index, vital signs, relevant medical history, and routine biomarkers. MEESSI-AHF and EVEREST scores were calculated. Ultrasound assessment at discharge was performed using a systematic protocol that included lung ultrasound, basic echocardiography, and venous congestion assessment using the VExUS protocol. Pulmonary congestion was quantified by the number of lung fields with B-lines (0-12), semiquantitative assessment of pleural effusion (0-3), and a cumulative pulmonary congestion index. Additional echocardiographic parameters related to congestion and ventricular function were recorded. The primary outcome was RR30 due to AHF in patients discharged from the emergency department. Statistical analysis included generalized linear models (Poisson regression with robust variance). Model performance was compared using the quasi-likelihood information criterion (QIC). Discriminative ability was assessed using ROC curves and area under the curve (AUC). An optimal cutoff point for the number of lung fields with B-lines was identified using the Youden index. A value of $P < .05$ was considered significant.

Results: The RR30 rate was 27.4%. The number of lung fields with B-lines was significantly associated with the risk of RR30. In the univariate model, each additional lung field was associated with a 23% increase in risk (RR, 1.23 per field; 95% CI, 1.16-1.31; *P* < .001), and showed the best overall fit among the analyzed models (QIC, 54.2). The MEESSI-AHF score showed a modest association with RR30. In the multivariable model combining MEESSI and lung fields with B-lines, the latter maintained independent prognostic value (*P* < .001), whereas MEESSI lost statistical significance (*P* = .826), without improving model fit. Discriminative ability was modest for MEESSI (AUC, 0.64; 95% CI, 0.51-0.77) and excellent for the number of lung fields with B-lines (AUC, 0.86; 95% CI, 0.79-0.93). The combination of MEESSI and lung ultrasound did not improve discrimination obtained with ultrasound alone (AUC, 0.81). ROC analysis identified a cutoff point of ≥ 4 lung fields with B-lines, with a sensitivity of 100% and an approximate specificity of 54%.

Conclusions: Early revisit or readmission after an episode of AHF treated in the emergency department is frequent. Lung ultrasound at discharge, especially the number of lung fields with B-lines, showed high predictive capacity for RR30, superior to that of the MEESSI-AHF score. A simple cutoff point (≥ 4 fields with B-lines) allows identification of high-risk patients, constituting a practical and easily applicable tool in the emergency department.

Diagnostic performance of structured telephone triage for detecting priority 1 in suspected prehospital stroke: a population-based analysis in Andalusia (Spain)

Rendimiento diagnóstico del triaje telefónico estructurado para la detección de prioridad 1 en la sospecha de ictus prehospitalario: análisis poblacional en Andalucía

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Introduction: Recognition of acute stroke in emergency and urgent care coordination centers (EUCCs) directly determines access to time-dependent reperfusion therapies. Telephone triage presents intrinsic complexity because of the absence of physical examination and variability in symptom description. In 2018, the GTTA54 protocol was implemented in the CES-061 system in Andalusia, consisting of a structured 6-step clinical telephone triage guide for suspected acute cerebrovascular events. Despite its use in a system serving 8.5 million inhabitants, its diagnostic performance had not been evaluated in large population-based cohorts.

Objetive: To quantify the diagnostic performance of structured GTTA54 triage versus direct priority assignment and to identify independent predictive factors for underprioritization and overprioritization using composite metrics that compensate for class imbalance.

Method: We conducted a retrospective multicenter cohort study (2020-2024) according to the Standards for Reporting Diagnostic Accuracy (STARD) 2015 guidelines, including all calls for suspected stroke (A54 code) managed by the 8 provincial CES-061 EUCCs. Of 84,319 eligible calls, 43,986 (52.2%) had complete diagnostic data. The index test was the GTTA54 protocol and the reference standard was the clinical priority assigned in situ. Sensitivity, specificity, predictive values, undertriage and overtriage rates, and composite metrics were calculated: F1 score, Youden index, Matthews correlation coefficient (MCC), and balanced accuracy (BA). Multivariate logistic regression models validated through repeated cross-validation and bootstrap resampling were constructed. Adjusted ORs (aORs) with exact 95% CIs were obtained.

Results: A total of 28,956 calls with GTTA54 triage (65.8%) and 15,030 with direct assignment (34.2%) were analyzed. The GTTA54 group was older (median 79 vs 75 years) and had a lower prevalence of true priority 1 cases (35.5% vs 51.2%), confirming its selective application to more ambiguous presentations. Structured triage outperformed direct assignment in accuracy (68.1% vs 52.1%; *P* < .001) and sensitivity (47.9% vs 29.4%; *P* < .001). The undertriage rate was reduced from 49.4% to 26.6% (*P* < .001) without increasing overtriage (44.2% vs 44.0%; *P* = .865). Composite metrics confirmed the improvement: Youden index increased from 0.052 to 0.271, MCC from 0.059 to 0.281, and BA from 0.526 to 0.635 (all *P* < .001). Women showed greater accuracy (63.7% vs 61.5%) but lower sensitivity (35.3% vs 44.2%), although the benefit of triage was consistent in both sexes. In multivariate analysis (N = 39,334; 9,659 underprioritization events), GTTA54 use was paradoxically associated with greater underprioritization after adjustment (aOR, 1.62; 95% CI, 1.49-1.76), a finding attributed to confounding by indication. Advanced age increased risk (aOR, 1.18 per decade; 95% CI, 1.15-1.20), whereas each additional question was protective (aOR, 0.73; 95% CI, 0.72-0.74). For overprior-

itization (N = 39,354; 5,584 events), each additional question increased the aOR to 1.20 (95% CI, 1.18-1.23), whereas age was protective (aOR, 0.74 per decade; 95% CI, 0.70-0.78). Sex was not associated with either outcome. Both models showed moderate discrimination with an AUC of 0.699 and 0.701, respectively.

Conclusions: The GTTA54 protocol substantially improved prehospital identification of stroke in the largest European study of telephone triage for this condition, increasing sensitivity by 18.5 percentage points and reducing undertriage from 49.4% to 26.6% without increasing overtriage. Residual underprioritization and the persistence of errors in older patients highlight the need for complementary strategies such as algorithms incorporating posterior circulation symptoms, continuous operator training, and artificial intelligence–based support tools.

Automated detection of sepsis in emergency departments and its clinical impact: a pre–post study

Detección automatizada de sepsis en urgencias y su impacto clínico: estudio pre-post

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Introduction: Sepsis is a frequent cause of care in emergency departments and one of the main sources of hospital morbidity and mortality. Early recognition and prompt initiation of diagnostic and therapeutic measures are key determinants of prognosis. International guidelines recommend early blood culture collection and prompt initiation of empirical antibiotic therapy after clinical suspicion. However, initial identification may be complex in health care settings with high care pressure. In this context, automated detection systems may facilitate early recognition and improve adherence to recommendations.

Objetive: To evaluate the clinical and health care impact of an automated sepsis detection and alert system in the emergency department on mortality and process times using a comparative pre-post design.

Method: We conducted an observational pre-post study in patients treated in a hospital emergency department with an ICD-10 diagnosis of sepsis or septic shock. Two periods were defined: PRE (January 2017 to February 2022) and POST (July 2023 to December 2025). Patients ≥ 45 years with heart rate > 100 bpm in the previous 8 hours and at least 1 of the following criteria were included: systolic blood pressure between 30-90 mmHg, respiratory rate > 20 breaths/min, or temperature < 36°C or > 38.3°C. During the POST period, an automated system analyzed clinical records in real time and identified episodes compatible with sepsis, generating an alert to the responsible physician. The alert suggested requesting a sepsis laboratory profile and blood cultures, as well as evaluating the initiation of early empirical antibiotic therapy. Physicians could confirm or dismiss the alert; therefore, 2 subgroups were defined: TodoPOST (all generated alerts) and ActiveAlert (confirmed alerts with diagnostic and therapeutic intervention). Hospital mortality, time in minutes to blood culture collection and to initiation of empirical antibiotic therapy, percentage of antibiotic administration within the first hour, intensive care unit (ICU) admission, 30-day readmissions, and duration of hospital and ICU stay were analyzed. Generalized linear models adjusted for age, clinical severity, and diagnosis-related groups were used for analysis.

Results: A total of 811 patients were included in the PRE period, 331 in TodoPOST, and 210 in ActiveAlert. Mortality decreased from 31.3% in PRE to 27.8% in TodoPOST ($P = .023$) and to 18.6% in ActiveAlert ($P < .01$). Mean time to blood culture collection decreased from 168.4 minutes in PRE to 66 minutes in TodoPOST and 58 minutes in ActiveAlert ($P < .05$). In the ActiveAlert subgroup, time to initiation of empirical antibiotic therapy decreased from 148 to 98 minutes ($P < .05$), with an increase in administration within the first hour (17.9% vs 26.2%; $P < .05$). No statistically significant differences were observed in ICU admission or duration of the hospital or ICU stay.

Conclusions: Implementation of an automated sepsis detection system in the emergency department is associated with a significant reduction in mortality and a relevant improvement in key process times. This effect is especially evident when the alert is confirmed and translated into effective clinical intervention, reinforcing the role of these tools as decision-support systems in highly complex health care environments.