Sistema Socio Sanitario Regione Lombardia

UNIVERSITÀ DEGLI STUDI DI BRESCIA

Prognostic stratification of status epilepticus: a descriptive analysis of EMSE, STESS and SACE scores in a Neurology cohort

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Objective

Status epilepticus (SE) is a time-critical neurological emergency associated with significant mortality, disability, and healthcare burden.
This study aimed to determine the prognostic accuracy of SE-dedicated scores—EMSE, STESS and SACE — to predict all-cause 90-day mortality after a SE episode.

Materials

We retrospectively reviewed 45 patients admitted to our Neurology Unit between 1st January 2021 and 30rd April 2025 using institutional REDCap data and clinical records.
Convulsive, non-convulsive, self-limited, refractory and super-refractory cases of SE were included.

Variable	Value
Tot patients	45
Male (%)	19 (42.2%)
Female (%)	26 (57.7%)
CSE (%)	18 (40.0%)
NCSE (%)	27 (60.0%)
SSE (%)	24 (53.3%)
RSE (%)	21 (46.7%)
Mean age	61.1 years
Age range	18 – 87 years

Fig 1.Epidemiological data for the cohort.

Methods

Original publications cut-offs were used: EMSE ≥ 100, STESS ≥ 4 and SACE < 3 .
Analysis: ROC curves AUC (IC 95 %); comparison of score distributions in survivors and deceased (univariate logistic regression), score differences across the six Trinka classes (Kruskal-Wallis test, Bonferroni-corrected Mann-Whitney U pairwise comparisons); correlation between class-specific median EMSE and 90-day mortality (Spearman's ρ).

Results

Overall 90-day mortality was 49% (22/45).
EMSE values were higher in the deceased (120 [109–161]) than in survivors (94 [81–105]; p = 0.006), while STESS and SACE did not differ significantly. ROC analysis yielded AUC 0.69 (95% CI 0.54–0.83) for EMSE and 0.59 (0.43–0.74) for STESS. At their original thresholds, EMSE ≥ 100 provided 62% accuracy, 65% sensitivity and 58% specificity; STESS ≥ 4 achieved high specificity (92%) but low sensitivity (26%).
EMSE differed significantly between etiologies (Kruskal-Wallis p=0.001); pair-wise Bonferroni tests showed higher EMSE in acute (80%) and remote (57%) symptomatic SE versus cryptogenic (25%) (both p_adj <0.01). Median EMSE increased step-wise from 85 (cryptogenic) to 140 (acute symptomatic), and correlated positively (but not significantly) with class-specific mortality (ρ=0.60, p=0.21).

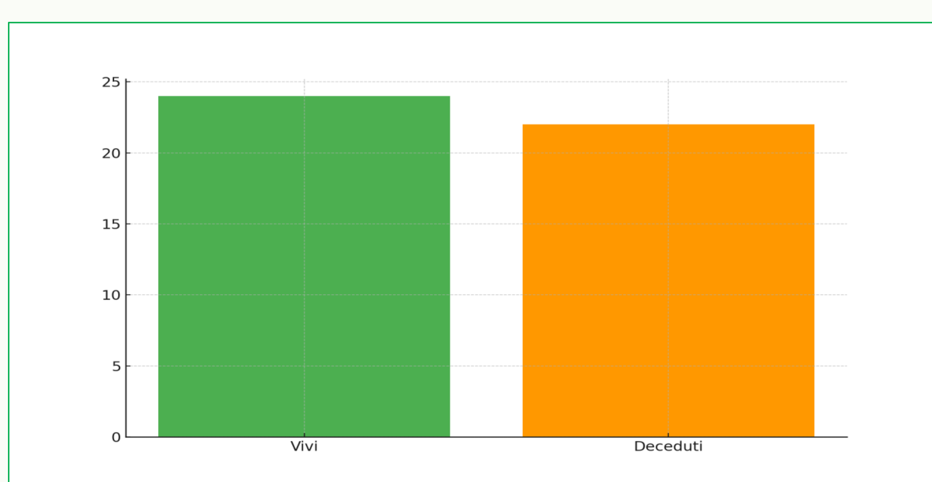

Fig 2. Overall 90-day mortality 22/45 deseased *(48.8%).*

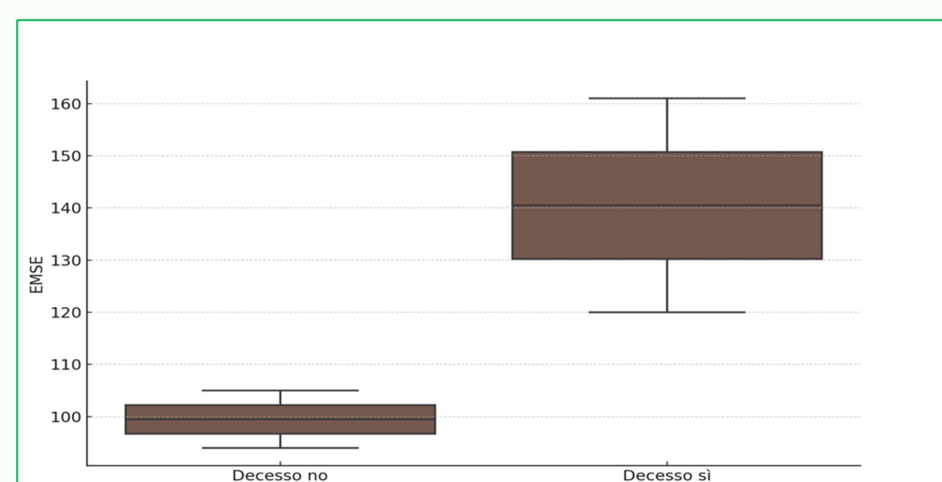

Fig 3. EMSE median (120) diseased vs (94) survivors (p=0.006).

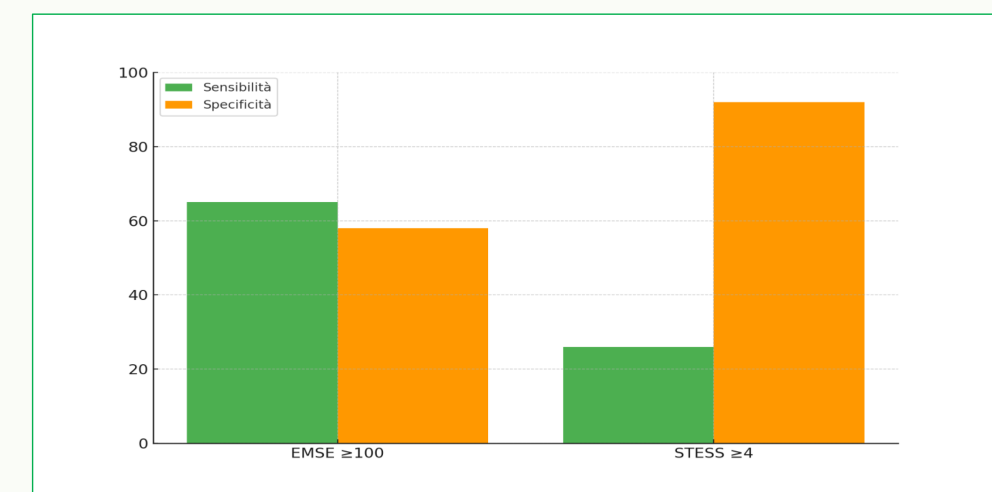

Fig 4. EMSE balanced (sen 65% / spec 58 %)
STESS very specific (92%) but low sensibility (26%).

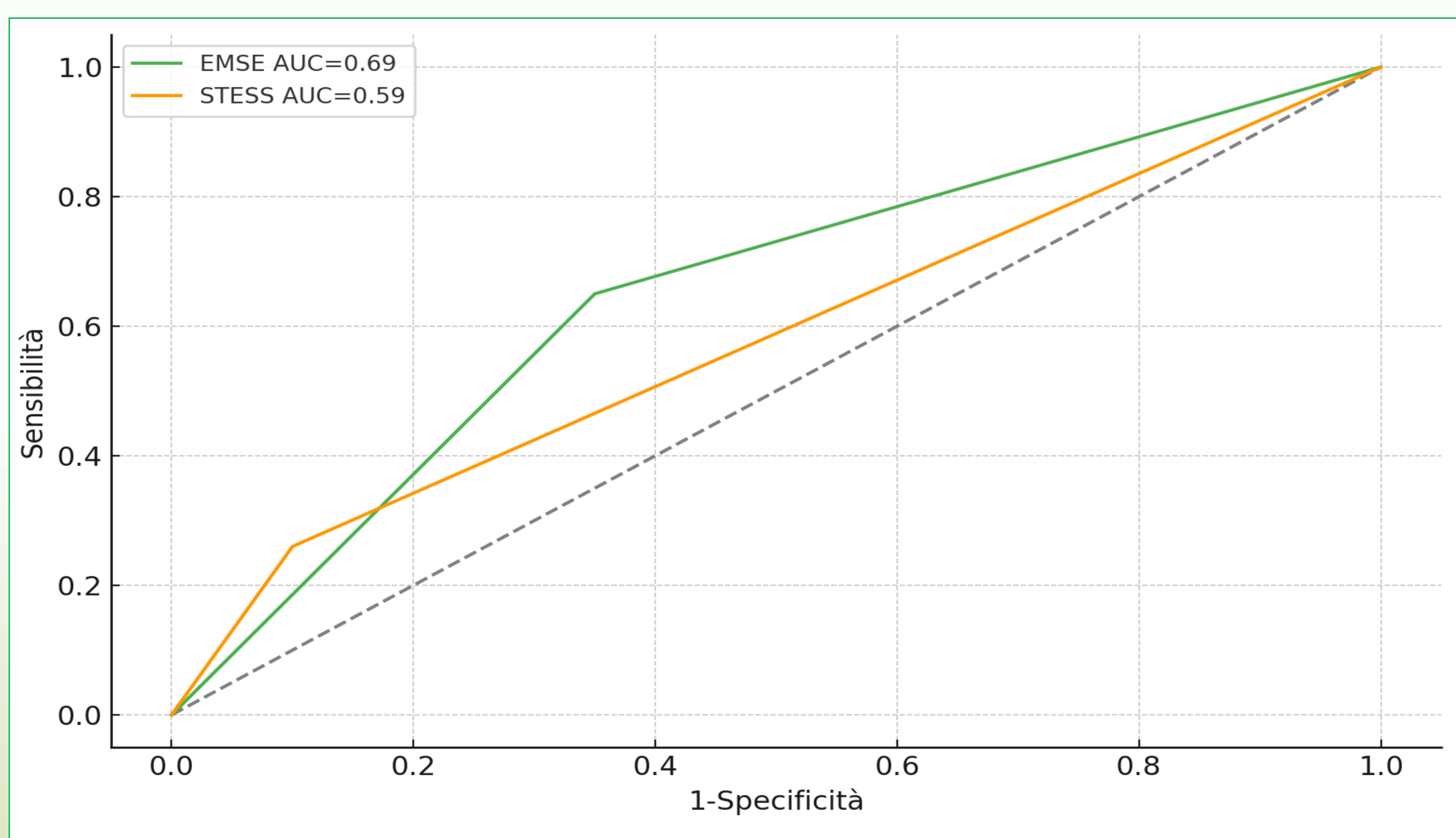

Fig 5. ROC curves: EMSE AUC 0.69 (IC95% 0.54–0.83), STESS AUC 0.59 (0.43–0.74).

Score	Cut-off	Sensitivity	Specificity	Accuracy	AUC
EMSE	≥100	65%	58%	62%	0.69
STESS	≥4	26%	92%	59%	0.59

Fig 6. Diagnostic performance with conventional cut-offs.

Etiology	Total	Morti/Tot	Mortality %	Median EMSE
Acute symptomatic	5	4/5	80%	140
Remote symptomatic	7	4/7	57%	132
Progressive	10	5/10	50%	87
De-novo epilessia	10	4/10	40%	89
Other systemic	6	3/6	50%	77
Cryptogenic	8	2/8	25%	85

Fig 7. Mortality and EMSE for each etiology.

Discussion

Among SE-dedicated scores, EMSE showed the highest accuracy for determination of survival at 90 days, with acute symptomatic SE being the etiology with worse outcome.
Our results align with literature reports, supporting routing integration of SE-specific scores into clinical practice in order to determine the likelihood of a good outcome in SE and identify cases more prone to intensive treatment.

Conclusions

Using conventional thresholds, EMSE successfully flags high-risk SE patients and merits routine use in emergency care. Fatality and EMSE values rose sharply in acute and remote symptomatic etiologies, underscoring the importance of incorporating etiology into prognostic assessment.

Bibliography

Trinka E, Cock H, Hesdorffer D, et al. A definition and classification of status epilepticus—Report of the ILAE Task Force on Classification of Status Epilepticus. *Lancet Neurol.* 2022;21:750-760.
Sculier C, Ochoa JG, Szurhaj W, et al. Factors associated with outcome in convulsive status epilepticus in adults: A European multicentre study. *Neurology.* 2018;90:e359-e370.
Lattanzi S, Trinka E, González-Hernández E, et al. Validation of the Epidemiology-Based Mortality Score in Status Epilepticus (EMSE). *Epilepsia.* 2021;62:1420-1430

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