




Re-Audit: NSE Testing for Neuroprognostication

OUT-OF-HOSPITAL CARDIAC ARREST AT KGH (2023–2024)

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Background

- ▶ OOHCA is a frequent ICU admission at KGH (regional PPCI center).
- ▶ NSE > 60 µg/L at 72h- marker for poor neurological outcome.
- ▶ Testing aims to support decisions on organ support continuation.

Neuroprognostication & NSE

- RCUK Guidelines : Multimodal approach at ≥ 72 h in comatose patients
- Poor outcome likely if:
- $M \leq 3$ **AND** ≥ 2 of following
 - No pupillary and corneal reflexes at ≥ 72 h
 - **Bilaterally absent N20 SSEP wave**
 - Highly Malignant EEG at ≥ 24 h
 - **NSE > 60 mcg/L at 48 or 72h**
 - Status Myoclonus ≤ 72 h
 - Diffuse & extensive anoxic injury on brain CT/MR

Rationale

▶ Audit Objectives:

1. Compliance with 48h NSE turnaround time.
2. Correlation of NSE results with patient outcomes

Methodology

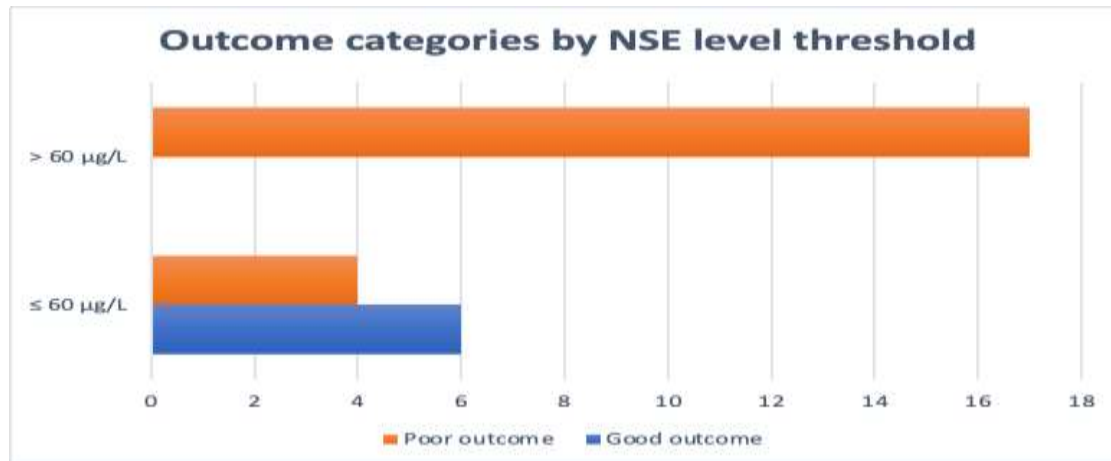
- ▶ Retrospective audit (Dec 2023 – Dec 2024).
- ▶ Sources: ICNARC data, EPR via Careflow Connect.
- ▶ Inclusion: Patients post-OOHCA LOS>72 hours undergoing NSE testing.
- ▶ Metrics: NSE levels, turnaround time, survival, discharge outcome.

Audit Data Summary

- ▶ 74 OHCA cases audited
- ▶ 45 patients with LOS >72h
- ▶ 29 patients with LOS <72h
- ▶ NSE done: 27
- ▶ NSE not done: 18

NSE Audit Results Summary

NSE Category	Good Outcome	Poor Outcome
$\leq 60 \mu\text{g/L}$	6	4
$> 60 \mu\text{g/L}$	0	17



Findings: NSE vs Outcome

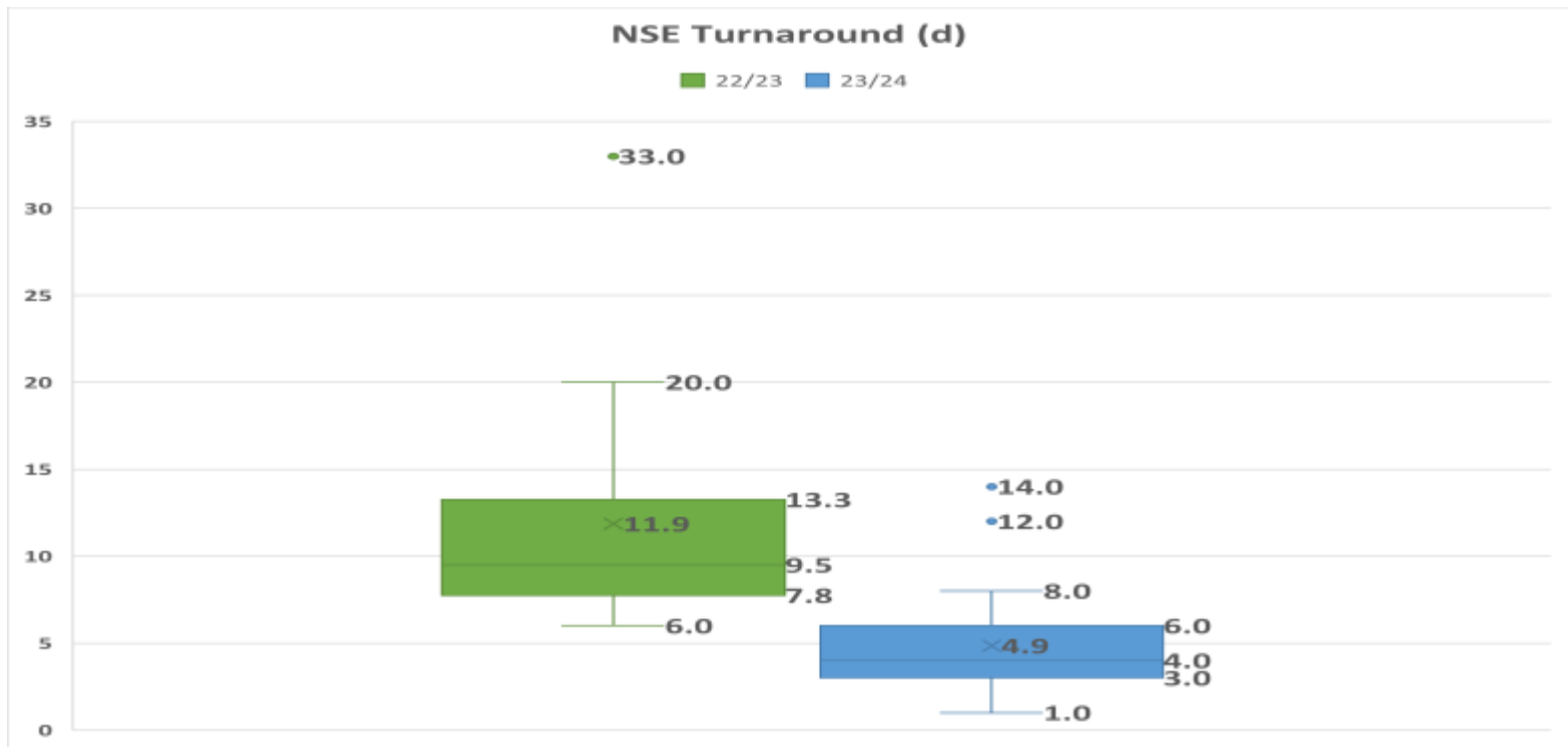
- ▶ Patients with NSE > 60 µg/L had a higher incidence of poor outcomes.
- ▶ Patients with NSE ≤ 60 µg/L were more likely to survive and be discharged home.
- ▶ Supports NICE and Resus Council guidelines on neuroprognostication.

Findings: Turnaround Time

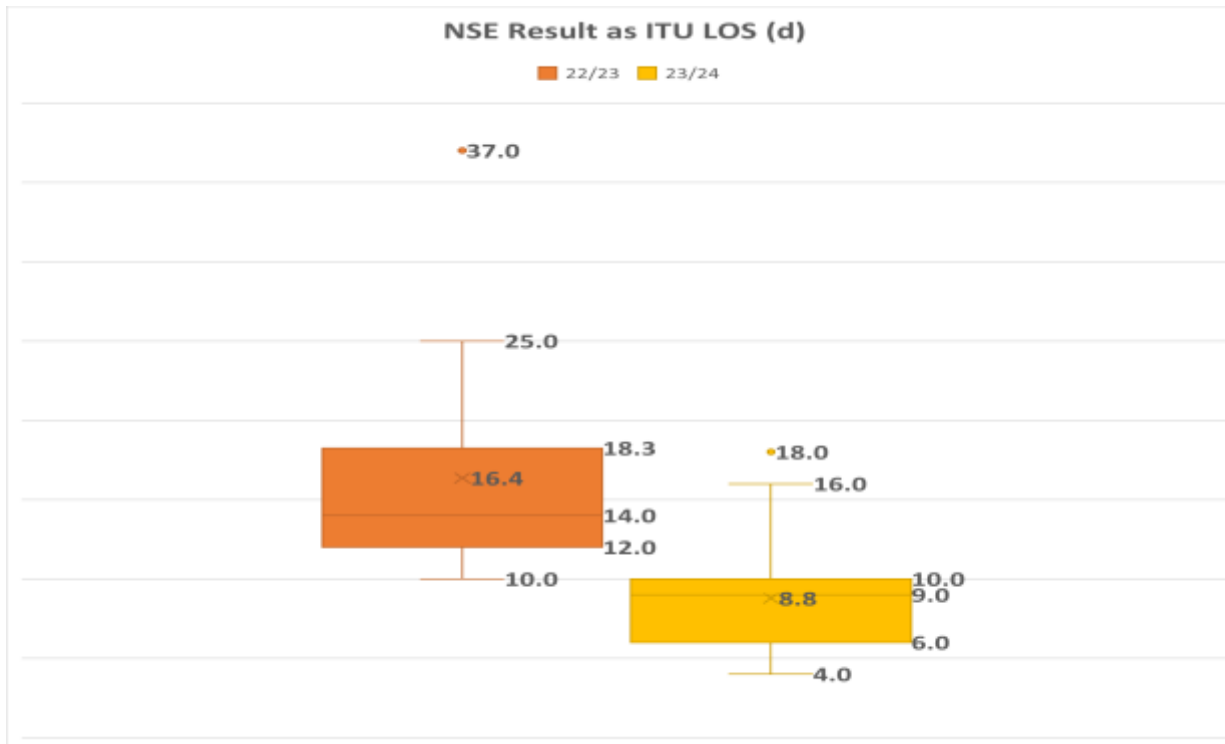
- ▶ Target: 48-hour result return post Day 3 sample.
- ▶ Results available within 48h in only 5/27 cases(19%)
- ▶ 81% of NSE results were delayed (>48h).
- ▶ Delays may impact timely neuroprognostication and decisions.

Turnaround Time	Count	Percentage	Status
≤ 48 hours	5	18.5%	✓ Met target
> 48 hours	22	81.5%	✗ Delayed
Mean Turnaround Time			5 days

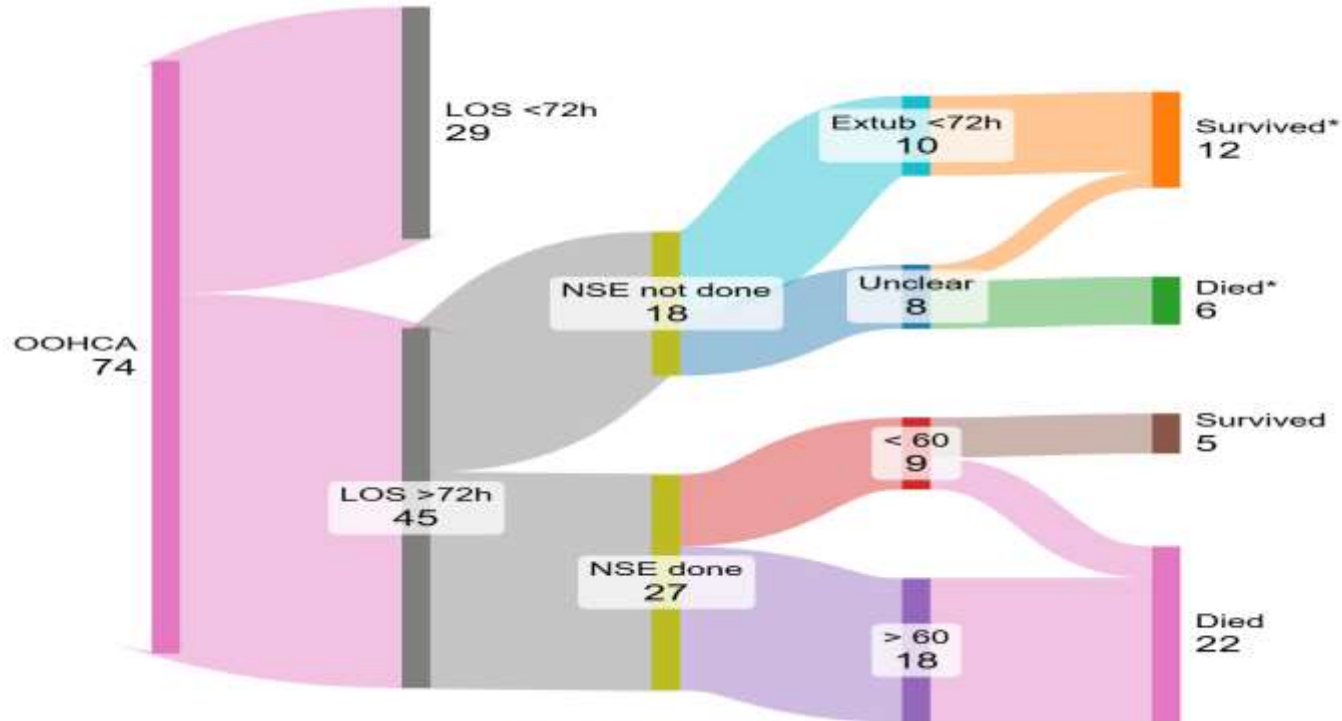
NSE Test Turnaround Time Comparison 22/23 with 23/24



ITU LOS(days) Comparison 22/23 with 23/24



Correlation Analysis: NSE Levels vs outcomes

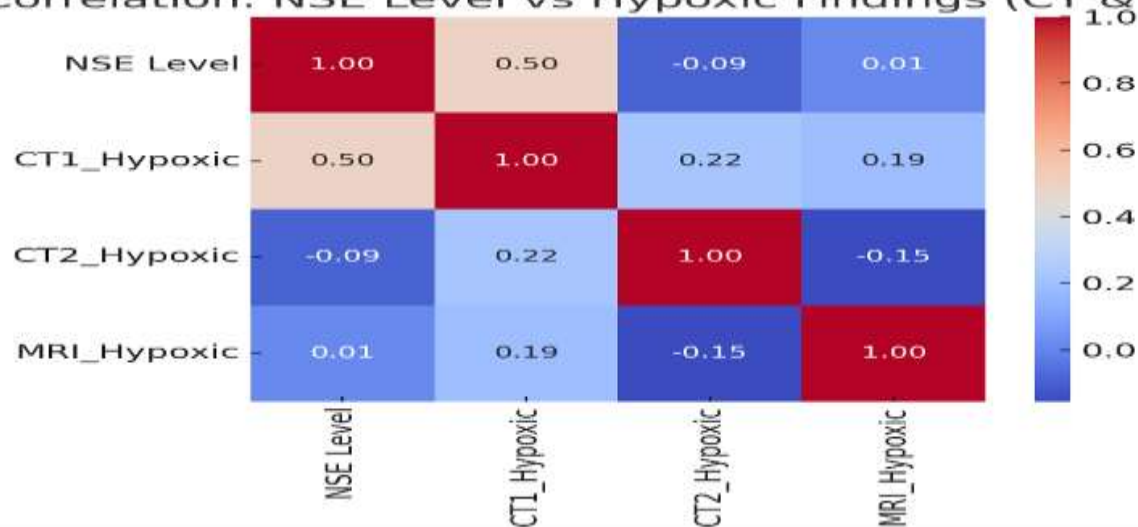


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Correlation Analysis: NSE Levels vs Hypoxic Injury Findings

- ▶ CT1 findings show a strong positive correlation ($r = 0.73$) with NSE levels.
- ▶ MRI findings show a moderate correlation ($r = 0.55$) with NSE levels.

Correlation: NSE Level vs Hypoxic Findings (CT & MF)



Correlation Analysis: NSE Levels vs Hypoxic Injury Findings

- ▶ Total OHCA patients: 74
- ▶ Length of stay (LOS) >72h: 45 patients
- ▶ NSE done in LOS >72h: 27 patients
- ▶ NSE not done despite LOS >72h: 18
- ▶ Main reasons for NSE not being done: Extubation <72h, Unclear pathway, Poor prognosis
- ▶ Recovery was observed in 5/27 (19%) where NSE was done
- ▶ CT changes supporting poor prognosis were seen in 18 cases
- ▶ Patients extubated early (n=8) often had failed or missed NSE

Correlation Analysis: NSE Levels vs Patient outcomes

- ▶ NSE >60 (n = 18): All patients had a poor prognosis.
- ▶ supports the existing evidence of strongly associated with adverse neurological outcomes.
- ▶ NSE ≤60 (n = 9): 5 had good prognosis while 4 patients still had a poor prognosis.
- ▶ NSE alone is not fully reliable in predicting favorable outcomes.

Key Results:

- ▶ Patients audited:** 74
- ▶ LOS >72h:** 45 patients
- ▶ NSE performed:** 27(60%)
- ▶ NSE > 60 → All had poor outcome (100%)
- ▶ NSE ≤ 60 → 5 out of 9 had good outcomes (56%)
- ▶ Result Turnaround ≤48h: 5/27 (19%)
- ▶ CT/MRI correlation:** High correlation (CT r = 0.73; MRI r = 0.55)

Conclusions

- ▶ Strong correlation between NSE levels and clinical outcomes.
- ▶ Major delays in turnaround times hinder clinical decision-making.
- ▶ NSE >60 serves a robust marker of poor prognosis, aligning with national guidance.
- ▶ NSE ≤60 shows greater variability, so prognosis must be interpreted in conjunction with other modalities (e.g., clinical exam, CT, EEG).

Recommendations

- ▶ Standardize sampling at 72h
- ▶ Urgent pathway with Sheffield lab
- ▶ Explore in-house testing or expedited transport.
- ▶ Automate EPR prompts (Day 3)
- ▶ ICE visibility of results
- ▶ Maintain multimodal neuroprognostication

NSE Audit QIP Action Plan

Action	Responsible	Timeline
Discuss lab delays with biochemistry team	ICU Consultant / Audit Lead	July 2025
Add NSE prompt to ICU workflow or EPR	Clinical Audit / IT	June 2025
Re-audit NSE timing and outcomes	Audit Team	Q4 2025–26