# Diagnostic Accuracy of Plasma Renin and Renin Activity in Predicting Mortality and Kidney Outcomes in Patients With Septic Shock and Hypoperfusion or Hypotension: A Multicenter, Prospective, Observational Study

Gun Tak Lee, M.D.[1,2,*], Byuk Sung Ko, M.D.[3,*], Da Seul Kim, M.D.[1], Minha Kim, M.D.[1], Jong Eun Park, M.D.[1,2], Sung Yeon Hwang, M.D.[1], Daun Jeong, M.D.[4], Chi Ryang Chung, M.D.[5], Hyunggoo Kang, M.D.[3], Jaehoon Oh, M.D.[3], Tae Ho Lim, M.D.[3], Bora Chae, M.D.[6], Won Young Kim, M.D.[6], and Tae Gun Shin, M.D.[1] on behalf of the Korean Shock Society

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**Supplemental Data Table S1.** 28-day mortality according to biomarker levels

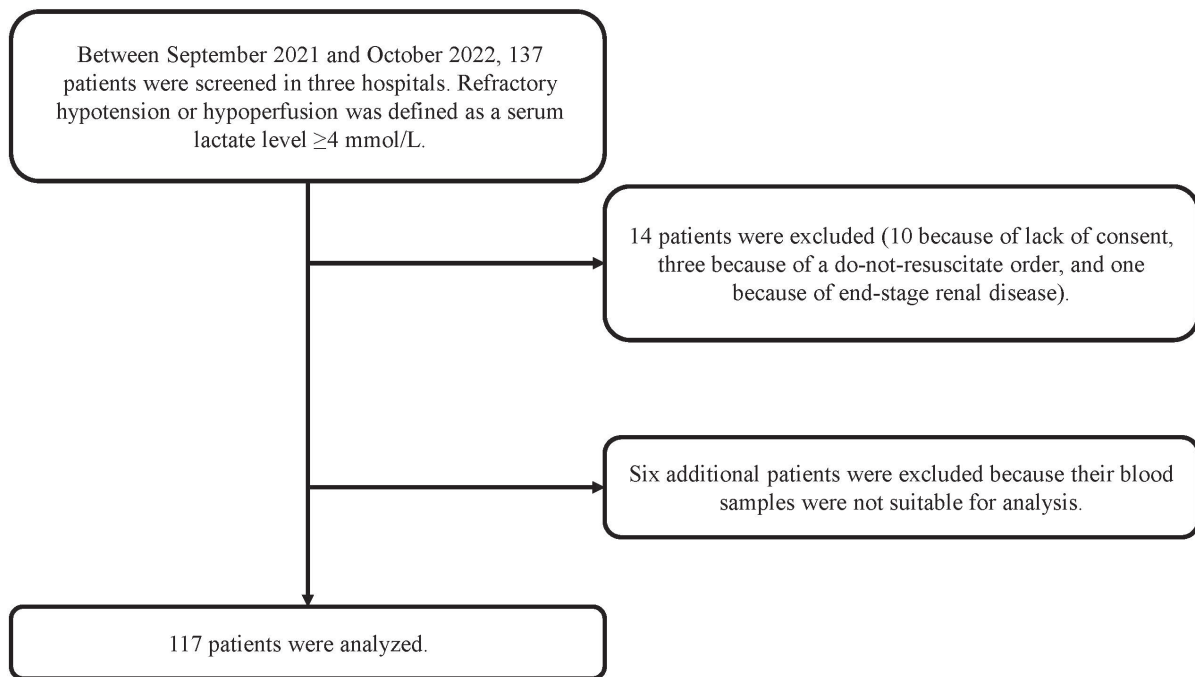| Variables | 28-day mortality, % | | | |
| --- | --- | --- | --- | --- |
| | Low renin activity | High renin activity | Low renin concentration | High renin concentration |
| **At the time of registration**[*] | | | | |
| Low lactate concentration | 4.3 | 33.3 | 6.4 | 30.8 |
| High lactate concentration | 31.5 | 40.0 | 31.8 | 40.9 |
| **24 hrs later**[†] | | | | |
| Low lactate concentration | 8.8 | 23.1 | 8.1 | 30.0 |
| High lactate concentration | 13.6 | 37.5 | 16.1 | 41.0 |

[*]Cutoff points at the time of study enrollment: renin activity, 2.7 ng/mL/hr; renin concentration, 34.3 pg/mL; lactate level, 5.2 mmol/L.

[†]Cutoff points at 24 hrs after study enrollment: renin activity, 2.4 ng/mL/hr; renin concentration, 51.0 pg/mL; lactate level, 2.1 mmol/L.
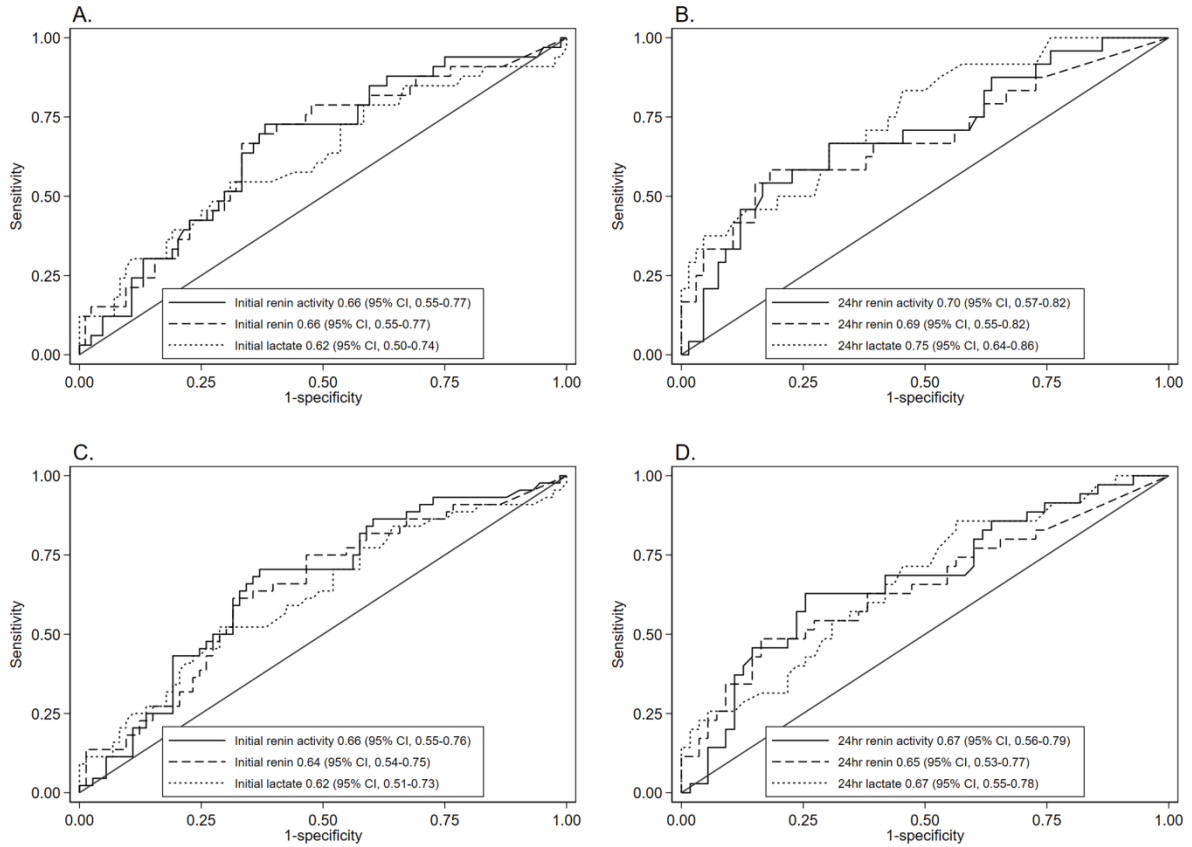
**Supplemental Data Table S2.** Optimal cutoff values of renin activity, renin concentration, and lactate levels in AKI

| Variables | AUC | Sensitivity, % (95% CI) | Specificity, % (95% CI) | PPV, % (95% CI) | NPV, % (95% CI) |
|---|---|---|---|---|---|
| Initial | | | | | |
| Renin activity | 0.68 | 53.4 | 83.1 | 75.6 | 64.5 |
| (≥ 4.7 ng/mL/hr) | (0.60–0.76) | (39.9–66.7) | (71.0–91.6) | (59.7–87.6) | (52.7–75.1) |
| Renin concentration | 0.72 | 62.1 | 81.4 | 76.6 | 68.6 |
| (≥ 38.3 pg/mL) | (0.64–0.80) | (48.4–74.5) | (69.1–90.3) | (62.0–87.7) | (56.4–79.1) |
| Lactate concentration | 0.56 | 44.8 | 66.1 | 56.5 | 54.9 |
| (≥ 5.1 mmol/L) | (0.47–0.64) | (31.7–58.5) | (52.6–77.9) | (41.1–71.1) | (42.7–66.8) |

Abbreviations: AKI, acute kidney injury; AUC, area under the receiver operating characteristic curve; PPV, positive predictive value; NPV, negative predictive value.

Between September 2021 and October 2022, 137 patients were screened in three hospitals. Refractory hypotension or hypoperfusion was defined as a serum lactate level ≥4 mmol/L.

14 patients were excluded (10 because of lack of consent, three because of a do-not-resuscitate order, and one because of end-stage renal disease).

Six additional patients were excluded because their blood samples were not suitable for analysis.

117 patients were analyzed.

**Supplemental Data Fig. S1.** Flowchart of patient enrollment.

**Supplemental Data Fig. S2.** ROCs for in-hospital and 90-day mortality. Initial (A) and 24hrs (B) AUCs for in-hospital mortality. Initial (C) and 24 hrs (D) AUCs for 90-day mortality. "Initial" denotes the time of study enrollment, whereas "24hr" denotes the time point 24 hrs after the first measurement.

Abbreviations: ROC, receiver operating characteristic; AUC, area under the ROC curve.