

Supplementary Table 1. Comparison of Adjusted Odds Ratios for Urosepsis Between Purposeful-Selection and Firth-Penalised Logistic Regression Models.

Variable	Purposeful-selection model			Firth-penalised model		
	OR	95 % CI	p	OR	95 % CI	p
Sex (Female vs Male)	2.21	1.06 – 4.59	0.032	2.1	1.03 – 4.45	0.04
Age (per year)	1.049	1.019 – 1.081	0.001	1.048	1.018 – 1.080	0.002
Fever (Yes vs No)	2.94	1.25 – 6.96	0.014	2.86	1.22 – 6.70	0.016
Severe hydronephrosis †	5.98	2.90 – 9.39	0.009	5.5	2.70 – 8.74	0.012
U-LEU (1+)	22	2.47 – 196.6	0.007	20.7	2.29 – 182.8	0.009
U-LEU (2+)	28.9	3.20 – 261.3	0.004	27	2.97 – 246.1	0.006
U-LEU (3+)	63.5	6.78 – 595.2	<0.001	60.1	6.41 – 564.7	<0.001
U-GLU (2+)	4.55	1.61 – 12.49	0.004	4.3	1.50 – 12.31	0.006
U-GLU (3+)	7.1	1.80 – 28.02	0.006	6.8	1.72 – 26.88	0.008

† Reference category = “No hydronephrosis

Variables forced into the full model but excluded after purposeful selection because $p > 0.10$ and no material confounding effect: flank/abdominal pain, urinary irritation, urine nitrite, HbA1c, hypertension, stone laterality, bstruction site, maximum stone diameter.

Supplementary Table 2. Collinearity Diagnostics for Multivariable Model.

Variable	VIF	Variable	VIF
Sex	1.20	Urine Leukocytes (U-LEU)	1.50
Age	1.30	Urine Glucose (U-GLU)	1.40
Fever	1.10	Urine Nitrite (U-NIT)	1.30
Flank/Abdominal Pain	1.15	Hydronephrosis Grade (ordinal)	1.25
Urinary Irritation	1.25	HbA _{1c}	1.20
Hypertension	1.22	Stone Laterality	1.10
Obstruction Site	1.12	Maximum Stone Diameter	1.30

All variance inflation factors (VIFs) were <2.5 and all condition indices (CIs) were <20, indicating acceptable collinearity among predictors. Maximum condition index = 19.2

Supplementary Table 3. Final Model Discrimination and Calibration.

Statistic	Estimate
Hosmer–Lemeshow χ^2 (df = 8)	5.3; P = 0.72
Calibration slope	0.98
Brier score	0.12

Non-significant Hosmer–Lemeshow test and calibration slope ≈ 1 indicate adequate calibration.

Supplementary Table 4. Linearity of Continuous Predictors in the Logit.

Predictor	Test for Non-Linearity (χ^2 , df=1)	P Value	Conclusion
Age	0.95	0.33	Linear assumption satisfied
HbA _{1c}	1.12	0.29	Linear assumption satisfied
Maximum Stone Diameter	0.45	0.50	Linear assumption satisfied
Predictor	Test for Non-Linearity (χ^2 , df=1)	P Value	Conclusion
Age	0.95	0.33	Linear assumption satisfied
HbA _{1c}	1.12	0.29	Linear assumption satisfied
Maximum Stone Diameter	0.45	0.50	Linear assumption satisfied

Non-significant spline tests indicate no departure from linearity on the logit scale.

Supplementary Table 5. Influential Observations (Cook's Distance).

Predictor	Test for Non-Linearity (χ^2 , df=1)	P Value	Conclusion
Age	0.95	0.33	Linear assumption satisfied
HbA _{1c}	1.12	0.29	Linear assumption satisfied
Maximum Stone Diameter	0.45	0.50	Linear assumption satisfied
Predictor	Test for Non-Linearity (χ^2 , df=1)	P Value	Conclusion
Age	0.95	0.33	Linear assumption satisfied
HbA _{1c}	1.12	0.29	Linear assumption satisfied
Maximum Stone Diameter	0.45	0.50	Linear assumption satisfied

Non-significant spline tests indicate no departure from linearity on the logit scale.

Supplementary Table 6. Internal Validation by Bootstrap (1,000 Resamples).

Metric	Apparent	Optimism	Corrected
Brier Score	0.120	0.010	0.130
Calibration Slope	0.98	0.05	0.93
Metric	Apparent	Optimism	Corrected