

Supplementary data

Search strategy

PubMed, Excerpta Medica Database, Web of Science and the Cochrane Library were searched about the risk factors for unfavourable outcomes in adult patients with IgAVN from the time of their inception to January 2025 by the following medical subject heading (MeSH) terms or keywords: “nephritis”, “IgA vasculitis”, “prognosis”, “renal insufficiency”, and “kidney failure”. Two independent authors (Yueyi Shi and Zhuoning Hong) independently screened all titles and abstracts to determine. The full texts were browsed when the abstracts could not determine the study. Any disagreements were resolved by consulting two other researchers, Bojian Lou and Caifeng Zhu, to attain a consensus.

Detailed search strategy in PubMed

#1 “Nephritis”[Mesh] OR Nephritides
 #2 “IgA Vasculitis”[Mesh] OR Vasculitis, IgA OR Allergic Purpura OR Purpura, Allergic OR Anaphylactoid Purpura OR Purpura, Anaphylactoid OR Schönlein-Henoch Purpura OR Schönlein Henoch Purpura OR Henoch-Schönlein Purpura OR Henoch Schönlein Purpura OR Purpura, Henoch-Schönlein OR Purpura, Schönlein-Henoch OR Purpura, Schönlein Henoch OR Henoch Purpura OR Purpura, Henoch OR Henoch-Schönlein Purpura OR Henoch-Schönlein Purpuras OR Purpura, Henoch-Schönlein OR Purpuras, Henoch-Schönlein OR Henoch Schönlein Purpura OR Henoch Schönlein Purpuras OR Purpura, Henoch Schönlein OR Purpuras, Henoch Schönlein OR Schönlein Purpura, Henoch OR Schönlein Purpuras, Henoch OR Purpura, Schönlein-Henoch OR Purpura, Schönlein Henoch OR Purpuras, Schönlein-Henoch OR Schönlein-Henoch Purpura OR Schönlein-Henoch Purpuras OR Vasculitis, Hemorrhagic OR Hemorrhagic Vasculitis OR Rheumatoid Purpura OR Purpura, Rheumatoid OR Purpura, Nonthrombocytopenic OR Nonthrombocytopenic Purpura OR Purpura, Nonthrombocytopenic OR Nonthrombopenic Purpura OR Nonthrombopenic Purpuras OR

Purpuras, Nonthrombopenic OR Purpura Hemorrhagica OR Hemorrhagica, Purpura

#3 #1 AND #2

#4 (“Prognosis”[Mesh]) OR Prognoses OR Prognostic Factors OR Prognostic Factor OR Factor, Prognostic OR Factors, Prognostic

#5 (“Renal Insufficiency”[Mesh]) OR Renal Insufficiencies OR Kidney Insufficiency OR Insufficiency, Kidney OR Kidney Insufficiencies OR Kidney Failure OR Failure, Kidney OR Failures, Kidney OR Kidney Failures OR Renal Failure OR Failure, Renal OR Failures, Renal OR Renal Failures

#6 (“Kidney Failure, Chronic”[Mesh]) OR Renal Failure, Chronic OR Chronic Renal Failure OR End-Stage Kidney Disease OR Disease, End-Stage Kidney OR End Stage Kidney Disease OR Kidney Disease, End-Stage OR ESRD OR End-Stage Renal Disease OR Disease, End-Stage Renal OR End Stage Renal Disease OR Renal Disease, End-Stage OR Renal Failure, End-Stage OR End-Stage Renal Failure OR Renal Failure, End Stage OR Chronic Kidney Failure

#7 #4 OR #5 OR #6

#8 Child [Title] OR Children [Title] OR Pediatrics [Title] OR Pediatric patients [Title]

#9 #3 AND #7 NOT #8

Detailed search strategy in Excerpta Medica database

#1 ‘nephritis’/exp

#2 ‘epidemic nephritis’: ab,ti OR ‘haematuria, hereditary’: ab,ti OR ‘hematuria, hereditary’: ab,ti OR ‘hereditary nephritis’: ab,ti OR ‘inflammation, kidney’: ab,ti OR ‘kidney inflammation’: ab,ti OR ‘nephritic syndrome’: ab,ti OR ‘nephritis, hereditary’: ab,ti OR ‘renal inflammation’: ab,ti OR ‘nephritis’: ab,ti

#3 #1 OR #2

#4 ‘anaphylactoid purpura’/exp

#5 ‘allergic diathesis’: ab,ti OR ‘allergic purpura’: ab,ti OR ‘anaphylactic purpura’: ab,ti OR ‘haemorrhagic capillary toxicosis’: ab,ti OR ‘hemorrhagic capillary toxicosis’: ab,ti OR ‘henoch purpura’: ab,ti OR ‘henoch schönlein disease’: ab,ti OR ‘henoch schönlein purpura’: ab,ti OR ‘henoch schönlein

syndrome’: ab,ti OR ‘henoch schönlein disease’: ab,ti OR ‘henoch schönlein purpura’: ab,ti OR ‘henoch schönlein syndrome’: ab,ti OR ‘iga vasculitis’: ab,ti OR ‘immunoglobulin a vasculitis’: ab,ti OR ‘peliosis rheumatica’: ab,ti OR ‘purpura henoch schönlein’: ab,ti OR ‘purpura nervosa’: ab,ti OR ‘purpura rheumatica’: ab,ti OR ‘purpura schönlein henoch’: ab,ti OR ‘purpura, anaphylactic’: ab,ti OR ‘purpura, schönlein-henoch’: ab,ti OR ‘rheumatic purpura’: ab,ti OR ‘rheumatoid purpura’: ab,ti OR ‘schönlein disease’: ab,ti OR ‘schönlein henoch disease’: ab,ti OR ‘schönlein henoch purpura’: ab,ti OR ‘schönlein henoch syndrome’: ab,ti OR ‘schönlein-henoch purpura’: ab,ti OR ‘schönlein henoch disease’: ab,ti OR ‘schönlein henoch purpura’: ab,ti OR ‘schönlein henoch syndrome’: ab,ti OR ‘anaphylactoid purpura’: ab,ti

#6 #4 OR #5

#7 #3 AND #6

#8 ‘prognosis’/exp OR ‘prognosis’: ab,ti

#9 ‘kidney failure’/exp OR ‘kidney insufficiency’: ab,ti OR ‘maternal kidney failure’: ab,ti OR ‘renal failure’: ab,ti OR ‘renal insufficiency’: ab,ti OR ‘terminal kidney failure’: ab,ti OR ‘kidney failure’: ab,ti

#10 #8 OR #9

#11 ‘child’/exp OR ‘child’: ab,ti OR ‘children’: ab,ti

#12 ‘pediatrics’/exp

#13 ‘community paediatrics’: ab,ti OR ‘community pediatrics’: ab,ti OR ‘paediatric aspect’: ab,ti OR ‘paediatric care’: ab,ti OR ‘paediatric educating’: ab,ti OR ‘paediatric education’: ab,ti OR ‘paediatric institute’: ab,ti OR ‘paediatric internship’: ab,ti OR ‘paediatric perspective’: ab,ti OR ‘paediatric practice’: ab,ti OR ‘paediatric research’: ab,ti OR ‘paediatric service’: ab,ti OR ‘paediatrics’: ab,ti OR ‘paediatrics department’: ab,ti OR ‘pediatric aspect’: ab,ti OR ‘pediatric care’: ab,ti OR ‘pediatric educating’: ab,ti OR ‘pediatric education’: ab,ti OR ‘pediatric institute’: ab,ti OR ‘pediatric internship’: ab,ti OR ‘pediatric practice’: ab,ti OR ‘pediatric research’: ab,ti OR ‘pediatric service’: ab,ti OR ‘pediatrics department’: ab,ti OR ‘pediatry’: ab,ti OR

‘social peditary’: ab,ti OR ‘well baby clinic’: ab,ti OR ‘pediatrics’: ab,ti
 #14 #11 OR #12 OR #13
 #15 #7 AND #10 NOT #14

Detailed search strategy in Web of Science

#1 TS= (Nephritis OR Nephritides)
 #2 (TS= (IgA Vasculitis OR Allergic Purpura OR Anaphylactoid Purpura OR Schönlein-Henoch Purpura OR Schönlein Henoch Purpura OR Henoch-Schönlein Purpura OR Henoch Schönlein Purpura OR Henoch Purpura OR Henoch-Schönlein Purpura OR Henoch-Schönlein Purpuras OR Henoch Schönlein Purpura OR Henoch Schönlein Purpuras OR Schönlein-Henoch Purpura OR Schönlein-Henoch Purpuras OR Hemorrhagic Vasculitis OR Rheumatoid Purpura OR Nonthrombocytopenic Purpura OR Nonthrombopenic Purpura OR Nonthrombopenic Purpuras OR Purpura Hemorrhagica))
 #3 #1 AND #2
 #4 (TS= (Prognosis OR Prognoses OR Prognostic Factors OR Prognostic Factor OR Renal Insufficiency OR Renal Insufficiencies OR Kidney Insufficiency OR Kidney Insufficiencies OR Kidney Failure OR Kidney Failures OR Renal Failure OR Renal Failures OR Chronic Renal Failure OR End-Stage Kidney Disease OR End Stage Kidney Disease OR ESRD OR End-Stage Renal Disease OR End Stage Renal Disease OR End-Stage Renal Failure OR Chronic Kidney Failure))
 #5 #3 AND #4
 #6 (TS= (Child OR Children OR Pediatrics OR Pediatric patients))
 #7 #5 NOT #6

Detailed search strategy in the Cochrane Library

#1 MeSH descriptor: [Nephritis] explode all trees
 #2 (Nephritides): ti,ab,kw OR (Nephritis): ti,ab,kw
 #3 #1 OR #2
 #4 MeSH descriptor: [IgA Vasculitis] explode all trees
 #5 (IgA Vasculitis):ti,ab,kw OR (Purpura, Rheumatoid):ti,ab,kw OR (Rheumatoid Purpura):ti,ab,kw OR

(Henoch-Schönlein Purpura):ti,ab,kw OR (Schönlein Henoch Purpura): ti,ab,kw
 #6 (Purpuras, Schönlein-Henoch):ti,ab,kw OR (Henoch-Schönlein Purpura): ti,ab,kw OR (Purpura, Henoch): ti,ab,kw OR (Schönlein-Henoch Purpura): ti,ab,kw OR (Anaphylactoid Purpura): ti,ab,kw
 #7 (Schönlein-Henoch Purpuras): ti, ab, kw OR (Purpura, Anaphylactoid): ti,ab,kw OR (Purpura, Henoch-Schönlein): ti,ab,kw OR (Allergic Purpura): ti,ab,kw OR (Purpuras, Henoch Schönlein): ti,ab,kw
 #8 (Purpura, Henoch-Schönlein): ti,ab,kw OR (Schönlein Purpuras, Henoch): ti,ab,kw OR (Purpura, Schönlein Henoch): ti,ab,kw OR (Schönlein-Henoch Purpura): ti,ab,kw OR (Purpuras, Henoch-Schönlein): ti,ab,kw
 #9 (Henoch-Schönlein Purpuras): ti,ab,kw OR (Purpura, Henoch Schönlein): ti,ab,kw OR (Henoch Schönlein Purpuras) :ti,ab,kw OR (Henoch Schönlein Purpura, Henoch): ti,ab,kw
 #10 (Purpura, Schönlein-Henoch): ti,ab,kw OR (Henoch Schönlein Purpura): ti,ab,kw OR (Henoch Purpura): ti,ab,kw OR (Vasculitis, IgA): ti,ab,kw OR (Purpura, Schönlein-Henoch): ti,ab,kw
 #11 (Purpura, Allergic): ti,ab,kw OR (Purpura, Schönlein Henoch): ti,ab,kw OR (Hemorrhagica, Purpura): ti,ab,kw OR (Purpura Hemorrhagica): ti,ab,kw OR (Vasculitis, Hemorrhagic): ti,ab,kw
 #12 (Hemorrhagic Vasculitis): ti,ab,kw OR (Nonthrombocytopenic Purpura): ti,ab,kw OR (Purpura, Nonthrombocytopenic): ti,ab,kw OR (Nonthrombopenic Purpuras): ti,ab,kw OR (Nonthrombopenic Purpura): ti,ab,kw
 #13 (Purpuras, Nonthrombopenic): ti,ab,kw OR (Purpura, Nonthrombopenic): ti,ab,kw
 #14 #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13
 #15 #3 AND #14
 #16 MeSH descriptor: [Prognosis] explode all trees
 #17 (Prognosis): ti,ab,kw OR

(Factor, Prognostic): ti,ab,kw OR (Prognostic Factors): ti,ab,kw OR (Prognostic Factor): ti,ab,kw OR (Factors, Prognostic): ti,ab,kw
 #18 (Prognoses): ti,ab,kw
 #19 #16 OR #17 OR #18
 #20 MeSH descriptor: [Renal Insufficiency] explode all trees
 #21 (Renal Insufficiency): ti,ab,kw OR (Renal Insufficiencies): ti,ab,kw OR (Kidney Insufficiency): ti,ab,kw OR (Kidney Insufficiencies): ti,ab,kw OR (Insufficiency, Kidney): ti,ab,kw
 #22 (Renal Failure): ti,ab,kw OR (Failure, Renal): ti,ab,kw OR (Failures, Renal): ti,ab,kw OR (Failures, Kidney): ti,ab,kw OR (Kidney Failures): ti,ab,kw
 #23 (Kidney Failure): ti,ab,kw OR (Failure, Kidney): ti,ab,kw AND (Renal Failures): ti,ab,kw
 #24 #20 OR #21 OR #22 OR #23
 #25 MeSH descriptor: [Kidney Failure, Chronic] explode all trees
 #26 (Kidney Failure, Chronic): ti,ab,kw OR (Disease, End-Stage Renal): ti,ab,kw OR (End Stage Kidney Disease): ti,ab,kw OR (End Stage Renal Disease): ti,ab,kw OR (Chronic Kidney Failure): ti,ab,kw
 #27 (Renal Disease, End Stage): ti,ab,kw OR (Kidney Disease, End-Stage): ti,ab,kw OR (End-Stage Renal Disease): ti,ab,kw OR (Renal Failure, Chronic): ti,ab,kw OR (Chronic Renal Failure): ti,ab,kw
 #28 (ESRD):ti,ab,kw OR (Renal Disease, End-Stage): ti,ab,kw OR (End-Stage Kidney Disease): ti,ab,kw OR (Renal Failure, End Stage): ti,ab,kw OR (Disease, End-Stage Kidney): ti,ab,kw
 #29 (End-Stage Renal Failure): ti,ab,kw OR (Renal Failure, End-Stage): ti,ab,kw
 #30 #25 OR #26 OR #27 OR #28 OR #29
 #31 #19 OR #24 OR #30
 #32 #15 AND #31
 #33 (Child):ti,ab,kw OR (children): ti,ab,kw OR (Pediatrics): ti,ab,kw OR (Pediatric patients): ti,ab,kw
 #34 #32 NOT #33

Supplementary Table S1. Baseline characteristics of the derivation cohort.

First Author_Year	Country or region	Study design	Sample size (% male)	Age (year)	Follow up (month)	duration (month)	Risk factors
Kim_2014	Korea	prospective cohort	30 (60%)	58 (40, 65)	49.3	3.73 (1.17-9.77)	24-h UP, HTN, eGFR, E, T
Komatsu_2018	Japan	retrospective cohort	152 (46.7%)	54.13±17.62	46.8	NA	Age, SBP, 24 h-UP, eGFR, ALB, E, C, Steroid pulse therapy, RAS blockade
Inagaki_2018	Japan	retrospective cohort	74 (47.3%)	47.8±17.4	49.3	1.77 (0.83-5.6)	Age, Sex, 24h-UP, E, T, C
Huang_2018	China	retrospective cohort	698 (52.0%)	29.0 (22.0-39.0)	54	5.0 (1.0-24.0)	24 h-UP, eGFR, Glomerular sclerosis, Moderate and severe tubular atrophy/ interstitial fibrosis
Shimamura_2019	Japan	prospective cohort	30 (60%)	58 (40, 65)	31.2	NA	Age, Sex, Gastrointestinal bleeding
Zhong_2019	China	prospective cohort	188 (45.7%)	31.04±15.54	26	5.97±10.59	HTN, C, M, E, S, T, Scr, UP, ALB, eGFR, U-RBC
Tan_2021	China	prospective cohort	189 (57.14%)	30.79±15.24	27.4	NA	BIL, HTN, 24 h-UP, e-GFR, U-RBC, ALB, CHOL, Anaemia, M, E, S, C, T
Zhao_2023	China	retrospective cohort	145 (46.2%)	32 (22, 49)	23.45	2 (0.78, 9)	T, C, MAP, 24 h-UP, Scr, ALB
Guan_2023	China	retrospective cohort	106 (52.8%)	38 (24-53)	102	1.87 (0.7-9.33)	Age, Sex, HTN, Scr, 24 h-UP, Haemoglobin, Global sclerosis, ACEi or ARB, Immunosuppressive therapy
Stanway_2024	UK	retrospective cohort	202 (65.9%)	44 (29-64)	43.5	1.4 (0.2-4.8)	Age, Sex, Ethnicity, Diabetic, eGFR, C, Chronic changes

Supplementary Table S2. Risk factors included in the systematic review and meta-analysis.

Risk factors	First author_Year	Sample size	No. of unfavourable outcomes	Definition of risk factor	HR (95% CI)	p-value
Age	Komatsu_2018	152	15	>65 (vs. 19-64) years	3.61 (1.09-12)	0.036
Age	Inagaki_2018	74	14	Increment by 10 years	1.57 (1.12-2.21)	0.0095
Age	Shimamura_2019	30	6	Increment by 1 year	1.1 (0.98-1.23)	0.102
Age	Guan_2023	106	17	Increment by 10 years	1.03 (0.98-1.07)	0.23
Age	Stanway_2024	202	43	18-34 (vs. 35-64) years	5.5 (0.9-32.5)	0.06
Age	Stanway_2024	202	43	>64(vs. 35-64) years	1.8 (0.2-13.5)	0.6
Sex	Inagaki_2018	74	14	Male	2.92 (0.74-11.6)	0.13
Sex	Shimamura_2019	30	6	Female	14.4 (0.66-312)	0.09
Sex	Guan_2023	106	17	Male	1.12 (0.31-4.05)	0.86
Sex	Stanway_2024	202	43	Male	5.2 (1.1-25.5)	0.04
Hypertension	Kim_2014	61	13	yes (vs. no)	2.30 (0.18-29.40)	0.522
Hypertension	Zhong_2019	188	15	yes (vs. no)	1.28 (0.38-4.28)	0.691
Hypertension	Tan_2021	189	13	yes (vs. no)	1.58 (0.27-9.37)	0.613
Hypertension	Guan_2023	106	17	yes (vs. no)	3.59 (1.03-12.58)	0.046
E	Kim_2014	61	13	E1 (vs. E0)	8.91 (1.47-53.88)	0.017
E	Komatsu_2018	152	15	>25% (vs. < 25%)	2.06 (0.57-7.47)	0.274
E	Inagaki_2018	74	14	E1 (vs. E0)	6.71 (1.06-42.7)	0.044
E	Zhong_2019	188	15	E1 (vs. E0)	1.39 (0.21-9.04)	0.734
E	Tan_2021	189	13	E0 (vs. E1)	0.96 (0.12-8.05)	0.960
T	Kim_2014	61	13	T1/2 (vs. T0)	8.74 (1.40-54.38)	0.02
T	Inagaki_2018	74	14	T1/2 (vs. T0)	2.57 (0.67-9.77)	0.17
T	Zhong_2019	188	15	T1/2 (vs. T0)	8.15 (1.59-41.84)	0.012
T	Tan_2021	189	13	T0 (vs. T1/2)	0.01 (0.00-0.000)	0.000
T	Zhao_2023	145	12	T1 (vs. T0)	5.739 (0.701-46.995)	0.1
T	Zhao_2023	145	12	T2 (vs. T0)	41.732 (2.073-840.081)	0.02
C	Komatsu_2018	152	15	C2 (vs. C0/1)	3.07 (0.64-14.7)	0.160
C	Inagaki_2018	74	14	C1 (vs. C0)	2.88 (0.29-29.1)	0.37
C	Inagaki_2018	74	14	C2 (vs. C0)	2.76 (0.23-33.2)	0.42
C	Zhong_2019	188	15	C1/2 (vs. C0)	0.28 (0.07-1.18)	0.083
C	Tan_2021	189	13	C0 (vs. C1/2)	5.44 (0.81-36.65)	0.082
C	Zhao_2023	145	12	C1 (vs. C0)	0.67 (0.084-5.332)	0.7
C	Zhao_2023	145	12	C2 (vs. C0)	0.742 (0.074-7.455)	0.8
C	Stanway_2024	202	43	C1/2 (vs. C0)	1.1 (0.8-4.1)	0.9
Urinary protein	Kim_2014	61	13	Increment by 1g/d	0.94 (0.68-1.31)	0.716
Urinary protein	Komatsu_2018	152	15	Increment by 1g/d	0.86 (0.68-1.11)	0.244
Urinary protein	Inagaki_2018	74	14	≥1g/d (vs. <1g/d)	0.52 (0.11-2.42)	0.41
Urinary protein	Huang_2018	698	32	>1g/d (vs. ≤1g/d)	2.486 (1.087-5.685)	0.031
Urinary protein	Zhong_2019	188	15	Increment by 1g/L	1.03 (0.86-1.22)	0.764
Urinary protein	Tan_2021	189	13	Increment by 1g/d	1.20 (0.91-1.58)	0.197
Urinary protein	Zhao_2023	145	12	Increment by 1mg/d	1.000 (0.999-1.000)	0.2
Urinary protein	Guan_2023	106	17	Increment by 1g/d	0.99 (0.80-1.21)	0.89
eGFR	Kim_2014	61	13	Increment by 1 ml/min/1.73 m2	1.03 (0.99-1.07)	0.144
eGFR	Komatsu_2018	152	15	Increment by 1 ml/min/1.73 m2	1.01 (0.98-1.03)	0.514
eGFR	Huang_2018	698	32	<60 mL/min/1.73 m2 (vs. ≥60 mL/min/1.73 m2)	5.344 (2.297-12.433)	<0.001
eGFR	Zhong_2019	188	15	Increment by 1 ml/min/1.73 m2	0.99 (0.96-1.03)	0.692
eGFR	Tan_2021	189	13	Increment by 1 ml/min/1.73 m2	1.00 (0.97-1.02)	0.924
eGFR	Stanway_2024	202	43	<30 mL/min/1.73 m2 (vs. ≥30 mL/min/1.73 m2)	10.1 (2.7-36.9)	0.0005
Scr	Zhong_2019	188	15	Increment by 1 μmol/L	1.00 (0.98-1.03)	0.757
Scr	Zhao_2023	145	12	Increment by 1 μmol/L	1.016 (1.007-1.024)	<0.001
Scr	Guan_2023	106	17	Increment by per 88.4 μmol/L	1.14 (0.75-1.72)	0.54
ALB	Komatsu_2018	152	15	Increment by 1 g/L	0.2 (0.07-0.6)	0.004
ALB	Zhong_2019	188	15	Increment by 1 g/L	0.89 (0.81-0.98)	0.015
ALB	Tan_2021	189	13	Increment by 1 g/L	0.95 (0.84-1.08)	0.468
ALB	Zhao_2023	145	12	Increment by 1 g/L	0.808 (0.664-0.985)	0.04

Supplementary Table S3. Overall response and subgroup/sensitivity analysis of the 10 risk factors.

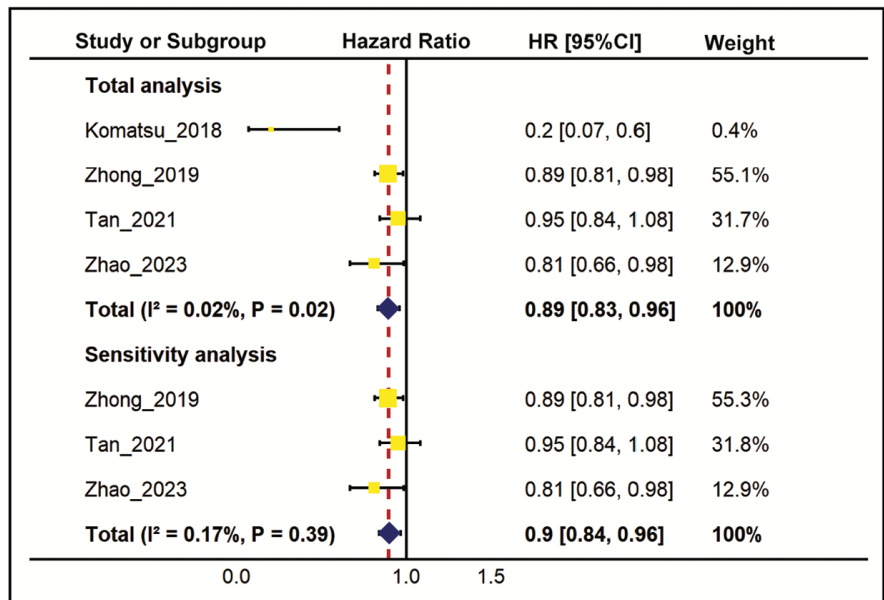
Risk factors	Analysis mode (No. of including studies)	Pooled HR (95% CI)	p-value	Heterogeneity
Age	Meta-analysis (6)	1.29 (0.98-1.72)	0.07	I ² = 87.38%, p=0.01
	Subgroup analysis: increment by 10 years (2)	1.23 (0.82-1.85)	0.32	I ² = 82.8%, p=0.02
Sex	Meta-analysis (4)	1.64 (0.49-5.45)	0.42	I ² = 52.66%, p=0.07
	Sensitivity analysis (3)	2.37 (0.98-5.72)	0.06	I ² = 16.11%, p=0.31
HTN	Meta-analysis (4)	2.02 (0.96-4.26)	0.07	I ² = 0%, P = 0.7
E	Meta-analysis (5)	2.81 (1.31-6.03)	0.01	I ² = 1.13%, p=0.4
	Subgroup analysis: E1 (vs. E0) (3)	3.33 (1.29-8.60)	0.01	I ² = 18.92%, p=0.3
T	Meta-analysis (5)	5.85 (2.63-13.00)	<.0001	I ² = 0%, p=0.49
	Subgroup analysis: T1/2 (vs. T0) (3)	4.91 (1.99-12.11)	0.0005	I ² = 0%, p =0.44
C	Meta-analysis (8)	0.92 (0.54- 1.58)	0.76	I ² = 27.98%, p=0.21
	Subgroup analysis: C1 (vs. C0) (2)	1.29 (0.28-6.02)	0.75	I ² = 0%, p=0.36
	Subgroup analysis: C2 (vs. C0) (2)	1.36 (0.25-7.39)	0.72	I ² = 0%, p=0.45
	Subgroup analysis: C1/2 (vs. C0) (3)	0.48 (0.15-1.51)	0.21	I ² = 56.07%, p=0.1
UP	Meta-analysis (8)	1.00 (1.00-1.00)	0.9991	I ² = 19.85%, p=0.27
	Subgroup analysis: increment by 1g/d (4)	0.99 (0.87- 1.12)	0.82	I ² = 7.03%, p=0.36
eGFR	Meta-analysis (6)	1.01 (1.00-1.02)	0.45	I ² = 0%, p<.0001
	Subgroup analysis: Increment by 1 ml/min/1.73 m ² (4)	1.01 (0.99-1.02)	0.43	I ² = 0%, p=0.47
	Subgroup analysis: ≥60 mL/min/1.73 m ² (vs.<60 mL/min/1.73 m ²) (2)	0.16 (0.08-0.32)	<.0001	I ² = 0%, p=0.42 2
Scr	Meta-analysis (3)	1.01 (1.01-1.02)	0.0004	I ² = 0%, p=0.43
	Subgroup analysis: increment by 1 μmol/L (2)	1.01 (1.01-1.02)	0.0004	I ² = 28.81%, p=0.24
ALB	Meta-analysis (4)	0.89 (0.83-0.96)	0.0015	I ² = 0.02%, p=0.02
	Sensitivity analysis (3)	0.90 (0.84-0.96)	0.0028	I ² = 0.17%, p=0.39

Supplementary Table S4. Newcastle-Ottawa Quality Assessment Scale of the 10 cohort studies.

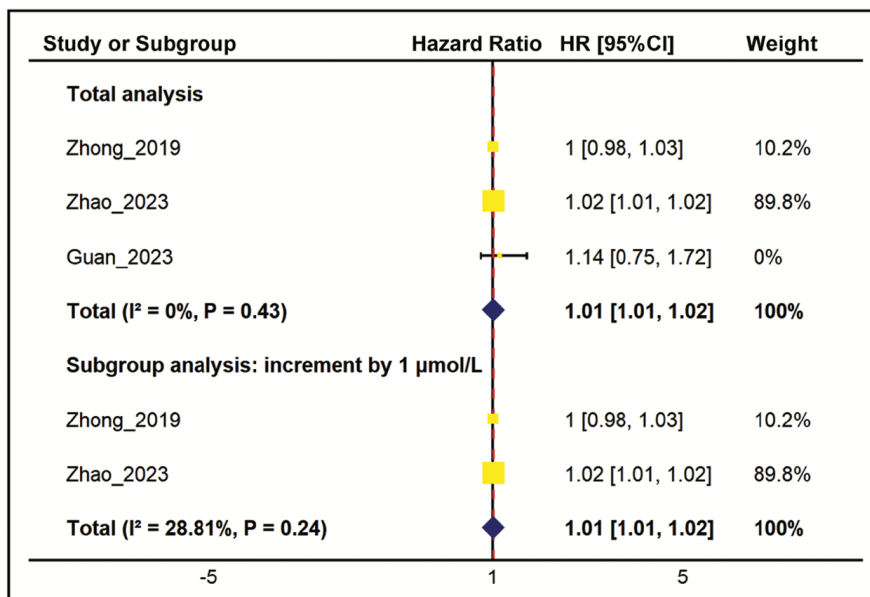
First Author_Year	Selection			Comparability		Outcome		Total scores
	Representativeness of the exposed cohort	Selection of the non-exposed cohort	Ascertainment of exposure	Demonstration that outcome of interest was not present at the start of the study	Assessment of outcome	Was follow-up long enough for outcomes to occur	Adequacy of follow-up of cohorts	
Kim_2014	☆	☆	☆	☆	☆	☆	☆	8
Komatsu_2018	☆	☆	☆	☆	☆☆	☆	☆	9
Inagaki_2018	☆	☆	☆	☆	☆☆	☆	☆	9
Huang_2018	☆	☆	☆	☆	☆	☆	☆	8
Shimamura_2019	☆	☆	☆	☆	☆☆	☆	☆	9
Zhong_2019	☆	☆	☆	☆	☆	-	☆	7
Tan_2021	☆	☆	☆	☆	☆☆	☆	☆	9
Zhao_2023	☆	☆	☆	☆	☆	-	☆	6
Guan_2023	☆	☆	☆	☆	☆☆	☆	☆	8
Stanway_2024	☆	☆	☆	-	☆☆	☆	☆	8

Supplementary Table S5. Baseline characteristics of the patients in the validation cohort.

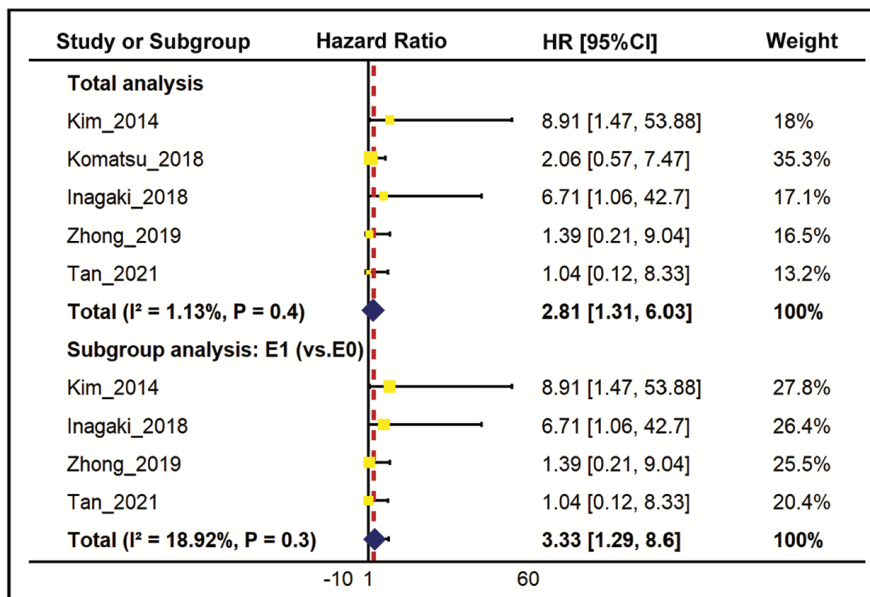
Variables	Total	Unfavourable outcomes		p-value
		No	Yes	
N	133	119	14	
Follow-up (months)	33.91 (19.98, 49.3)	35.65 (21.35, 51.15)	16.38 (2.36, 32.96)	0.011
Duration (days)	3 (0.67, 24)	3 (0.67, 24)	2.5 (0.54, 33)	0.719
Age (years)	36 (27, 55)	35 (26, 51)	59.5 (53.5, 65.25)	<0.001
Sex (%)				
Male	48 (36)	41 (34)	7 (50)	0.394
Female	85 (64)	78 (66)	7 (50)	
ALB(g/L)	37.9 (33.4, 40.5)	38.4 (34.65, 41.15)	30 (26.07, 32.72)	<0.001
Scr (μmol/L)	68 (56, 86)	67 (55, 84.5)	173.5 (72, 272.5)	<0.001
eGFR (mL/min/1.73 m ²)	106.8 (73.39, 126.06)	110.91 (78.17, 128.94)	34.35 (16.5, 92.04)	<0.001
T (%)		< 0.001		
T1/2	30 (23)	21 (18)	9 (64)	
T0	103 (77)	98 (82)	5 (36)	
E (%)		0.076		
E1	70 (53)	59 (50)	11 (79)	
E0	63 (47)	60 (50)	3 (21)	



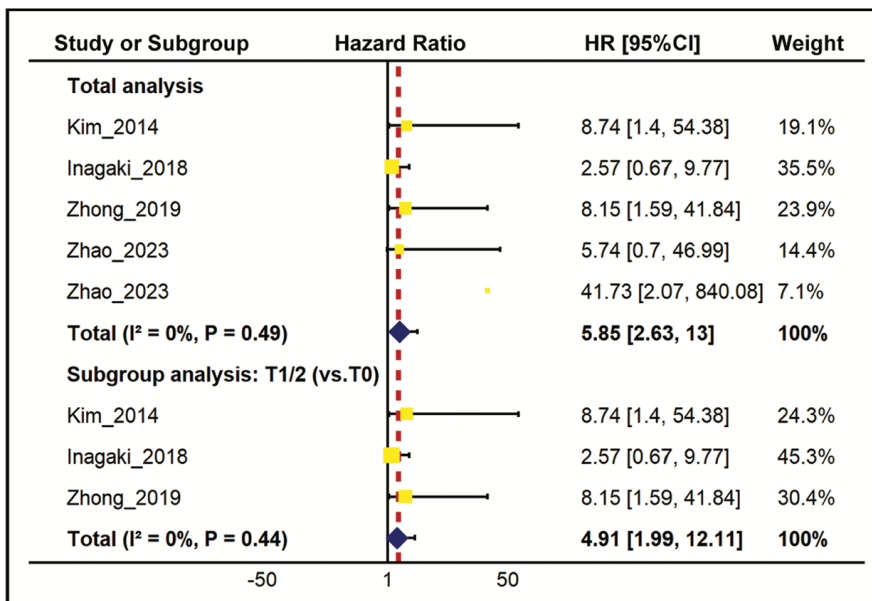
Supplementary Fig. S1. ALB.



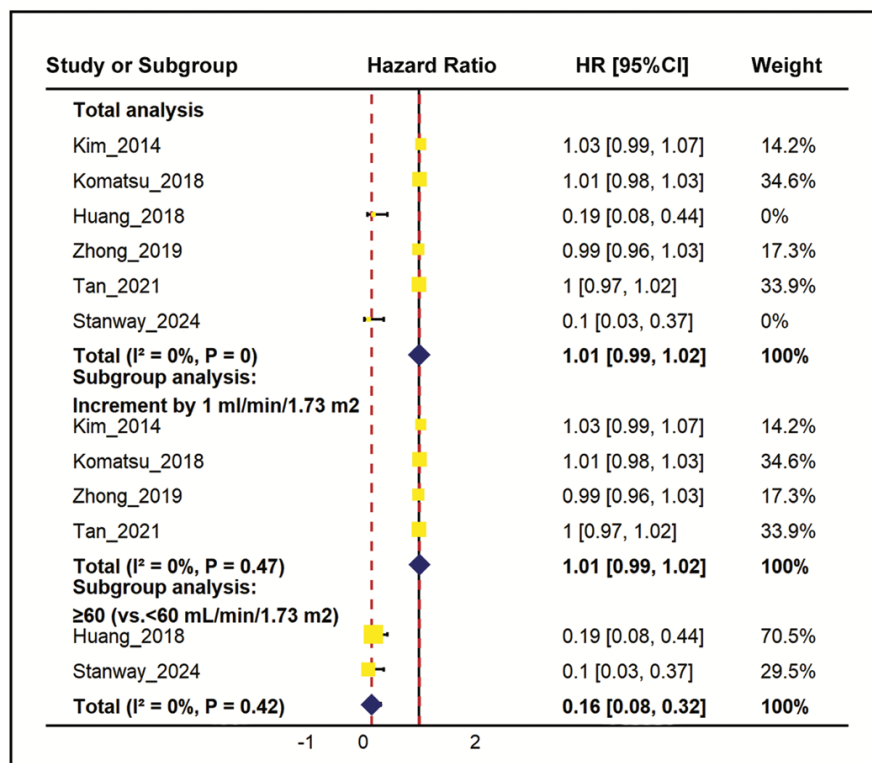
Supplementary Fig. S2. Scr.



Supplementary Fig. S3. E.



Supplementary Fig. S4. T.



Supplementary Fig. S5. eGFR.

Supplementary Table S6. Pooled HR (95%CI), sample size, and β -coefficients of risk factors included in the risk stratification scale.

Risk Factors	Sample Size	Pooled HR (95% CI)	β -Coefficient
ALB (by 1 g/L)	522	0.90 (0.84-0.96)	-0.11
eGFR \geq 60 mL/min/1.73 m ² (vs.<60 mL/min/1.73 m ²)	900	0.16 (0.08-0.32)	-1.86
E1 (vs. E0)	512	3.33 (1.29-8.60)	1.20
T1/2 (vs. T0)	323	4.91 (1.99-12.11)	1.59

Supplementary Table S7. The confusion matrix, Youden index, sensitivity, and specificity of different cut-off scores.

Cut-off Score	Youden Index	TP	FP	TN	FN	Sensitivity (95% CI)	Specificity (95% CI)
0.00	0.00	14.00	119.00	0.00	0.00	1.00 (0.77-1.00)	0.00 (0.00-0.03)
0.50	0.34	14.00	79.00	40.00	0.00	1.00 (0.77-1.00)	0.34 (0.25-0.43)
1.00	0.30	13.00	75.00	44.00	1.00	0.93 (0.66-1.00)	0.37 (0.28-0.46)
1.50	0.52	12.00	40.00	79.00	2.00	0.86 (0.57-0.98)	0.66 (0.57-0.75)
2.00	0.67	12.00	22.00	97.00	2.00	0.86 (0.57-0.98)	0.82 (0.73-0.88)
2.50	0.65	11.00	16.00	103.00	3.00	0.79 (0.49-0.95)	0.87 (0.79-0.92)
3.00	0.68	11.00	13.00	106.00	3.00	0.79 (0.49-0.95)	0.89 (0.82-0.94)
3.50	0.62	10.00	11.00	108.00	4.00	0.71 (0.42-0.92)	0.91 (0.84-0.95)
4.00	0.52	8.00	6.00	113.00	6.00	0.57 (0.29-0.82)	0.95 (0.89-0.98)
4.50	0.39	6.00	5.00	114.00	8.00	0.43 (0.18-0.71)	0.96 (0.90-0.99)
5.00	0.40	6.00	4.00	115.00	8.00	0.43 (0.18-0.71)	0.97 (0.92-0.99)
5.50	0.36	5.00	0.00	119.00	9.00	0.36 (0.13-0.65)	1.00 (0.97-1.00)
6.00	0.21	3.00	0.00	119.00	11.00	0.21 (0.05-0.51)	1.00 (0.97-1.00)
6.50	0.21	3.00	0.00	119.00	11.00	0.21 (0.05-0.51)	1.00 (0.97-1.00)

TP: true positives; FP: false positive; TN: true negatives; FN: false negatives.