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Timing and Predictors of Renal Involvement in Childhood Immunoglobulin A (IgA) Vasculitis: A Systematic Review of De-intensification of Renal Surveillance

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Abstract

Renal involvement is the principal determinant of long-term prognosis in childhood immunoglobulin A vasculitis, but the optimal duration and intensity of surveillance remain uncertain. This systematic review examined the timing and predictors of renal involvement, focusing on residual risk after normal assessments and the evidence informing surveillance de-intensification. MEDLINE through PubMed, Embase, Scopus, Web of Science Core Collection, and CENTRAL were searched from inception to 1 September 2026. Two reviewers independently selected studies, extracted data, and assessed risk of bias using the Joanna Briggs Institute Critical Appraisal Checklist for Cohort Studies. Reporting followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 and Synthesis Without Meta-analysis guidance. Of 401 records identified, 369 underwent title and abstract screening; 149 reports were assessed in full, and 19 reports could not be retrieved. Eight studies involving 1,208 children were included: one had low, four moderate, and three high risk of bias. Most renal involvement was detected at diagnosis or within three months. Later abnormalities varied in severity, and inconsistent documentation of preceding assessments limited distinction between delayed onset and delayed detection. One cohort reported a residual nephritis risk of 2% after two months without renal involvement; this study-specific estimate could not be pooled or generalized. The number of children developing genuinely delayed nephritis after consistently normal assessments was not reliably ascertainable across studies. Older age, gastrointestinal involvement, recurrence, and early urinary abnormalities were recurring indicators of overall renal involvement but were not validated predictors of delayed nephritis after normal assessments. Heterogeneous definitions, surveillance schedules, and incomplete landmark denominators precluded estimation of pooled conditional risk. These findings support prospective evaluation of individualized reductions in monitoring frequency, while retaining a six-month assessment consistent with existing guidance. They do not establish the safety of reduced surveillance or an early stopping rule.

Categories: Other, Rheumatology, Internal Medicine
Keywords: delayed renal involvement, henoch-schönlein purpura, iga vasculitis, nephritis, pediatric vasculitis, renal surveillance, risk stratification, urinalysis

Introduction And Background

Immunoglobulin A (IgA) vasculitis, formerly termed Henoch-Schönlein purpura, is an immune-mediated small-vessel vasculitis characterized by IgA-containing immune-complex deposition. It is the most common systemic vasculitis of childhood, although its incidence varies across geographical regions and populations. Its characteristic manifestations include non-thrombocytopenic palpable purpura, arthralgia or arthritis, gastrointestinal symptoms, and renal involvement. Although the illness is usually self-limiting, recurrence and organ-specific complications can cause substantial morbidity [1,2].

Renal involvement is the principal determinant of long-term prognosis and ranges from isolated microscopic hematuria or mild proteinuria to nephritic or nephrotic syndrome, hypertension, and impaired kidney function. It may be clinically silent, making urinalysis and blood-pressure assessment essential even when presenting symptoms are predominantly cutaneous or gastrointestinal [3]. Pediatric cohort evidence demonstrates variation in renal severity, management, and outcomes, underscoring the need to distinguish minor urinary abnormalities from clinically significant nephritis [4]. An international cohort of children and adults with biopsy-confirmed IgA vasculitis nephritis further demonstrated the prognostic importance of clinical and histological features [5]. Updated pediatric guidance recommends considering kidney biopsy for nephrotic-range proteinuria, reduced kidney function, acute nephritic syndrome, or persistent proteinuria, highlighting the importance of identifying sustained or severe abnormalities [6].

Renal surveillance aims to detect new abnormalities and establish whether they resolve or persist. Published clinical reviews recommend follow-up for at least six months, with some approaches extending monitoring to 12 months despite normal initial urinalysis and blood-pressure measurements [3]. Consensus

recommendations describe more frequent testing early in the disease course, followed by progressively longer intervals between assessments [6]. Nevertheless, the optimal surveillance schedule remains uncertain. The principal concern is nephritis developing after initially or serially normal renal assessments. However, abnormalities first identified late may represent either genuinely delayed onset or delayed detection due to intermittent testing; these cannot be distinguished reliably without documented preceding assessments. Moreover, the timing of detection alone cannot establish whether prolonged surveillance improves patient outcomes.

This systematic review therefore primarily examined the timing of renal involvement in childhood IgA vasculitis, particularly the residual risk after initially or serially normal assessments. Its analytical framework distinguished cumulative detection proportions from conditional risk among children remaining renal-normal at successive time points and interpreted delayed findings according to preceding assessments and surveillance schedules. Severity and predictors were secondary dimensions used to assess the clinical significance of delayed abnormalities and identify potentially higher-risk children. The review explored whether declining residual risk, considered alongside the severity of subsequent events, supports cautious, risk-stratified reduction in surveillance intensity. It did not seek to establish the comparative effectiveness of monitoring schedules or derive a validated stopping rule.

Review

Materials and methods

Review Design and Reporting Framework

This systematic review evaluated the timing, clinical significance, and predictors of incident renal involvement in childhood IgA vasculitis. Reporting followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement, with study identification, screening, eligibility assessment, and inclusion documented in a PRISMA flow diagram [7]. A protocol specifying the research question, eligibility criteria, outcomes, and appraisal methods was developed before formal screening but was not prospectively registered. The absence of prospective registration limits independent verification of prespecification. Eligibility criteria, selection procedures, data extraction, appraisal, and synthesis methods are described below; adherence to PRISMA concerns reporting and does not itself establish methodological quality.

Research Question and PICO Framework

The research question followed an adapted population, exposure, comparator, and outcome framework. The population comprised children and adolescents younger than 18 years with IgA vasculitis, formerly termed Henoch-Schönlein purpura. The exposure of interest was elapsed time from disease onset, interpreted alongside the frequency and results of renal surveillance using urinalysis, urine protein measurement, blood-pressure assessment, or kidney function testing. Timing was interpreted according to each study's reported reference point, distinguishing disease onset from diagnosis where possible. Surveillance schedules were treated as study-level characteristics affecting detection rather than as a standardized exposure.

Comparisons included children with normal versus abnormal renal findings at presentation and those with early versus delayed renal involvement. The primary outcome was the timing of first detected renal involvement. Conditional risk of subsequent nephritis after previously normal assessments was evaluated where reported or estimable from an identifiable renal-normal population with subsequent follow-up; cumulative detection proportions were not treated as conditional-risk estimates. The first abnormal urine test was distinguished from confirmed clinically significant nephritis where reports provided sufficient information. When preceding assessments or confirmatory testing were inadequately documented, the reported timing was interpreted as detection rather than established biological onset.

Secondary outcomes included predictors of renal involvement, persistence or resolution of urinary abnormalities, clinically significant nephritis, nephrology referral, kidney biopsy, immunosuppressive treatment, and long-term renal outcomes.

Information Sources and Search Strategy

MEDLINE through PubMed, Embase, Scopus, Web of Science Core Collection, and the Cochrane Central Register of Controlled Trials (CENTRAL) were searched from inception to 1 September 2026 without language restrictions. Searches combined four concept groups using AND: IgA vasculitis, pediatric populations, renal involvement, and timing or prediction. Synonyms within each group were combined using OR. Relevant Medical Subject Headings (MeSH) and Emtree terms were incorporated alongside free-text terms, with syntax adapted for each database. Database-specific search terms, Boolean operators, controlled vocabulary, field tags, and available information on search restrictions are presented in the Appendix. Reference lists of eligible studies and relevant reviews were screened manually, and forward citation searching was performed to identify additional reports. The dates of supplementary searches and the platform used for forward citation searching were not documented in the available search records.

Eligibility Criteria

Original studies were eligible if they enrolled children or adolescents with clinically diagnosed IgA vasculitis and reported the onset, detection, or predictors of renal involvement. Eligible designs included prospective and retrospective cohorts, longitudinal observational studies, inception cohorts, surveillance-pathway evaluations, and randomized trials providing usable natural-history or surveillance data from participant follow-up. Studies had to report at least one of the following: the timing of renal involvement, the number or proportion of cases detected at defined intervals, nephritis after an initially normal renal assessment, or clinical or laboratory predictors of subsequent renal involvement. Studies enrolling children with renal abnormalities at presentation were eligible when baseline and follow-up findings could be distinguished or the timing distribution of renal involvement was reported. A planned follow-up of at least six months, or sufficient information to establish the timing of renal involvement within the first six months, was required.

Studies were excluded if they enrolled only adults, combined adult and pediatric populations without separately extractable pediatric data, or included only children with established IgA vasculitis nephritis without an observable population at risk of incident renal involvement. Case reports, very small case series, conference abstracts with insufficient outcome data, reviews, guidelines, editorials, and laboratory studies were excluded from the primary evidence set. Studies focused exclusively on renal histopathology, treatment response, or long-term outcomes in biopsy-confirmed nephritis were also excluded unless they provided relevant onset data. For overlapping cohorts, the most complete report was prioritized unless additional publications contributed non-duplicated outcomes.

Study Selection

Retrieved records were imported into reference-management software, and duplicates were removed. Two reviewers independently screened titles and abstracts against the predefined eligibility criteria and assessed potentially relevant reports in full. Disagreements were resolved through discussion or consultation with a third reviewer. Reasons for exclusion were recorded at the full-text stage.

Data Extraction and Outcome Classification

A standardized form captured authorship, publication year, country, clinical setting, study design, sample size, age distribution, diagnostic criteria, surveillance schedule, and follow-up duration and completeness. Two reviewers independently extracted renal status at presentation, incident abnormalities, time to renal involvement, nephritis definitions, clinical severity, persistence or resolution, and reported predictors with corresponding effect estimates, confidence intervals, and p-values. Discrepancies were resolved by consulting the original publication.

Renal findings were extracted using each study's definitions and additionally classified as minor urinary abnormalities or clinically significant renal involvement. Minor abnormalities included isolated microscopic hematuria or transient low-grade dipstick proteinuria without quantitative confirmation or other evidence of kidney disease. Clinically significant renal involvement included persistent or quantitatively confirmed proteinuria, nephritic or nephrotic syndrome, hypertension attributable to renal disease, impaired kidney function, nephrology referral, kidney biopsy, or immunosuppressive treatment. Where data permitted, timing was recorded at diagnosis, within the first month, between one and three months, between three and six months, and after six months. Delayed events were interpreted in relation to preceding renal findings and surveillance schedules rather than a universal time threshold.

Risk-of-Bias Assessment

Two reviewers independently assessed risk of bias using the Joanna Briggs Institute Critical Appraisal Checklist for Cohort Studies [8]. This tool was selected because the outcomes of interest were derived from longitudinal follow-up, including data originating from randomized trials. Assessment covered population selection, ascertainment of exposure and renal outcomes, identification and control of confounding, adequacy and completeness of follow-up, and appropriateness of statistical analysis. Overall judgments were classified as low, moderate, or high risk of bias based on the number and clinical importance of identified concerns rather than a numerical score. Disagreements were resolved by consensus.

Data Synthesis

Heterogeneity in renal outcome definitions, surveillance schedules, follow-up duration, baseline renal status, and statistical reporting precluded meaningful meta-analysis. Findings were therefore synthesized narratively in accordance with Synthesis Without Meta-analysis reporting guidance. Studies were compared by the timing of renal involvement, the proportion of children remaining renal-normal at successive time points, the severity of delayed abnormalities, and the consistency of reported predictors. Particular attention was given to distinguishing cumulative incidence from the conditional risk of nephritis after previously normal assessments. Predictors were considered more credible when supported by multivariable analyses and replicated across independent cohorts. Publication-bias testing was not performed because

only eight heterogeneous studies were included and no common effect estimate was pooled.

Ethical Considerations

Ethical approval and individual patient consent were not required because the review used previously published data and involved no new collection of patient-level information.

Results

Study Selection

The study selection process is presented in Figure *1*. Database searches identified 401 records: 96 from MEDLINE through PubMed, 113 from Embase, 82 from Scopus, 71 from Web of Science Core Collection, and 39 from CENTRAL. After 32 duplicates were removed, 369 records underwent title and abstract screening, and 201 records were excluded. Of the 168 reports sought for retrieval, 19 could not be obtained, leaving 149 reports for full-text assessment. Of these, 141 were excluded because of ineligible populations (n = 22), established nephritis without an at-risk population (n = 31), case-report or small case-series designs (n = 21), insufficient conference data (n = 12), review or guidance-based publications (n = 20), laboratory study designs (n = 8), absence of relevant nephritis-onset data (n = 22), or overlapping cohorts (n = 5). Eight studies met the eligibility criteria and were included.

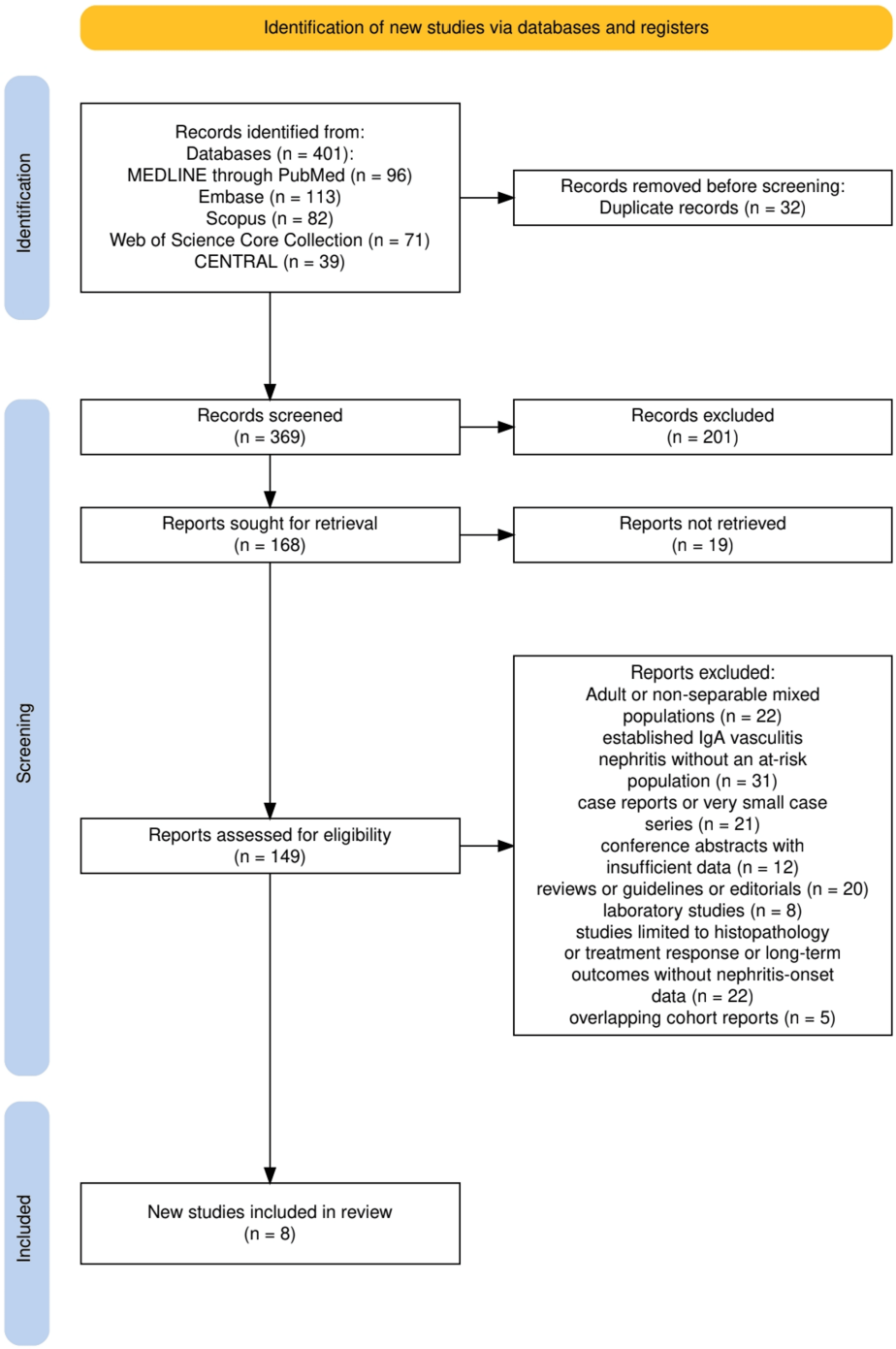


FIGURE 1: PRISMA 2020 flow diagram of study identification, screening, and inclusion.

PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; MEDLINE, Medical Literature Analysis and Retrieval System Online; CENTRAL, Cochrane Central Register of Controlled Trials; IgA, immunoglobulin A; n, number.

Characteristics of the Included Studies

The eight included studies comprised 1,208 children from Finland, Singapore, the United Kingdom, Italy, Turkey, and Thailand. Designs included prospective and retrospective cohorts and a surveillance-pathway evaluation. The total sample represents overall enrollment rather than the number of initially renal-normal children remaining under observation at each surveillance landmark. Monitoring schedules, renal outcome definitions, clinical settings, and follow-up duration varied substantially, limiting direct comparisons. Renal involvement was generally detected early, although several studies reported delayed abnormalities; where

surveillance schedules were unspecified, detection timing could not reliably establish biological onset. Table *1* presents study-specific outcome definitions alongside surveillance approaches, timing findings, and reported predictors.

Study	Design; setting	Population	Renal surveillance/outcome	Follow-up	Landmark findings	Predictors/statistical findings
Jauhola et al., 2010, Finland [9]	Prospective pediatric cohort	223 children; 102 (46%) developed HSN	Five outpatient visits plus home urine dipstick monitoring; HSN defined by hematuria and/or proteinuria	6 months	Mean onset: 14 days; majority occurred within 1 month; residual risk after two renal-normal months was 2%	Age >8 years: OR 2.7 (95% CI 1.4–5.1); abdominal pain: OR 2.1 (1.1–3.7); recurrent HSP: OR 3.1 (1.5–6.3)
Wang et al., 2019, Singapore [10]	Single-center inception cohort	238 children; 43 had abnormal UA at diagnosis, and 46 developed abnormalities during follow-up	Monthly UA for six months, followed by six three-monthly assessments; separated minimal urinary abnormalities from renal impairment	Median 20.6 months (IQR 11.3–24.4)	Abnormal UA developed in 89/238 (37.4%); 91% occurred within six months; renal impairment occurred in 17/238 (7.1%)	Older age predicted renal involvement (P<0.001); initially normal UA was associated with earlier resolution (P=0.008); prednisolone did not affect onset
Watson et al., 2012, UK [11]	Retrospective evaluation of a nurse-led surveillance pathway	102 children; 53% had normal UA at diagnosis; none had severe nephritis or impaired renal function initially	UA and BP at days 7 and 14 and months 1, 3, 6 and 12; intensified monitoring when proteinuria developed	Median 12 months	Thirteen developed proteinuria after day 7. Abnormalities appeared up to day 168, but every first abnormality after day 28 was transient isolated 1+ proteinuria with normal UACR and outcome	Normal day-7 UA predicted a normal renal outcome: NPV 97% (95% CI 90–99%); referred children were older: 12.3 vs 6.0 years (P<0.01)
Carucci et al., 2022, Italy [12]	Retrospective single-center cohort	132 children; 65 (49%) developed HSPN	Urinalysis screening; renal involvement predominantly hematuria with or without proteinuria; testing schedule not standardized	Median 1,220 days (range 425–5,300)	Renal involvement detected within 30 days in 72% and within six months in 91%; 6/65 cases (9%) were diagnosed after six months	Increasing age: adjusted OR 1.14 per year (95% CI 1.02–1.29); abdominal pain: OR 2.53 (1.20–5.32)
Yazılıtaş et al., 2022, Turkey [13]	Prospective single-center observational study	178 children; 24 (13.5%) developed renal involvement	Serial urine microscopy; first-month UA evaluated for predicting hematuria/proteinuria at month 6	6 months	Among children with abnormal UA at six months, 85.7% had already demonstrated abnormalities at the first-month assessment	Age ≥8 years (P=0.005), season of onset (P=0.025), serum creatinine (P=0.016) and abnormal first-month UA (P=0.005) were independent predictors
Williams et al., 2025, UK [14]	Single-center longitudinal cohort	First 100 children; 23 developed nephritis	Serial clinical and urine assessments; baseline dipstick evaluated for hematuria/proteinuria	Most uncomplicated cases discharged at six months; extended nephrology follow-up when indicated	Mean onset: 25.5±22.9 days. Excluding one atypical case, 68% occurred within one month, 91% within two months, 96% within three months and all within four months; one case occurred at 522 days	Older age: OR 1.24 (95% CI 1.09–1.42); GI involvement: OR 3.43 (1.16–10.45); positive baseline dipstick: OR 20.03 (2.66–483.6); negative dipstick predicted absence of nephritis in 98.2%
Demir et al., 2021, Turkey [15]	Retrospective single-center cohort	188 children; 23 had renal involvement initially and 42/165 initially renal-normal children developed it later	Renal involvement included hematuria, RBC casts, proteinuria, hypertension or renal insufficiency; testing schedule not specified	Median 18.1 months (range 6–48)	Of 42 incident cases, 21 (50%) occurred within 1 month, 19 (45.2%) during months 1–3 and 2 (4.8%) during months 4–6; none occurred after six months	Age >10 years was associated with renal involvement in unadjusted analysis (P=0.026); no independent predictor remained significant; ESR was borderline: OR 4.13 (95% CI 0.91–11.54; P=0.055)
Pabunruang et al., 2002, Thailand	Observational single-center pediatric	47 children; 22 (46.8%) developed renal	Sequential urinary examinations; exact testing schedule and	Mean 2.6 years (range 1–5)	Renal involvement detected within 2 months in 16/22 cases (72.7%); 6/22 (27.3%) were detected between 2 and 6 months; none	No significant predictors of renal involvement were identified

[16]	cohort	involvement	renal criteria not reported	developed end-stage kidney disease

TABLE 1: Characteristics of included studies, renal surveillance approaches, and timing and predictors of renal involvement.

BP, blood pressure; CI, confidence interval; ESR, erythrocyte sedimentation rate; GI, gastrointestinal; HSN, Henoch–Schönlein nephritis; HSP, Henoch–Schönlein purpura; HSPN, Henoch–Schönlein purpura nephritis; IQR, interquartile range; NPV, negative predictive value; OR, odds ratio; RBC, red blood cell; UA, urinalysis; UACR, urinary albumin-to-creatinine ratio; UK, United Kingdom; vs, versus. P denotes the p-value.

Quality Assessment

Risk-of-bias assessment classified one study as low risk, four as moderate risk, and three as high risk. The principal concerns included selection bias, incomplete or insufficiently documented follow-up, inconsistent renal outcome definitions, unspecified surveillance schedules, and limited adjustment for confounding. Small numbers of renal events also reduced the precision of predictor estimates and raised concerns about model overfitting. Table *2* summarizes the domain-level judgments, overall risk-of-bias classifications, and main methodological concerns for each study.

Study	Selection	Renal outcome measurement	Follow-up	Confounding/statistics	Overall risk	Main concern
Jauhola et al., 2010, Finland [9]	Low	Low	Some concerns	Low	Moderate	Prospective standardized monitoring, but limited to six months and completeness of follow-up was insufficiently detailed
Wang et al., 2019, Singapore [10]	Low	Low	Low	Some concerns	Low	Strong inception cohort with structured monitoring; limited adjustment for potential confounders
Watson et al., 2012, UK [11]	High	Low	Some concerns	High	High	Retrospective design; pathway data unavailable for 61/165 potentially eligible children; referral-based outcome
Carucci et al., 2022, Italy [12]	Some concerns	Some concerns	Low	Some concerns	Moderate	Retrospective tertiary-centre cohort with no standardized urinalysis schedule; late detection may represent delayed testing
Yazılıtaş et al., 2022, Turkey [13]	Low	Low	Some concerns	Some concerns	Moderate	Only 24 renal events, creating possible model overfitting; six-month follow-up
Williams et al., 2025, UK [14]	Some concerns	Low	High	High	High	Tertiary-referral selection, incomplete follow-up and only 23 nephritis events; very imprecise predictor estimates
Demir et al., 2021, Turkey [15]	Some concerns	Some concerns	Low	Some concerns	Moderate	Retrospective data, exclusion of children followed for <6 months and unspecified surveillance frequency
Pabunruang et al., 2002, Thailand [16]	Some concerns	High	Some concerns	High	High	Small historical cohort; renal definitions and testing schedule unclear; incomplete long-term renal-outcome data

TABLE 2: Risk-of-bias assessment and main methodological concerns in the included studies.

Discussion

Principal Findings and Central Interpretation

This review suggests that renal involvement in childhood IgA vasculitis occurs predominantly within the first three months after disease onset, with progressively fewer cases identified thereafter [9,14,15]. A central distinction is between detecting any urinary abnormality and identifying clinically significant nephritis: isolated hematuria or transient low-grade proteinuria may have different prognostic implications from persistent proteinuria, hypertension, impaired kidney function, or nephritic and nephrotic syndromes [11]. Carucci et al. documented renal involvement detected after six months [12], while Williams et al. reported an exceptionally late presentation at 522 days [14]. However, the reports did not consistently establish whether preceding assessments had remained normal, limiting differentiation between genuinely delayed onset and delayed detection. Older age, gastrointestinal involvement, recurrent disease, and early urinary abnormalities were recurring risk indicators, although their definitions and effect estimates varied across studies [9,12-14]. Guidance from the International Pediatric Nephrology Association (IPNA) and Kidney Disease: Improving Global Outcomes (KDIGO) supports renal surveillance for at least six months [17,18]. Nevertheless, the findings suggest that surveillance intensity may warrant adjustment according to time since onset and successive normal assessments. This interpretation supports evaluation of an individualized approach but does not establish the safety of stopping surveillance early.

How Renal Risk Changes Over Time

Interpretation requires distinguishing the cumulative proportion of nephritis cases detected by a given time from the conditional risk of future nephritis among children whose assessments have remained normal. Renal involvement was frequently present at diagnosis or emerged during the first month, with fewer incident cases during subsequent months [9,15]. Jauhola et al. provided the clearest conditional estimate, reporting a residual nephritis risk of 2% after two months without renal involvement [9]. Demir et al. found that 40 of 42 incident cases occurred within three months and none after six months [15]. Excluding one atypical presentation at 522 days, Williams et al. reported that 91% of nephritis cases occurred within two months and 96% within three months [14].

New abnormalities between three and six months were uncommon in several cohorts, although their timing and clinical significance varied [11,14,15]. Watson et al. found that abnormalities first detected after day 28 consisted of transient isolated proteinuria, with normal quantitative testing and favorable outcomes [11]. Carucci et al. reported cases detected after six months, but the absence of a standardized testing schedule limited certainty regarding their true onset [12]. Although Wang et al. and Carucci et al. each reported that approximately 91% of renal abnormalities were identified within six months [10,12], these cumulative timing estimates do not quantify the residual risk in children with serially normal urinalysis results. Estimating that risk requires the number of children remaining renal-normal and under observation at each surveillance time point.

Any Urinary Abnormality Versus Clinically Significant Nephritis

Definitions of renal involvement varied substantially, encompassing isolated microscopic hematuria, dipstick proteinuria, persistent quantified proteinuria, nephritic or nephrotic syndrome, hypertension, and impaired kidney function [9-15]. Studies also reported nephrology referral, biopsy, or immunosuppressive treatment as indicators of clinical consequence. These outcomes are not interchangeable, and referral or intervention may additionally reflect local practice.

Watson et al. illustrated this distinction: urinary abnormalities were detected up to day 168, but every first abnormality after day 28 consisted of transient isolated 1+ proteinuria with a normal urine albumin-to-creatinine ratio and a favorable subsequent outcome. Clinically important abnormalities prompting nephrology assessment generally emerged earlier [11]. National recommendations by Oni et al. similarly define severe nephritis according to the magnitude and persistence of proteinuria, acute kidney injury, or nephrotic syndrome [19].

The clinical value of prolonged surveillance therefore depends on whether it detects persistent or severe disease that alters management or prognosis. Minor abnormalities warrant confirmation and reassessment, but should be reported separately from clinically significant nephritis. Combining these outcomes may overstate the clinical importance of delayed findings and obscure the potential benefit of prolonged universal surveillance.

Interpreting Apparently Delayed Nephritis

Carucci et al. reported six of 65 nephritis cases diagnosed after six months [12], while Williams et al. described an atypical presentation at 522 days [14]. These findings demonstrate late detection but do not establish its incidence among children with consistently normal, regularly performed assessments. Apparent delayed onset may reflect genuine inflammation, recurrence, intermittent testing, or previously undocumented abnormalities. SHARE recommendations advise urinalysis and blood-pressure monitoring for six to twelve months [20], but this precaution does not demonstrate that extended surveillance benefits

every low-risk child. Future analyses should assess the influence of atypical cases and nonstandardized surveillance schedules and distinguish transient late abnormalities from persistent or clinically significant nephritis.

Toward Risk-Stratified Renal Surveillance

Older age, gastrointestinal involvement, elevated creatinine, early urinary abnormalities, and recurrence may identify children requiring closer surveillance [9,12-14,21]. Williams et al. reported that a negative baseline dipstick predicted absence of nephritis in 98.2% of children, although few events limited precision [14]. Jauhola et al. found nephritis in 63% of children with two risk factors and 87% with all three factors, comprising age over eight years, abdominal pain, and recurrence; however, these estimates describe overall occurrence rather than residual risk after normal assessments [9]. Chan et al. similarly associated older age, abdominal symptoms, persistent purpura, and relapse with renal involvement [21]. These findings support evaluating combined predictors, but heterogeneous definitions and limited validation preclude their use as a surveillance stopping rule. Future studies should develop dynamic predictive nomograms that update the estimated risk of subsequent clinically significant nephritis using information available at successive assessments, including elapsed time, serial urinary findings, blood pressure, kidney function, and recurrence. Candidate biomarkers could be incorporated if they demonstrate incremental predictive value beyond these routinely available measures. Models should distinguish the risk of incident nephritis among children remaining renal-normal from the risk of persistent disease or chronic kidney impairment after nephritis develops. Existing prediction-model research has substantial methodological limitations, reinforcing the need for prospective development, adequate event numbers, calibration assessment, and external validation [22,23]. The value of a dynamic nomogram would depend on whether its updated estimates improve surveillance decisions and outcomes, rather than discrimination alone.

Clinical Implications and a Proposed Surveillance Framework

The findings support evaluating surveillance intensity according to time since diagnosis and evolving risk. Monitoring should remain close during the first one to two months, when much renal involvement emerges [9,14,15]. Less frequent assessments could be evaluated after two to three months of consistently normal findings, while retaining a six-month assessment. Narchi reported that approximately 97% of urinary abnormalities appeared within six months and that permanent renal impairment was not observed after persistently normal urinalysis, although the evidence was heterogeneous [22]. Extended monitoring may warrant consideration for children with urinary abnormalities, recurrent or persistent disease, or other concerning features; established nephritis requires severity-based follow-up [17,20,21]. A future de-intensification algorithm should specify the documented normal assessments required before reducing monitoring frequency, how updated risk estimates would influence subsequent testing intervals, and which findings would trigger renewed intensive surveillance or specialist assessment. Such algorithms should be evaluated prospectively against usual surveillance, with missed or delayed clinically significant nephritis as a principal safety outcome and additional assessment of persistent proteinuria, kidney function, family burden, and costs. Any biomarker-based component would require validated thresholds and evidence that it improves decisions beyond conventional assessments. Families should receive clear advice about scheduled testing and symptoms requiring earlier reassessment [6,17]. Symptom resolution alone should not determine surveillance cessation, because renal involvement may be clinically silent. This proposed framework concerns individualized reductions in monitoring frequency and requires prospective validation before adoption.

Strengths and Limitations of the Evidence

The evidence was limited by predominantly single-centre cohorts, retrospective designs, and small numbers of incident nephritis events. Variation in surveillance schedules, outcome definitions, and follow-up completeness, together with inconsistent separation of baseline and incident abnormalities, limited comparisons and precluded quantitative synthesis. Few studies reported the number of children remaining renal-normal at successive time points, preventing reliable estimation of conditional risk. Selection, referral, detection, and attrition bias were additional concerns. At the review level, 19 reports could not be retrieved, introducing potential retrieval bias, and the absence of prospective protocol registration limits independent verification of prespecification. The eligibility criteria shaped the available evidence, while the additional classification of renal outcomes required interpretation across heterogeneous definitions; referral and treatment also reflected local practice. No formal certainty-of-evidence assessment was performed, and study-level risk-of-bias judgments do not establish certainty for individual conclusions. Liao et al. similarly identified 23 pediatric renal-risk models and judged all to have high risk of bias, highlighting inadequate validation and methodological weaknesses [23]. A strength of this review is its explicit distinction between cumulative detection and conditional risk, although insufficient landmark data prevented this framework from yielding a quantitative surveillance stopping rule.

Research Agenda: Early Biomarkers, Dynamic Prediction, and Subclinical Imaging

Prospective multicentre inception cohorts are needed to establish when renal surveillance can safely be

reduced or discontinued. Studies should document baseline renal status, standardize blood-pressure and quantitative urinary protein assessments, and report the number of renal-normal children under observation at predefined time points. Outcomes should distinguish transient abnormalities from persistent proteinuria, nephritic or nephrotic syndrome, impaired kidney function, and specialist intervention. Survival and landmark analyses should estimate conditional risk after one, two, three, and six months of normal assessments, accounting for recurrence and treatment as time-varying factors. These priorities align with the evidence gaps described by Oni and Sampath [24].

An additional priority is identifying biomarkers that predict persistent renal disease before clinically apparent nephritis develops. Prospective studies should obtain serial samples at presentation and during the first four weeks to evaluate urinary kidney injury molecule-1 (uKIM-1), neutrophil gelatinase-associated lipocalin (uNGAL), and monocyte chemoattractant protein-1 (uMCP-1). This sampling window should be investigated rather than regarded as an established predictive interval. Studies must determine whether biomarker elevations precede conventional urinary abnormalities and predict chronicity, rather than merely identify existing injury or inflammation. Galactose-deficient IgA1 (Gd-IgA1) also warrants evaluation, with serum and urinary assays considered separately. Pillebout et al. identified higher serum Gd-IgA1 concentrations in children with nephritis at diagnosis, but this finding does not establish prediction of subsequent nephritis or chronic kidney impairment [25]. Urinary soluble C5b-9 and properdin should be investigated as candidate indicators of complement activation, with particular attention to whether their diagnostic information is independent of proteinuria and whether serial changes predict persistent disease. Diagnostic thresholds, assay reproducibility, sensitivity, specificity, and incremental value beyond conventional assessments require validation. Evidence of association with established disease should not be interpreted as proof of prediction before glomerular injury.

Biomarker trajectories could subsequently be integrated with clinical features into dynamic predictive nomograms that update risk as normal assessments accumulate or new abnormalities emerge. Model development should distinguish incident nephritis in initially renal-normal children from chronicity among those with established renal involvement. Given the methodological limitations of existing prediction models [23], prospective development, appropriate handling of missing data, calibration assessment, and external validation are essential. De-intensification algorithms should then be evaluated against usual surveillance, using predefined thresholds for reducing monitoring frequency and explicit triggers for renewed testing or specialist review. Their clinical usefulness should be assessed through missed clinically significant nephritis, subsequent kidney outcomes, family burden, and cost-effectiveness.

Non-invasive imaging deserves investigation as a complementary approach to detecting subclinical parenchymal remodeling after cutaneous, gastrointestinal, and joint symptoms have resolved. Renal shear-wave elastography and functional MRI could be evaluated longitudinally alongside urinary biomarkers and conventional renal assessments. However, their ability to identify early fibrosis cannot be assumed: a pediatric chronic kidney disease study found that shear-wave elastography had limited usefulness for detecting early fibrosis or chronicity [26]. IgAV-specific studies should establish measurement reproducibility, pediatric reference ranges, and relationships with subsequent renal outcomes, while distinguishing fibrosis from inflammation, altered perfusion, or other tissue changes. Histological comparisons should be restricted to children undergoing clinically indicated biopsy. Imaging should therefore remain an investigational adjunct until its additional clinical value is demonstrated. Serially normal findings provide reassurance, but neither emerging biomarkers nor imaging currently establishes a universally safe early stopping point.

Conclusions

Most renal involvement in childhood IgA vasculitis is detected within the first one to three months. However, heterogeneous surveillance schedules, incomplete documentation of preceding normal assessments, and insufficient landmark denominators prevented reliable estimation of conditional risk after serially normal findings. The included studies did not directly compare monitoring schedules or establish the safety of reduced surveillance. The findings therefore support prospective evaluation of individualized de-intensification, meaning reduced monitoring frequency rather than complete cessation. A proposed framework would concentrate surveillance early and retain assessment at six months, consistent with existing guidance, while considering extended follow-up for children with urinary abnormalities or recurrent or persistent disease. This framework requires prospective validation, including assessment of missed clinically significant nephritis and long-term renal outcomes, before it can be regarded as an established clinical recommendation.

Appendices

Database or source	Search terms or identification method	Coverage and restrictions
MEDLINE through PubMed	("IgA Vasculitis"[Mesh] OR "IgA vasculitis"[tiab] OR "immunoglobulin A vasculitis"[tiab] OR "Henoch-Schonlein purpura"[tiab] OR "Henoch-Schönlein purpura"[tiab] OR IgAV[tiab] OR HSP[tiab]) AND ("Child"[Mesh] OR "Adolescent"[Mesh] OR child*[tiab] OR pediatric*[tiab] OR paediatric*[tiab] OR adolescen*[tiab]) AND (renal[tiab] OR kidney[tiab] OR nephrit*[tiab] OR hematuria[tiab] OR haematuria[tiab] OR proteinuria[tiab] OR albuminuria[tiab] OR urinalysis[tiab]) AND (onset[tiab] OR timing[tiab] OR delayed[tiab] OR surveillance[tiab] OR monitor*[tiab] OR "follow-up"[tiab] OR longitudinal[tiab] OR "natural history"[tiab] OR risk[tiab] OR predict*[tiab] OR recurren*[tiab])	Inception to 1 September 2026; no language restrictions. Other interface filters were not specified in the manuscript.
Embase through Embase.com	('henoch schonlein purpura'/exp OR ('IgA vasculitis' OR 'immunoglobulin A vasculitis' OR 'Henoch-Schonlein purpura' OR 'Henoch-Schönlein purpura' OR IgAV OR HSP):ti,ab,kw) AND ('child'/exp OR 'adolescent'/exp OR (child* OR pediatric* OR paediatric* OR adolescen*):ti,ab,kw) AND (renal OR kidney OR nephrit* OR hematuria OR haematuria OR proteinuria OR albuminuria OR urinalysis):ti,ab,kw AND (onset OR timing OR delayed OR surveillance OR monitor* OR 'follow-up' OR longitudinal OR 'natural history' OR risk OR predict* OR recurren*):ti,ab,kw	Inception to 1 September 2026; no language restrictions. Other interface filters were not specified in the manuscript.
Scopus	TITLE-ABS-KEY("IgA vasculitis" OR "immunoglobulin A vasculitis" OR "Henoch-Schonlein purpura" OR "Henoch-Schönlein purpura" OR IgAV OR HSP) AND TITLE-ABS-KEY(child* OR pediatric* OR paediatric* OR adolescen*) AND TITLE-ABS-KEY(renal OR kidney OR nephrit* OR hematuria OR haematuria OR proteinuria OR albuminuria OR urinalysis) AND TITLE-ABS-KEY(onset OR timing OR delayed OR surveillance OR monitor* OR "follow-up" OR longitudinal OR "natural history" OR risk OR predict* OR recurren*)	Inception to 1 September 2026; no language restrictions. Other interface filters were not specified in the manuscript.
Web of Science Core Collection	TS=("IgA vasculitis" OR "immunoglobulin A vasculitis" OR "Henoch-Schonlein purpura" OR "Henoch-Schönlein purpura" OR IgAV OR HSP) AND TS=(child* OR pediatric* OR paediatric* OR adolescen*) AND TS=(renal OR kidney OR nephrit* OR hematuria OR haematuria OR proteinuria OR albuminuria OR urinalysis) AND TS=(onset OR timing OR delayed OR surveillance OR monitor* OR "follow-up" OR longitudinal OR "natural history" OR risk OR predict* OR recurren*)	Inception to 1 September 2026; no language restrictions. Other interface filters were not specified in the manuscript.
CENTRAL through the Cochrane Library Search Manager	#1: MeSH descriptor: [IgA Vasculitis] explode all trees #2: ("IgA vasculitis" OR "immunoglobulin A vasculitis" OR "Henoch-Schonlein purpura" OR "Henoch-Schönlein purpura" OR IgAV OR HSP):ti,ab,kw #3: (child* OR pediatric* OR paediatric* OR adolescen*):ti,ab,kw #4: (renal OR kidney OR nephrit* OR hematuria OR haematuria OR proteinuria OR albuminuria OR urinalysis):ti,ab,kw #5: (onset OR timing OR delayed OR surveillance OR monitor* OR "follow-up" OR longitudinal OR "natural history" OR risk OR predict* OR recurren*):ti,ab,kw #6: (#1 OR #2) AND #3 AND #4 AND #5	Inception to 1 September 2026; no language restrictions. Results restricted to Trials (CENTRAL). Other interface filters were not specified in the manuscript.
Reference-list screening	Manual screening of reference lists of eligible studies and relevant reviews to identify additional potentially eligible reports.	Screening date not specified in the manuscript.
Forward citation searching	Identification and screening of reports citing eligible studies.	Search date and citation-searching platform not specified in the manuscript.

TABLE 3: Database-specific search terms, search coverage, and supplementary identification methods.

CENTRAL, Cochrane Central Register of Controlled Trials; MeSH, Medical Subject Headings; tiab, title/abstract; ti,ab,kw, title/abstract/keywords; TITLE-ABS-KEY, title/abstract/keywords; TS, topic; /exp, explosion of an Emtree term to include narrower terms. The asterisk (*) denotes truncation.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

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