The IgA Vasculitis Study: the evolution of a cross-sectional cohort into a trial-ready cohort

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Statements and declarations

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Abstract

Objectives: The aim of this report is to describe a single centre cohort study and its evolutionary stages into a trial-ready cohort with the vision of stopping kidney failure secondary to IgAV.

Methods: The IgA Vasculitis Study was established as a single-centre, cross-sectional cohort study recruiting children with a clinical diagnosis of IgAV and has evolved into a trial-ready framework. Sociodemographic and clinical data, as well as corresponding biosamples, were collected longitudinally and the natural history of the first 100 recruits is provided.

Results: The IgA Vasculitis Study commenced in June 2019. The first 100 children recruited to the study had a mean age of 7.3 ± 3.7 years, male:female ratio 1.5:1. At presentation, all children had a lower limb-predominant rash, 76% had musculoskeletal involvement, 43% gastrointestinal involvement, and 23% met the definition of nephritis. Most children (54%) were discharged after six months, however 17% required paediatric nephrology input. The mean timing of onset for nephritis was 25.5 ± 22.9 days following disease presentation (range 0.0 – 101 days). Fourteen children with IgAV-N received immunosuppression. Children with an older age, residing in more affluent areas, had GI involvement, or had a positive urine dipstick (for proteinuria and/or haematuria) at presentation had a greater odds ratio for developing nephritis. Children with IgAV-N had statistically significantly more hospital visits and unplanned hospital admissions ($p<0.001$).

Conclusion: Nephritis remains a serious consequence of IgAV with little evidence to guide management, and this report outlines an exemplar study to advance the field towards better interventions.

Key words: Henoch-Schoenlein purpura, paediatric, children, kidney, nephritis

Key messages:

1. Clinical trials are urgently needed for patients with IgAV at highest risk of developing nephritis.
2. Proteinuria at presentation may be a good predictor of nephritis in children with IgAV.
3. Children with nephritis or atypical disease courses have a higher burden of disease which should be addressed.

Introduction

Immunoglobulin A (IgA) vasculitis (IgAV, formerly known as Henoch-Schoenlein purpura, HSP) is the most common paediatric vasculitis, with an estimated annual incidence of 3-27 cases per 100,000 children (1-3), and it can present at any age. It has a peak age at presentation between 4-6 years, with up to 90% of childhood-onset cases presenting before ten years of age (4, 5). Adult-onset disease is ultra-rare with an incidence of ~0.1-3 per 100,000 adults (6). IgAV appears to have some geospatial clustering around the Mediterranean and the western continental regions (7) with some ethnic disparities, including a higher incidence in Caucasian and Asian ethnic groups compared to children of Black ethnicity (4, 8).

IgAV typically presents with a characteristic lower limb-predominant non-blanching purpuric rash, less commonly affecting the upper limbs, torso, and, rarely, the face (9). In classification tools, the rash is a mandatory criterion together with one of four other criteria: abdominal pain, histopathological evidence of IgA, arthritis or arthralgia, or kidney involvement (10). IgAV involves the musculoskeletal (MSK) system in up to 90% of patients, gastrointestinal (GI) system in up to 70%, and/or kidney systems in around 30% of patients with heterogeneity in terms of severity within each of the presenting systems (11). Joint pains and GI symptoms mostly contribute to the significant short term morbidity, however they rarely manifest as serious long-term complications (12). An under-recognised consequence is persisting or recurrent disease, seen in 2.6-66% of children (13). Around 20-30% of children experience kidney inflammation, termed IgAV nephritis (IgAV-N), and there is a consistently reported risk of 1-2% progressing to irreversible kidney failure (14, 15). This risk rises significantly in selected cohorts presenting with more severe clinical or histological features of nephritis. In adult-onset IgAV, limited evidence suggest a far greater risk of chronic kidney disease (CKD) with reports of 23% of elderly patients developing kidney failure (5). Reducing the risk of CKD is therefore a priority in this condition and following diagnosis, it is recommended that all children complete six months of kidney monitoring with periodic urinalysis (16-18). Advances to risk stratify patients are yet to be made however a normal urinalysis at seven days post-diagnosis has been shown to be an excellent predictor of normal kidney outcomes implying that stratification may be achievable (19). Even in children who develop significant proteinuria, many will have a complete recovery and outcomes for most children are excellent, with 94% of children disease-free two years post-diagnosis (19-21).

Several cohort studies have described the natural history of IgAV nephritis, including a very large multicentre European retrospective analysis of 1148 children (22), however, there continue to be barriers in generating high quality evidence with the Cochrane collaboration repeatedly concluding

that there remains a lack of high quality randomised controlled trials (RCTs) to prevent or treat kidney disease in people with IgAV and no evidence to suggest any one immunosuppressive agent is superior when compared to others (23). There is an urgent need to progress the field to reduce the incidence of kidney failure related to this condition.

The aim of this work is to describe the clinical features, disease course, and outcomes of the first 100 children recruited to a study dedicated to IgAV and to describe the evolution of a single-centre cohort study into an age-inclusive, trial-ready framework as an incremental move towards evidence generation.

Patients and methods

The IgA Vasculitis Study

The IgA Vasculitis Study was established with two main aims: to advance the discovery of scientific targets for treatment, and to understand the natural history of the disease to guide optimal interventional opportunities. It began as a single-centre, prospective, observational cohort study recruiting participants attending a large tertiary children's hospital: Alder Hey Children's NHS Foundation Trust, Liverpool (UK). The aim of the study was to collect baseline clinical data with a corresponding biosample resource. Following protocol amendments, it evolved into a longitudinal study to capture the first 12 months of the disease course with additional amendments to extend the bioresource to include access to any surplus biopsy tissue taken for clinical purposes. The study subsequently received funding to extend the resource to permit national recruitment with the lead site supporting remote data collection and biosampling to form a trial-ready population through a 'consent to re-contact' cohort.

Patient cohort

Children with a clinical diagnosis of IgAV aged ≤18 years were eligible to be recruited to the IgA Vasculitis Study. For the purposes of this report, the first 100 patients recruited to the longitudinal aspect of IgA Vasculitis Study are described.

Data collection

Data were collected prospectively and longitudinally and enriched where necessary. This included comprehensive demographic data at disease onset, as well as symptom onset, date of diagnosis, date of first presentation, and possible disease triggers. Indices of multiple deprivation (IMD) were used to describe socioeconomic status. English postcodes were determined using the 2019 version of the

postcode lookup tool (24) and a similar tool was used for Welsh postcodes (25). Each postcode corresponds to a decile, with the first decile being most deprived and tenth being most affluent. Data were also collected on clinical observations (blood pressure (BP) and temperature), laboratory results, urinalysis, and treatment. The number of accident and emergency (A&E) centre visits and hospital admissions relating to the diagnosis of IgAV were also recorded. Inpatient hospital admissions solely for the purpose of conducting investigations such as a kidney biopsy were excluded. Data were collected at time intervals aligned with the previously published monitoring schedule, 'The Alder Hey HSP Pathway' (19).

Definitions

In line with the schedule, patients were discharged if there were no abnormalities on urinalysis six months after diagnosis. Patients were considered lost to follow-up if they "did not attend" (DNA) three consecutive appointments. The child's last review was defined as the most recent review prior to discharge, or their most recent clinic review as of June 2023. Multisystem involvement at presentation was defined as patients who presented with clinical features in ≥2 organ systems and children were considered febrile if they had a recorded temperature ≥38°C. A vasculitic rash extending beyond the lower limbs was defined as extensive whilst a severe rash was defined as a rash that was also accompanied by necrotic, bullous and/or ulcerative lesions. At the time of recruitment to the cohort, there were no agreed, standardised definitions of recurrent or persisting disease, therefore they were defined if they had been coded as such by a paediatric rheumatologist or nephrologist. 'Atypical disease' here refers to either recurrent or persisting disease (13, 26). Urinary abnormalities were defined as a urine dipstick positive for either blood, protein, or both. IgAV-N was defined as a urine albumin:creatinine ratio (UACR) >30mg/mmol, aligned with international guidelines (17). Kidney histology was described using the International Study of Kidney Disease in Children (ISKDC) classification or Oxford MEST-C classification (27). IgAV-N was assumed absent in children lost to follow-up.

Statistical analysis

Statistical analyses were performed using GraphPad Prism Software Inc version 10.1.2 (GraphPad Software, San Diego, California, USA) and R version 4.3.2 (R Foundation for Statistical Computing, Vienna, Austria). Due to the relatively small cohort, it was assumed that the data were non-parametric. Two-tailed Mann Whitney U tests were performed on continuous data while two-sided Fisher's exact tests were performed on non-continuous data. Spatial mapping of deprivation was performed using the tmap package in R (28) and patient postcodes were geocoded using the Postcodesio R package

(29). Exploratory analysis was performed of the baseline characteristics associated with urinary abnormalities at six months and only children who completed six months follow-up were included. Odds ratios (OR) and confidence intervals (CI) were calculated using Fisher's exact test for binary categorical variables and univariate logistic regression for other variables. The association of any blood test findings and the clinical outcomes were explored through categorical variables (i.e., normal or abnormal based on the age-specific laboratory reference ranges used in our centre (30)). A *p-value* of <0.05 was considered statistically significant.

Ethical and regulatory approval

Patients included in this study were consented to the IgA Vasculitis Study which had full approval by the health research authority and Health and Care Research Wales (HCRW) (REC 17/NE/0390, protocol UoL001347, IRAS 236,599). Written informed consent and/or assent was obtained from the caregiver and/or patient.

Results

The evolution of the IgA Vasculitis Study is summarised in Figure 1. It commenced in June 2019 as a single centre cross sectional study, evolved into a longitudinal study in January 2021, incorporated wider tissue collection in February 2023, and received approval to become a trial-ready framework in October 2024. This trial-ready framework will optimise methods to capture patients from initial presentation with serial data and biosampling collection. To date, there have been 175 patients recruited to the study over the 5-year period (Figure 2).

Cohort characteristics

Data are presented for the first 100 recruits. Sixty children were male (male:female, 1.5:1), and mean age at diagnosis was 7.3 ± 3.7 years (range 1.0-17.0). Most children (85%) were Caucasian. Seasonal variation was observed, with peaks of incidence seen in the summer (n=33, 33%) and winter (n=30, 30%). Fifty-six (56%) children lived in the lowest IMD quintile, with 38% living in the lowest decile (Figure 3). The cohort was comparable to the local catchment population, where 63% reside in the lowest IMD quintile, and 49% in the lowest decile (31).

Table 1 summarises the presenting features of children in this cohort. All children presented with a lower-limb predominant rash. Seventy-six children reported either arthralgia or arthritis, with the ankle joints being the most frequently affected (n=45, 59%) followed by the knees (n=27, 36%). GI involvement was reported in 43% of patients, mostly manifesting as abdominal pain (n=38, 88%), and

one child presented with a GI haemorrhage. Multisystem involvement was present in 34 children. Preceding upper respiratory tracts infections were reported in 57% of children, gastroenteritis was present in 3%, scarlet fever in 1%, and bacterial tonsillitis in 1%. Other potential risk factors identified included recurrent bacterial tonsillitis (5%) and dental caries (2%). Atopy was documented in nine children (asthma, 5%; eczema, 3%; milk allergy, 1%).

The key clinical and laboratory results are summarised in Table 2. Two children (3%) had a UACR greater than 30 mg/mmCr meeting the definition of nephritis at presentation, and 11 (15%) were hypertensive. Of the children who did have blood tests performed, one (2%) child was anaemic, and 26% had a raised white cell count (WCC). No patients were thrombocytopenic. Most children had normal serum albumin (38.5 $\pm$ 3.8 g/L, range 28-48). The mean serum creatinine was also normal (mean 37.4 $\pm$ 11.3 μmol/L, range 20-88). One child (2%) had an elevated serum creatinine of 88 μmol/L corresponding to an estimated glomerular filtration rate of 46.5 ml/min/1.73m^2 at presentation. There were no available data at presentation for 24 (24%) patients. The clinical course of the cohort is presented in Figure 3.

In total, 23% (23/100) of children met the definition of IgAV-N over the course of the study with the mean age at disease presentation for this subgroup being 9.7 ± 3.1 years compared to 6.6 ± 3.5 in the children with no nephritis (p<0.001). Children with IgAV-N were more likely to reside in more affluent areas (mean IMD 5.4 vs 3.1, p=0.003), although the number of children living in affluent regions was small. Most children who developed nephritis did so during the monitoring period (3%) or had established nephritis prior to specialist referral from another centre (18%). The mean time of nephritis onset was 25.5 ± 22.9 days following disease presentation (range 0.0 – 101 days), excluding one child with an atypical, persisting disease course during which they had severe extra-renal manifestations for over a year, and developed nephritis 522 days after initial symptom development. Excluding this child, 15/22 (68%) children developed IgAV-N within one month following symptom onset, 20/22 (91%) children within two months, 21/22 (96%) within three months, and all (100%) within four months.

The mean UACR for those with nephritis was 543.2 ± 509.4 mg/mmol (range 79.0-2357.7 mg/mmol). One child developed nephrotic syndrome. According to the SHARE guideline definitions (17), 7% (7/100) met the definition of mild nephritis and did not require a kidney biopsy. The remaining children had moderate nephritis (16%; 16/100) and all had a kidney biopsy. Most children who had a biopsy (63%; 10/16) demonstrated ISKDC stage IIIb nephritis on the kidney histology, with histological stages II (6%; 1/16) and IIIa (13%; 2/16) seen in three patients. Two patients clinically evolved into a

phenotype of IgA nephropathy (IgAN) and both biopsies were M1E1S0T0-C0 as per the Oxford MEST-C classification (32, 33). One child had a kidney biopsy demonstrating C3 glomerulonephritis.

Management of nephritis

Of the 23 children with nephritis, six (26%) required no treatment and remission was achieved spontaneously. Three children received renin-angiotensin-aldosterone system (RAAS) blockade as monotherapy, and seven received a course of glucocorticoid therapy ± RAAS blockade. All other children (n=7) received at least two immunosuppressants with varying combinations of oral (n=7) or IV glucocorticoids (n=3), azathioprine (AZA; n=4), mycophenolate mofetil (MMF; n=3), and cyclophosphamide (CYP; n=1). Mean duration of follow-up for children with IgAV-N was 28.70 ± 21.97 months (range 2.40 - 79.90). At last review, 15 (65%) children were receiving no treatment, four (17%) were still receiving RAAS blockade, and four (17%) remained on at least one immunosuppressant.

Atypical disease

A recent report describing atypical IgAV, some of whom were also participants of this current cohort (13). In this current study, acknowledging that it is a specialist centre, eight children were diagnosed with atypical IgAV (recurrent, n=3; persisting, n=5), representing 8% of the total cohort. The male:female ratio was 1:1. Compared to the typical cases, these children were significantly older at diagnosis (11.1 ± 3.7 years vs. 7.0 ± 3.6 years, p=0.006) and required longer follow-up (25.1 ± 55.0 months vs. 11.3 ± 14.5 months, p<0.001). Three had concomitant IgAV-N whilst the remaining children suffered from recurrent or persisting extra-renal manifestations. One child received no treatment, one was treated with dapsone, one with hydroxychloroquine, two with MMF, and two were treated with AZA. Four children received glucocorticoids and the three children with atypical IgAV and concomitant nephritis also received RAAS blockade.

Clinical characteristics associated with the presence of nephritis and outcomes

Older age at onset (OR 1.24, 95% CI [1.09;1.42]) and higher IMD (OR 1.27, 95% CI [1.09;1.49]) were statistically significantly associated with the development of IgAV-N. GI involvement and positive urine dipstick (for proteinuria and/or haematuria) at baseline were also strongly associated with the risk of developing nephritis (OR 3.43, 95% CI [1.16;10.45]; OR 20.03, 95% CI [2.66;483.6] respectively). A negative urinary dipstick at baseline had a positive predictive value (PPV) of 98.2% for not developing IgAV-N. Other parameters including ethnicity, sex, season of onset, preceding viral illness, extensive rash, joint involvement, and multisystem involvement were not associated with nephritis. No association was found between abnormal blood tests at baseline (leukocytosis, neutrophilia,

thrombocytosis, raised CRP, hypoalbuminaemia) and nephritis. Following initial presentation, most children (n=75) had no further A&E attendances, while 11% had a second A&E attendance related to symptoms of IgAV. One child diagnosed with persisting IgAV, attended A&E on ten occasions due to arthralgia, arthritis, and abdominal pain. There was a trend to a lower mean number of A&E presentations in typical cases compared to atypical cases (0.4 ± 0.9 vs. 1.9 ± 3.5 respectively, *p*=0.162) and a similar trend seen regarding unplanned hospitalisations (0.3 ± 0.5 vs. 0.5 ± 0.5 respectively, *p*=0.113). Patients with nephritis had greater mean number of A&E presentations when compared those without nephritis but this was not statistically significant (0.8 vs 0.4, *p*=0.083). Children with nephritis did have significantly more hospital admissions than those without nephritis (mean 0.7 ± 0.7 vs 0.2 ± 0.4 respectively, *p*<0.001) and children with nephritis (n=23) versus those without (n=77), had a greater mean number of hospital appointments (6.2 ± 5.9 vs 13.4 ± 8.1 respectively, *p*<0.001). Overall rate of DNA appointments was 8% and this did not vary significantly according to the presence of nephritis (7.9% vs 3.2% respectively, *p*=0.241). At the end of the study follow-up period, 50% of children had been discharged, 22% were lost-to-follow-up and presumed to have a normal outcome, 21% were undergoing active follow-up by a paediatric nephrologist, 6% had been referred to their local centre, and one (1%) child was transitioned to adult care (figure 3). No children required kidney replacement therapy.

Discussion

This study presents the evolution of a cohort study aimed at advancing the field for IgAV, as a foundation for future evidence generation using a trial-ready framework. The evolutionary stages of the study have generated data on the natural history of the disease that continues to highlight the burden of nephritis and a description of the first 100 children recruited allows meaningful comparison with previously published cohorts. To our knowledge, this is the largest prospective longitudinal cohort studies dedicated to recruiting children with IgAV with a corresponding invaluable bioresource (11, 19). The descriptive cohort also highlights the subgroup of children who experience an atypical disease course which may have similarities to adult-onset disease. Consistent with the literature, we have highlighted several risk factors for the development of IgAV-N including older age of disease onset, GI involvement, and a positive urinalysis (for proteinuria and/or haematuria) during the early phase of the disease. Additionally, we have highlighted many referrals for specialist input, a high lost to follow-up rate during the monitoring phase, together with hospital re-attendances and admission, which were in greater demand in patients with nephritis. These are likely to reflect under recognised costs in the wider consequences of nephritis associated with this condition.

The cohort is representative because the demographics align with current literature, demonstrating a slight male predominance, high proportion of Caucasian children, and the majority of cases diagnosed under the age of ten years (4). This study identified a 23% rate of nephritis, slightly lower than previous reports in the literature of 30-60%, which may reflect the heterogeneity in the definitions of nephritis (34, 35). The strength of proteinuria and its relationship with disease outcome continues to support its use as an early marker to risk stratify patients, and as an outcome measure for clinical trials, aligned with other forms of glomerulonephritis. The primary outcome measures of previous trials, albeit few, typically span durations of 12-30 months and have focused on resolution of proteinuria as the study endpoint with secondary outcome measures including the need for additional treatment, resolution of haematuria, vasculitis disease activity, and preserving normal kidney function (36).

We identified a low rate of recurrent disease (3%), although reported recurrence rates in the literature vary widely, ranging from 2.6% to 66% and this is likely due to the lack of standardised definitions and disease heterogeneity (13). In two of the bigger recent retrospective cohorts in the literature by Ekinici et al., and Karadag et al., disease recurred in 16.4% and 4.6% respectively (37, 38). Recurrent and/or persisting disease is a significant burden for patients and families, and there is very little evidence to guide the management of these patients (13). Consideration of patients experiencing an atypical disease course within a clinical trial setting is vital and must include consensus, standardised definitions of recurrence particularly with key discriminators indicating if and when rescue treatment may be required. Similarly, patients with atypical extra-renal manifestations should be explicitly included in trials primarily designed to evaluate novel treatments for nephritis.

The focus of this descriptive cohort was to identify the early evolution of nephritis to direct opportunities for intervention. The rates of glucocorticoid use in IgAV-N vary significantly in the literature from 36-89% in children, and similar rates of 37-86% in adults (5, 15, 39-42). Our cohort demonstrated a slightly lower rate of glucocorticoid use (30%) which may be in keeping with increasing awareness of steroid-related toxicity and the growing reluctance to use these agents sparingly in the absence of evidence. Additionally, we have identified that 26% of children with nephritis were conservatively managed, comparable to the findings by Selewski et al. who reported conservative management for 24% of paediatric patients and 12% of adults (42). The conservative approach and high rate of resolution of nephritis emphasises the need for carefully designed trials, with accurate ways to truly identify patients at risk of poorer outcomes (43).

This work is leading to the design of age-inclusive clinical trials for IgAV nephritis with proposed trial interventions during the first 12 months, early identification of higher risk individuals and acknowledging the differences in short- and long-term kidney outcomes seen across different aged populations.

There are limitations relevant to this study, as it presents a relatively small and heterogenous cohort with missing data, particularly related to children who did not complete the full duration of kidney monitoring and in those who initially presented to other centres. Additionally, the setting was a tertiary referral centre for paediatric nephrology with expertise in IgAV, therefore it is likely to encounter more patients with IgAV-N and atypical disease. There are also significant confounders, particularly related to the Covid-19 pandemic regarding disruption to study recruitment, adherence to the monitoring pathway, and follow-up appointments.

Conclusion

This report has described a UK-based study dedicated to advancing paediatric IgAV, that has the potential to act as a global exemplar and continues to highlight the unmet needs for patients with IgAV that is mostly related to nephritis. A global effort to conduct multicentre clinical trials are urgently needed to begin to alter the disease course for children with IgAV.

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Figures and tables

Figure 1, the evolutionary stages of the IgA Vasculitis Study. The IgA Vasculitis Study was established as a cross-sectional study following a previously published retrospective cohort analysis and the data was gathered in June 2023 (19). The study had an amendment to incorporate longitudinal data and biosampling in January 2021, the use of surplus histology tissue was incorporated in January 2023, the study end date was extended following further funding in August 2023, and in August 2024 there have been approval submissions to create a national trial-ready population via a 'consent to re-contact cohort'. To date the cohort has incorporated patient engagement (44), supported the first national standard of care guidelines, developed biopsy guidance (45), standardised the definitions of atypical disease, compiled natural history data contained within this manuscript and previous (19), and contributed to scientific understanding (13, 26). Further work in progress includes a disease specific vasculitis activity scoring tool, scientific data on the IgA protein structure and a workshop to create a pathway to design a clinical trial.

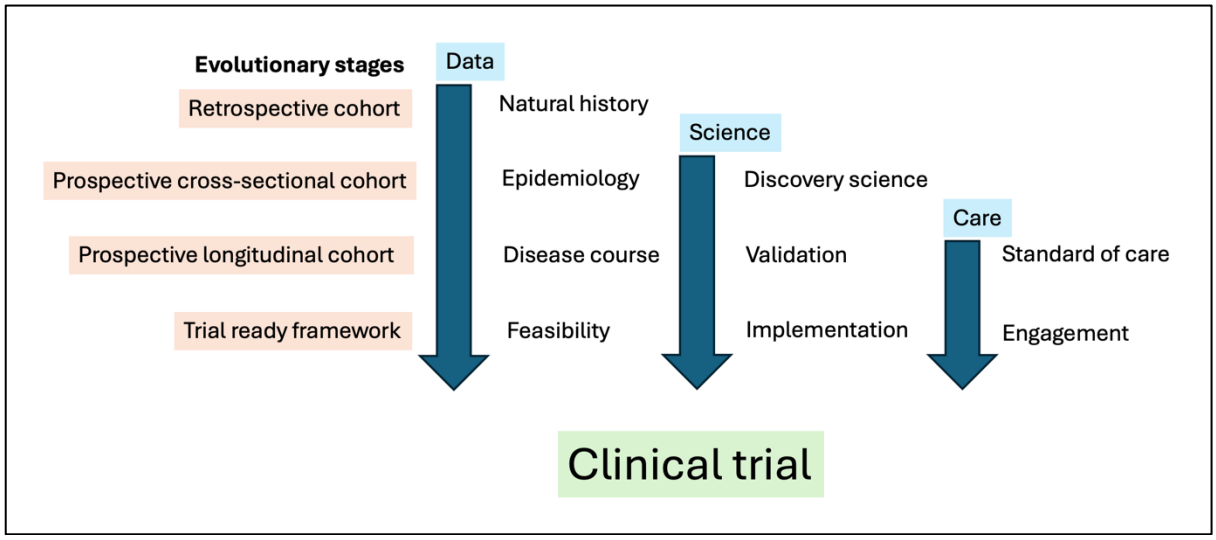

Figure 2, annual recruitment figures for the IgA Vasculitis Study. As of August 2024, there were 175 patients recruited to the study and over the five years since inception there was a mean recruitment rate of 2.9 children per month (annual recruitment range 11-45 patients). There was a notable reduction in recruitment figures during 2020 due a period of study closure during peak outbreaks of the Covid-19 pandemic and therefore recruitment figures for 2022-23 are likely to be the most representative to date.

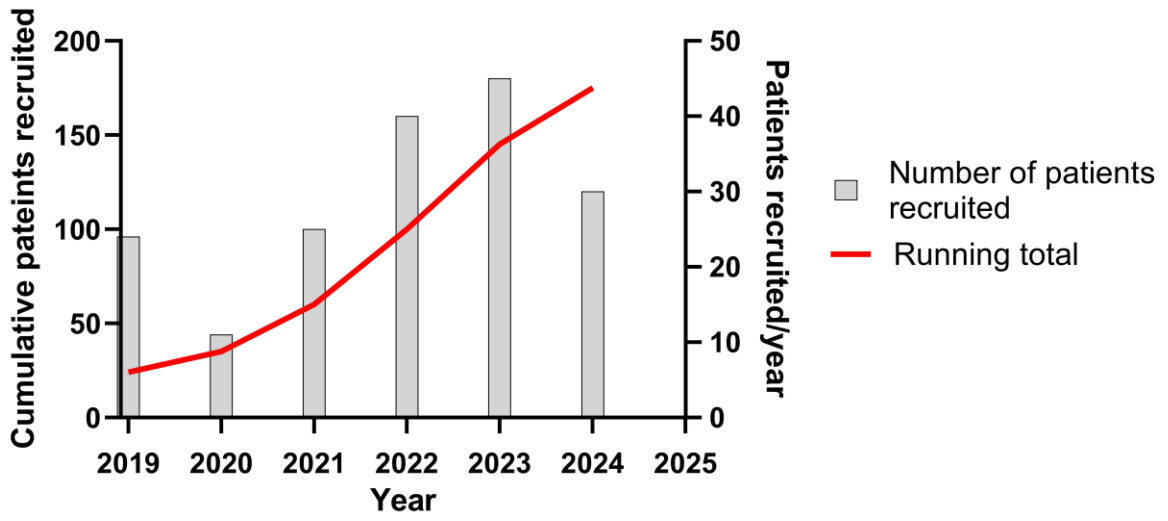

Figure 3, a summary of the pathways and routes of referral into Alder Hey Children's Hospital. This comprises the outcomes, including discharge or on-going follow-up, for the first 100 children recruited to the IgA Vasculitis Study. 76% presented directly to our centre, whilst 4% presented originally to primary care, and the rest of the children (20%) initially presented to general paediatric colleagues based at other hospitals in the region and were referred for secondary specialist care (figure 3).

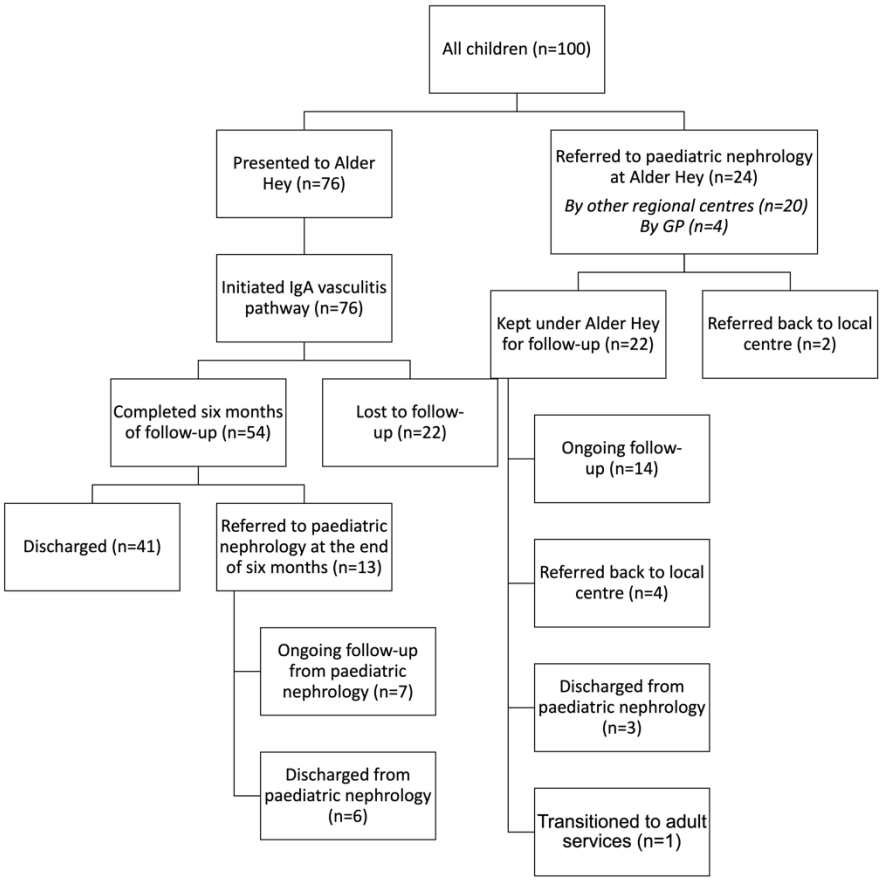

Figure 4, a heat map demonstrating geospatial distribution of participants in the IgA Vasculitis Study according to index of multiple deprivation (IMD). To illustrate the socioeconomic status of our cohort, the resident postcode for each patient was used to evaluate the index of multiple deprivation (IMD) centile. The lowest IMD decile represents the greatest level of deprivation. Eight patients were

excluded due to postcodes that could not be geocoded. Figure (a) shows a view with the resident location of all participants whilst (b) shows a higher resolution view focused on the Merseyside region.

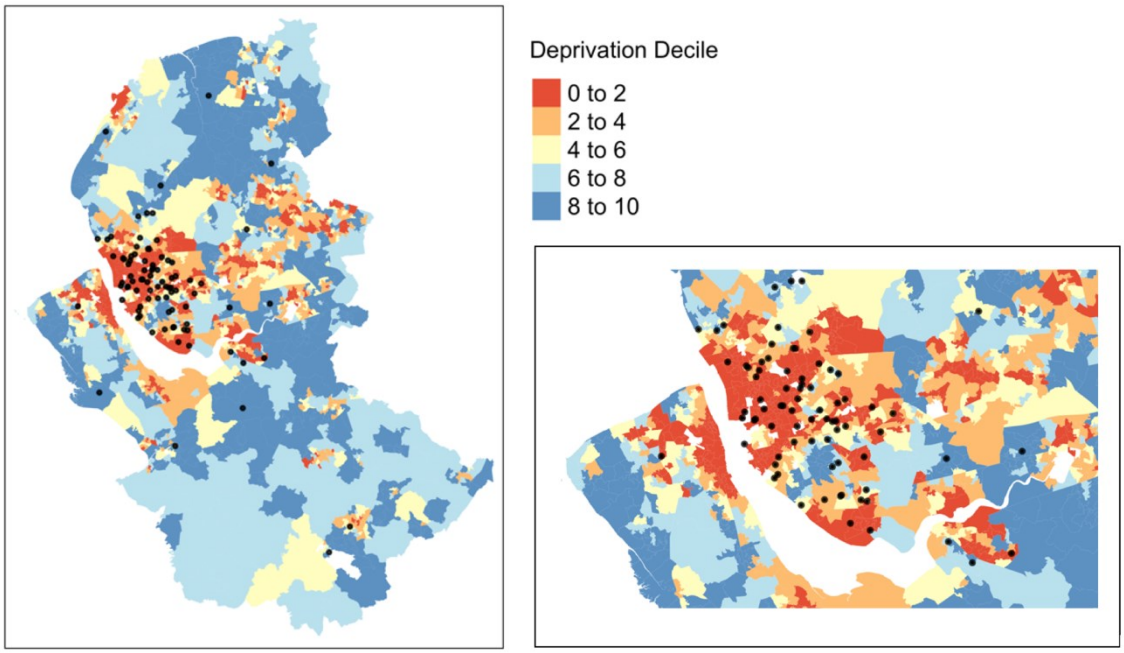

Table 1, a summary of the clinical features at initial presentation for the children included in this cohort (n=100).

Clinical features	n=100
Rash	n=100
Lower limb [a]	100 (100)
Upper limb [a]	26 (26)
Trunk [a]	17 (17)
Face [a]	5 (5)
Musculoskeletal involvement	n=76
Oligoarticular [a]	73 (96)
Polyarticular [a]	3 (4)
Ankles	45 (59)
Knees	27 (36)
Wrists	14 (18)
Shoulders	1 (1)
Gastrointestinal involvement	n=43
Pain [a]	38 (88)
Vomiting [a]	16 (37)
Diarrhoea [a]	8 (19)
Gastrointestinal bleeding [a]	1 (2)
Other system involvement	
Scrotal pain/swelling [a]	2 (2)

[a] n (%);

Table 2, key clinical and laboratory characteristics at presentation of children with a new diagnosis of IgA vasculitis (n=76).

Clinical and laboratory characteristics of patients at presentation	n=76 (%)
Blood pressure [a]	75 (99)
Systolic [b]	105.6 ± 12.0 (77-137)
Diastolic [b]	68.0 ± 12.9 (42-102)
Hypertensive [a]	11 (15)
Temperature [a]	76 (100)
Mean ± standard deviation (range) [c]	37.0 ± 0.6 (36.0-39.5)
Febrile [a]	4 (5)
Urinalysis [a]	76 (100)
Normal urinalysis [a]	54 (71)
Isolated proteinuria [a]	16 (21)
Isolated haematuria [a]	3 (4)
Mixed proteinuria and haematuria [a]	3 (4)
Urinary albumin:creatinine ratio (UACR) performed[a]	17 (22)
UACR[b,d]	32.7 ± 95.6 (0.5-398.0)
Blood results	
Full blood count [a]	55 (73)
Haemoglobin [b,e]	123.6 ± 10.3 (98-157)
White cell count [b,f]	10.9 ± 4.5 (4.4-26.4)
Platelets [b,f]	331.5 ± 110.0 (160-660)
Neutrophils [b,f]	6.1 ± 3.9 (1.6-23.2)
Biochemistry	
Serum creatinine [b,g]	37.4 ± 11.3 (20-88)
Serum albumin [b,e]	38.5 ± 3.8 (28-48)

[a] n (%); [b] mean ± standard deviation (range); [c] °C; [d] mg/mmol, [e] g/L; [f] x10^9/L; [g] µmol/L