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Do IgA nephropathy presentations display any seasonality?

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ABSTRACT

IgA nephropathy (IgAN) is the most common glomerulonephritis and one of the most common causes of chronic kidney disease worldwide. Although IgAN has been classically linked with respiratory tract infections (RTIs), little studies have examined the epidemiology of this condition in terms of seasonal variations in presentations. We present the first study in one of Australia's largest hospitals looking at the seasonality of this common condition. In summary, we surprisingly do not find any seasonal variations in the biopsy-proven presentation of this condition across 6 years of data.

Implication for health policy/practice/research/medical education:

The results of this study contribute to the epidemiology of one of the most common glomerulonephritides worldwide.

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Introduction

IgA nephropathy (IgAN) is one of the most common glomerulonephritides and has a number of established risk factors including genetic and ethnic factors (1). It affects between 30-45 per million people a year (2). The pathogenesis of this condition is unclear but fundamentally relies on autoantibodies against galactose-deficient IgA1 immunoglobulins, deposition in the mesangium and initiation of glomerular injury (3). Upper respiratory tract infections (RTIs) have been associated with and may trigger IgAN (4). Seeing RTIs tend to occur during the colder months (5), we wondered if the presentation of IgAN diagnoses varied according to season.

Objectives

We retrospectively ascertained any seasonality in presentations of IgAN based on renal biopsies at a major hospital in Sydney, Australia.

Patients and Methods

We looked at all new and relapsed cases of IgAN

which were confirmed on biopsy at a one of the largest quaternary hospitals in Sydney (New South Wales, Australia) during a six-year period (2014-2019). This hospital receives all kidney biopsies for the western part of the state of New South Wales. Sydney is a major city of Australia which is 34°C south of the equator and experiences autumn in March to May; and winter in June to August. Cases were retrospectively identified if the clinical manifestations matched typical findings of IgAN on light, immunofluorescence and electron microscopy, and correlated with clinical presentation at weekly clinicopathological meetings. Equivocal cases were excluded. Biopsies were performed within 2-3 weeks of presentations.

Ethical issues

This study adheres to the research principles outlined by the Declaration of Helsinki. As a quality improvement audit, this project was exempt from institutional ethics review (Western Sydney Local Health District Human Research Ethics Committee).

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Data analysis

Simple descriptive and non-parametric statistical analyses were conducted using GraphPad Prism software.

Results

During the six-year period, 2457 renal biopsies were performed with an equal spread of cases across each quarter ($H(4) = 0.189$, $P = 0.979$). There were 320 biopsy-proven cases of IgAN (13.0%) with 223 males (69.7%) and geometric mean age of 48.4 years (range 18-93 years). Tallies were grouped into quarters (Q): Q1 (January-March), Q2 (April-June), Q3 (July-September) and Q4 (October-December) for each year. The number of cases for each month, arranged per quarter, is displayed in Figure 1. One hundred and sixty-four cases (51.3%) occurred during Q2 and 3 (colder months). Kruskal-Wallis test with multiple comparisons found no difference in the number of cases across each quarter ($H(4) = 0.872$, $P = 0.832$), therefore confirming no seasonal variations in the number of cases. Exclusion of relapsed cases did not have any impact on the distribution.

Discussion

Seasonality of complications in patients with end-stage renal failure has been observed, with greater complications seen in winter which may relate to concurrent RTIs (6). As such, we deemed it important to ascertain if the presentations of IgAN, as proven on renal biopsy, had any seasonality to this. Interestingly, despite its links with RTIs, we were unable to ascertain any significant seasonality in positive IgAN biopsies.

One previous study in Pakistan found 80% of IgAN cases presented in the colder months (7), in contrast to our findings. It is possible that our data did not capture relapsed cases effectively since we relied on the patients having a biopsy. Some relapsed cases may also have been determined on clinical grounds (e.g., re-emergence of

microhematuria) and these, of course, could not be captured in our study. Furthermore, we did not monitor each patients' clinical parameters, such as urinary protein, throughout the year. Proteinuric exacerbations have been found to be associated with colder months in patients with IgAN (8).

Nevertheless, the strength of our study is that we are one of the first studies to examine seasonality of this condition using the definite diagnostic tool of a biopsy. IgAN presents heterogeneously and our negative findings could reflect the genetic and ethnic diversity of patients in Australia. Further work to dissect the risk factors for IgAN presentations and exacerbations is suggested.

Limitations of the study

Being a single-centred study, we are geographically limited to one part of the world which experiences relatively temperate climate. This makes the generalisability of our results limited. We also did not capture minor exacerbations of IgAN, in patients with previous biopsy-proven IgAN, that may have been captured through periodic urine monitoring. This could considerably affect the seasonality of this condition. Prospective, multi-centred studies should be undertaken to further explore these research avenues.

Authors' contribution

AYSL conducted data acquisition, analysis and drafted the original manuscript. MWL contributed to study design and study supervision. All authors participated in preparing the final draft of the manuscript, revised the manuscript and critically evaluated the intellectual contents. All authors have read and approved the content of the manuscript and confirmed the accuracy or integrity of any part of the work.

Conflicts of interest

The authors declare that they have no competing interests.

Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

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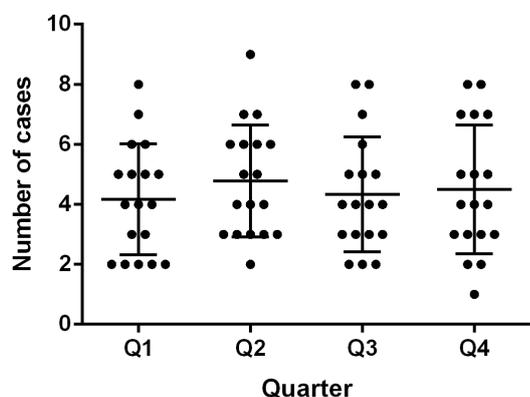


Figure 1. Total number of IgA nephropathy cases each quarter. Bars represent mean with standard deviation.

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