Epidemiology of Glomerulonephritis as an Extraintestinal Manifestation of Inflammatory Bowel Disease – a Large Population-Based Study

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Introduction

- Inflammatory bowel disease (IBD), including both Crohn's disease (CD) and Ulcerative colitis (UC), are known to cause many extraintestinal manifestations
- There is limited data describing the association between IBD and renal manifestations
- This study provides epidemiologic data to further understand the association between IBD and glomerulonephritis (GN)
- Sub-types of glomerulonephritis in this study include membranous, proliferative, mesangiocapillary, diffuse and focal membranoproliferative

Methods and Materials

- The aim of this study was to investigate if IBD is associated with GN and its various sub-types
- Data was collected from a commercial database (Explorys Inc, Cleveland, OH), an aggregate of EHR data from 27 integrated healthcare systems in the US between 1/2017-1/2022
- We identified patients with CD and UC based on SNOMED-CT
- We compared the prevalence of GN at least 30 days post-CD or post-UC diagnosis to a control cohort without CD or UC
- We excluded patients with a diagnostic predisposition for development of GN (Table 1)
- A univariate analysis was conducted using Microsoft Excel and MedCalc statistical software

Results

Excluded diagnoses
Systemic lupus erythematosus
Goodpasture's syndrome
Hereditary nephritis
Post-infectious GN
Granulomatosis with polyangiitis
Allergic grandulomatosis angiitis
Alport syndrome
Human immunodeficiency virus
Hepatitic B virus
Hepatitis C virus
Nephrotic syndrome with membranoproliferative glomerulonephritis
Primary pauci-immune necrotizing and crescentic glomerulonephritis
Berger's immunoglobulin A or immunoglobulin G nephropathy

Table 1. Diagnoses excluded

	CD	Prevalence per 100000	No CD	Prevalence per 100000	Odds Ratio	95% CI
Glomerulonephritis	310	207.18	24420	72.01	2.88	2.57-3.22
Adults (18-65)	180	171.61	13560	67.83	2.53	2.18-2.93
Elderly (65+)	120	280.57	10400	131.20	2.14	1.79-2.56
Caucasian	230	203.77	16260	88.32	2.31	2.03-2.63
African American	60	451.47	5750	148.79	3.03	2.35-3.91
Asian	0	0.00	500	92.62	0	0
Male	120	205.94	12370	82.23	2.51	2.09-3.00
Female	190	209.34	11990	64.37	3.25	2.82-3.75
	UC	Prevalence per 100000	No UC	Prevalence per 100000	Odds Ratio	95% CI
Glomerulonephritis	260	204.24	24470	72.11	2.83	2.51-3.20
Adults (18-65)	140	173.14	13600	67.95	2.55	2.16-3.01
Elderly (65+)	120	260.98	10400	131.26	1.99	1.66-2.38
Caucasian	210	213.44	16280	88.36	2.42	2.11-2.77
African American	40	416.23	5760	148.90	2.80	2.05-3.81
Asian	0	0	500	92.61	0	0
Male	120	236.69	12380	82.25	2.88	2.41-3.44
Female	140	183.73	12040	64.59	2.85	2.41-3.36

Table 2. Prevalence and prevalence ratios of glomerulonephritis after at least 30 days post-CD and post-UC diagnosis.
**All odds ratios calculated in this analysis were associated with p<0.001*

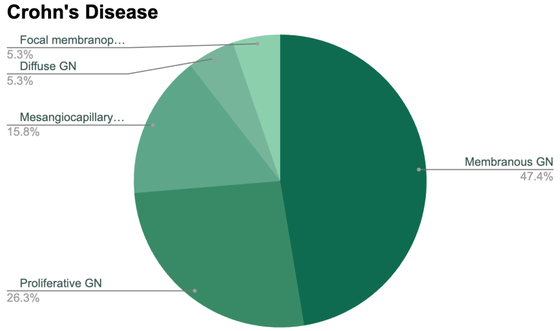

Figure 1. Prevalence of different subtypes of glomerulonephritis in Crohn's Disease

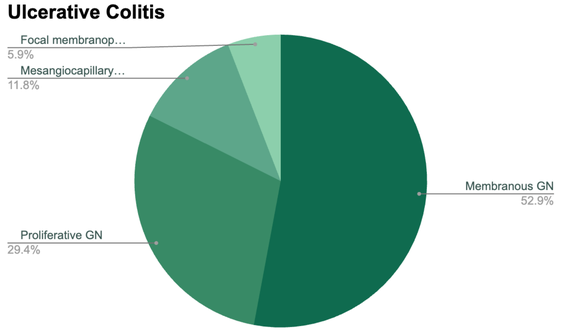

Figure 2. Prevalence of different subtypes of glomerulonephritis in Ulcerative Colitis

Results

- 34,063,760 patients identified in the database
- 149,630 cases of CD and 127,300 cases of UC
- Crohn's Disease
  - 310 cases of GN
  - Prevalence: 207/100000 persons
  - OR 2.88
- Ulcerative Colitis
  - 260 cases of GN
  - Prevalence: 72/100000
  - OR 2.83
- Membranous GN was the most prevalent (CD 90, UC 90), followed by proliferative (CD 50, UC 50)

Conclusions

- Glomerulonephritis was significantly more prevalent in patients with both CD and UC compared to those without IBD
- A prospective study using biopsy-proven GN in patients with concomitant renal disease would be helpful in identifying the pathophysiology involved with this association
- Limitations
  - Diagnoses were not necessarily biopsy-proven
  - Did not eliminate other less common causes of GN

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