Outcomes of Gout in Patients with Cirrhosis, a NIS-Based Study

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BACKGROUND

- Hyperuricemia is a prerequisite for the development of gout.
- Elevated serum uric acid (UA) levels result from either overproduction or decreased excretion.
- A correlation between serum UA levels and the incidence of non-alcoholic fatty liver disease (NAFLD) has been established, but less clear is the relationship between liver disease and gout.
- We aim to explore a link between cirrhosis and gout, by examining rates of gout flares and its complications in those with cirrhosis and comparing these rates to patients without a documented history of cirrhosis.

METHODS

- The National Inpatient Sample (NIS) was used to identify patients hospitalized with gout, via ICD-9 CM (International Classification of Diseases, Ninth Revision, Clinical Modification) codes. Patients were stratified based on a history of cirrhosis.
- Primary outcomes: mortality, gout complications, joint interventions
- Statistical analysis: Chi-squared tests were used to analyze categorical data, and independent t-tests were used to analyze continuous data. Multiple logistic regression was used to control for confounders, including age, sex, race, alcohol use disorder, cardiac arrhythmias, COPD, heart failure, diabetes, HIV, HTN, PVD and renal failure.
- Statistical significance: *p*-value <0.05

RESULTS

- Out of a total of 1,528,777 patients hospitalized with gout, 36,948 had a diagnosis of cirrhosis.
- Patients without cirrhosis were older (70.37±13.53 years versus 66.21±12.325 years; $p<0.05$).
- Most patients were male (74.63% in the cirrhosis group versus 66.83%; adjusted $p<0.05$).
- Patients with cirrhosis had greater rates of mortality (5.49% versus 2.03%; adjusted $p<0.05$), gout flare (2.89% versus 2.77%; adjusted $p<0.05$) and tophi (0.97% versus 0.75%; adjusted $p=0.677$).
- Patients without cirrhosis had higher rates of arthrocentesis (2.45% versus 2.21%; adjusted $p<0.05$) and joint injections (0.72% versus 0.52%; adjusted $p<0.05$).

		Non-Cirrhotics		Cirrhotics		OR	CI	*p*-value	AOR	ACI	Adjusted *p*-value
		Percentage	*n*	*Percentage*	*n*						
Sex at birth	*Female*	33.17	494,890	25.37	9,372	0.685	0.669-0.701	<0.05	0.979	0.953-1.006	0.121
	Male	66.83	996,939	74.63	27,576						
Mortality		2.03	30,286	5.49	2,029	2.804	2.678-2.937	<0.05	3.092	2.939-3.252	<0.05
Gout Flare		2.77	41,282	2.89	1,066	1.044	0.982-1.11	0.171	0.816	0.765-0.871	<0.05
Tophi		0.75	11,202	0.97	358	1.293	1.164-1.438	<0.05	1.025	0.914-1.149	0.677
Uric Acid Nephrolithiasis		0.02	374	0.02	9	0.972	0.502-1.882	0.932	1.037	0.53-2.03	0.915
Nephropathy		0.02	283	0.01	5	0.713	0.295-1.727	0.452	0.548	0.223-1.346	0.19
Arthrocentesis		2.45	36,611	2.21	818	0.9	0.839-0.965	<0.05	0.741	0.686-0.8	<0.05
Joint Injection		0.72	10,673	0.52	192	0.725	0.628-0.837	<0.05	0.713	0.61-0.833	<0.05
Septic Arthritis		0.31	4,637	0.31	114	0.993	0.824-1.196	0.939	0.997	0.821-1.211	0.977

	Mean	SD	SE Mean	Mean	SD	SE Mean	Mean difference	CI	*p*-value
Age at admission (years)	70.37	13.53	0.011	66.21	12.325	0.064	4.167±0.071	4.027-4.306	<0.05

CONCLUSIONS

- Patients with cirrhosis had higher rates of gout-related complications, including rates of gout flare and tophi formation. However, only rates of gout flare were statistically significant after adjustment for confounding variables.
- These differences could be due to increased risk for hyperuricemia in patients with cirrhosis.
- Patients with cirrhosis had lower rates of invasive gout-related procedures, including arthrocentesis and joint injection, all with statistical significance.
- Lower rates of invasive procedures could be due to clinicial hesitancy with performing them due to the known predilection for bleeding in patients with cirrhosis. This could hamper timely diagnosis and management of gout, and could result in prolonged hospital stays.
- A significant study limitation is the fact that patients with alcoholic cirrhosis and NAFLD already have risk factors for hyperuricemia, including alcohol use and metabolic syndrome respectively. Therefore, their risk factors for liver disease could also place them at higher risk for gout.
- Future studies can involve stratifying patients based on cirrhosis subtype, including alcoholic, non-alcoholic, and viral cirrhosis. This would enable further characterization of specifically the relationship between liver disease and hyperuricemia/gout by isolating rates of gout complications in patients with viral cirrhosis, as they would not inherently have the predilection to develop hyperuricemia as in patients with the other twp subtypes of cirrhosis.