Introduction:

- NASH is characterized by liver inflammation and is associated with the development of fibrosis and cirrhosis.
- Prior studies have indicated that patients with NAFLD may have an increased risk for post-ERCP pancreatitis (PEP) and mortality.
- We aimed to study the association between NASH and post-ERCP AEs in this context.

Methods:

- We queried a commercial database (Explorys Inc, Cleveland, OH) with electronic medical record data from 26 major U.S. healthcare systems. Adult patients (>/=18 years old) with and without NASH who underwent ERCP between 1999 and 2020 were identified based on systematized nomenclature of medicine-Clinical Terms (SNOMED-CT).
- Differences in baseline characteristics and demographics were analyzed using chi-squared tests. Odds ratio analyses were performed between NASH and non-NASH patients for post-ERCP AEs within 30 days. Subgroup analysis was performed on patients with NASH without cirrhosis. We defined P-values less than 0.05 to be statistically significant.

Results:

- A total of 147,320 patients were found to have undergone ERCP. Of those, 1760 (1.2%) had NASH.
- NASH patients were more likely to be under the age of 65 (49.4% vs 41.6%, P<0.0001), more likely to be male (43.8% vs 40%, P=0.0315), identified with White race (87.5% vs 78.8%, P<0.0001) and had a greater likelihood of having cirrhosis (64.8% vs 6.2%, P<0.0001).
- NASH patients were more likely to experience same day PEP (OR: 1.23, P=0.0072), sepsis (OR: 1.87, P<0.0001), gastrointestinal bleeding (GI) (OR: 2.16, P < 0.0001), AKI (OR: 3.37, P<0.0001), MI (OR: 1.28, P=0.044) and 30-day mortality (OR: 41.6, P<0.0001).
- There was no difference in delayed PEP (1-7 days) or intestinal perforation. Subgroup analysis of NASH patients without cirrhosis had an increased likelihood of same day PEP (OR: 1.29, P=0.0425), delayed PEP (OR: 4.41, P<0.0001), GI bleeding (OR: 1.50, P=0.0306).
- There was no difference in AKI, sepsis, cholangitis, intestinal perforation and 30-day mortality.

Discussion:

- This study demonstrates that patients with NASH (with and without cirrhosis) may have a greater chance of experiencing post-ERCP AEs. However, some of these outcomes, particularly mortality, may be driven by an enriched prevalence of cirrhosis amongst those diagnosed with NASH.

Endoscopic Retrograde Cholangiopancreatography Adverse Events in Patients with Non-Alcoholic Steatohepatitis

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"NASH may have a greater chance of experiencing post-ERCP AEs. However, mortality, may be driven by cirrhosis amongst those diagnosed with NASH."

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Outcome	ERCP in NASH (N=1760)	NASH (%)	ERCP in non-NASH (N=145560)	Non-Nash (%)	P-Value	Odds Ratio	Confidence Interval (95%)
Post ERCP Panc <1d	190	10.8%	13,030	9.0%	0.0072	1.2309	1.0577, 1.4324
Post ERCP Panc 1-7d	60	3.4%	4,730	3.2%	0.7076	1.0508	0.8110, 1.3616
30 day mortality	10	0.6%	20	0.01%	< 0.0001	41.5829	19.4359, 88.9660
Sepsis	210	11.9%	9,810	6.7%	< 0.0001	1.8748	1.6208, 2.1686
Cholangitis	350	19.9%	33,180	22.8%	0.0039	0.8407	0.7474, 0.9457
GI perforation	20	1.1%	1,390	1.0%	0.4377	1.1922	0.7648, 1.8584
GI bleed	120	6.8%	4,770	3.3%	< 0.0001	2.1597	1.7903, 2.6053
AKI	330	18.8%	9,320	6.4%	< 0.0001	3.3734	2.9874, 3.8093
MI	70	4.0%	4,560	3.1%	0.0441	1.2808	1.0066, 1.6296
Age							
18-65	360	49.4%	60,610	41.6%	0.0001		
>65	260	51.1%	83,110	57.1%	0.0003		
Gender							
Female	990	56.3%	87,270	60.0%	0.0181		
Male	770	43.8%	58,250	40.0%	0.0315		
Race							
White	1540	87.5%	114,770	78.8%	0.0001		
AA	100	5.7%	15,210	10.4%	0.1244		
asian	20	1.1%	2,160	1.5%	0.8834		
hispanic/latino	30	1.7%	1,740	1.2%	0.8038		
Comorbidities							
Cerebrovascular disease	330	18.8%	21,270	14.6%	0.0323		
CAD	560	31.8%	33,210	22.8%	< 0.0001		
Cardiomyopathy	150	8.5%	7,680	5.3%	0.0849		
CHF	380	21.6%	19,760	13.6%	0.0001		
COPD	340	19.3%	25,420	17.5%	0.3858		
PAD/PVD	870	49.4%	44,750	30.7%	< 0.0001		
HTN	1,460	83.0%	88,840	61.0%	< 0.0001		
HLD	1,240	70.5%	72,640	49.9%	< 0.0001		
DM	1,120	63.6%	44,140	30.3%	< 0.0001		
CKD	670	38.1%	25,390	17.4%	< 0.0001		
ESRD	200	11.4%	4,580	3.1%	< 0.0001		
Presence of cirrhosis	1,140	64.8%	9,050	6.2%	< 0.0001		
Alcohol abuse	170	9.7%	7,710	5.3%	0.012		
tobacco abuse	360	20.5%	25,390	17.4%	0.1238		
Obesity	1,100	62.5%	36,760	25.3%	< 0.0001		

Outcome	ERCP in NASH without cirrhosis (N=620)	NASH without Cirrhosis (%)	ERCP in non-NASH (N=145560)	Non-Nash (%)	P-Value	Odds Ratio	Confidence Interval (95%)
Post ERCP Panc <1d	70	11.3%	13,030	9.0%	0.0425	1.2945	1.0088, 1.6611
Post ERCP Panc 1-7d	80	12.9%	4,730	3.2%	< 0.0001	4.4109	3.4816, 5.5883
30 day mortality	0	0.0%	20	0.01%	0.2232	5.7208	0.3456, 94.6966
Sepsis	40	6.5%	9,810	6.7%	0.7754	0.9543	0.6923, 1.3156
Cholangitis	140	22.6%	33,180	22.8%	0.8991	0.9879	0.8180, 1.1930
GI perforation	10	1.6%	1,390	1.0%	0.0971	1.7003	0.9082, 3.1833
GI bleed	30	4.8%	4,770	3.3%	0.0306	1.5008	1.0388, 2.1683
AKI	40	6.5%	9,320	6.4%	0.9605	1.0081	0.7313, 1.3899
MI	10	1.6%	4,560	3.1%	0.0333	0.5069	0.2712, 0.9476
Age							
18-65	360	58.1%	60,610	41.6%	< 0.0001		
>65	260	41.9%	83,110	57.1%	< 0.0001		
Gender							
Female	410	66.1%	87,270	60.0%	0.0119		
Male	210	33.9%	58,250	40.0%	0.0717		
Race							
White	540	87.1%	114,770	78.8%	< 0.0001		
AA	40	6.5%	15,210	10.4%	0.4195		
asian	10	1.6%	2,160	1.5%	0.9793		
hispanic/latino	10	1.6%	1,740	1.2%	0.9079		
Comorbidities							
Cerebrovascular disease	100	16.1%	21,270	14.6%	0.6718		
CAD	150	24.2%	33,210	22.8%	0.6835		
Cardiomyopathy	40	6.5%	7,680	5.3%	0.7356		
CHF	70	11.3%	19,760	13.6%	0.5751		
COPD	110	17.7%	25,420	17.5%	0.9561		
PAD/PVD	250	40.3%	44,750	30.7%	0.001		
HTN	470	75.8%	88,840	61.0%	< 0.0001		
HLD	450	72.6%	72,640	49.9%	< 0.0001		
DM	320	51.6%	44,140	30.3%	< 0.0001		
CKD	120	19.4%	25,390	17.4%	0.5643		
ESRD	20	3.2%	4,580	3.1%	0.9795		
Presence of cirrhosis	0	0.0%	9,050	6.2%	NA		
Alcohol abuse	40	6.5%	7,710	5.3%	0.7356		
tobacco abuse	120	19.4%	25,390	17.4%	0.5643		
Obesity	380	61.3%	36,760	25.3%	< 0.0001		