

**BACKGROUND AND HYPOTHESIS**

- Acute cholangitis, often caused by biliary obstruction, can lead to sepsis and death due to multiorgan failure.
- Endoscopic retrograde cholangiopancreatography (ERCP) is the recommended first line therapeutic modality in the management of acute cholangitis. ERCP can be associated with complications such as pancreatitis, perforation, and bleeding.
- Protein-calorie malnutrition (PCM) is associated with poor clinical outcomes in hospitalized patients.
- The aim of this study is to elucidate the relationship between PCM and patients undergoing ERCP for acute cholangitis.

**METHODS**

- Data were extracted from the National Inpatient Sample (NIS) database in the period between 2016 to 2019.
- Using the International Classification of Diseases, 10th revision, and Clinical Modification (ICD-10-CM) codes to obtain baseline demographic and clinical data, in-hospital mortality, hospital charges, and hospital length of stay (LOS).
- Statistical analysis was completed using t-test and Chi-squared analyses. Multivariate analysis for the mortality odds ratio (OR) was calculated after adjusting for potential confounders.

**TABLE 1 UNIVARIATE AND MULTIVARIATE ANALYSIS OF POTENTIAL FACTORS AFFECTING IN-HOSPITAL MORTALITY IN PATIENTS WITH CHOLANGITIS UNDERWENT ERCP**

Variable	Univariate		Multivariate	
	OR (CI 95%)	P-value	OR (CI 95%)	P-value
<b>Protein-calorie malnutrition</b>	3.66 (3.08-4.34)	< 0.01	3.4 (2.85-4.04)	< 0.01
<b>Age &gt; 65</b>	1.47 (1.25-1.73)	< 0.01	1.38 (1.16-1.64)	< 0.01
<b>Female</b>	1.06 (0.91-1.22)	0.41	1.06 (0.91-1.23)	0.436
<b>Non-White</b>	1.24 (1.06-1.44)	< 0.01	1.25 (1.07-1.46)	< 0.01
<b>Alcoholism</b>	1.4 (1.03-1.9)	0.02	1.32 (0.94-1.84)	0.1
<b>Cirrhosis</b>	2.18 (1.68-2.82)	< 0.01	1.89 (1.82-2.6)	< 0.01
<b>Congestive heart failure</b>	2.38 (2.02-2.82)	< 0.01	2.17 (1.42-2.52)	< 0.01
<b>Smoking</b>	0.57 (0.48-0.68)	< 0.01	0.6 (0.5-0.71)	< 0.01

**RESULTS**

- A total of 123,285 patients with ascending cholangitis underwent ERCP, and 11,135 (9%) of these patients had PCM.
- The mean age of the PCM group was 68.15 years which was not significantly different from the non-PCM group (p-value 0.86).
- Most patients in the PCM group were males (56%) and whites (62.6%). More patients in the PCM group were alcoholics, had diabetes mellitus, congestive heart failure (CHF), and cirrhosis compared to the non-PCM group.
- After controlling for potential confounders, PCM was associated with higher in-hospital mortality (OR 3.4, CI 2.85-4.04; p< 0.01).
- Moreover, patients with PCM had higher total hospital charges (\$175,726 vs. \$82,824; P< 0.01), and a longer LOS (12.7 vs 6.1 days; P< 0.01). In addition to malnutrition, age > 65 years, non-white race, cirrhosis, and CHF were independently associated with higher in-hospital mortality (Table 1).

**CONCLUSIONS AND RECOMMENDATIONS**

- PCM is a strong predictor of poor clinical outcomes in patients with acute cholangitis admitted for ERCP.
- Systemic comorbidities such as cirrhosis and CHF are often associated with diminished nutritional states which may explain the higher prevalence of in-hospital mortality in the study group.
- Nutritional status is a modifiable risk factor and should be optimized to improve clinical outcomes in hospitalized patients with cholangitis.