

# Impact of Smoking on Clinical Outcomes in Patients with Chronic Pancreatitis: A National Database Study

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## BACKGROUND

- Smoking has been shown to have a dose-dependent, adverse association with chronic pancreatitis
- Several smaller studies showing worsening of disease activity, increased opioid analgesic use, and recurrent hospital admissions

## OBJECTIVES

- To compare clinical outcomes in chronic pancreatitis patients with and without a history of smoking

## METHODS

- Study design: Retrospective case-control study
- Data source: TriNetX, LLC., a large commercial healthcare database which aggregates data from >70 healthcare organizations across the United States comprising more than 100 million patients using ICD-9/10 and CPT codes
- Cases: Adults ≥ 18 years with chronic pancreatitis and a **history of smoking**
- Controls: Adults ≥ 18 years with chronic pancreatitis who were **never smokers**
- Matching: Cases and Controls were propensity matched (1:1 Greedy Nearest Neighbor matching algorithm)
- Matched variables: age, gender, race, BMI ≥ 25, type 2 diabetes, alcohol dependence, hyperlipidemia, cholelithiasis and family history of GI malignancies
- Outcomes of interest: 1. Acute pancreatitis flare, 2. Walled-off pancreatic necrosis (WOPN), 3. Hospital admissions, 4. ICU admissions, 5. Five-year survival, 6. Overall mortality, and 7. Pancreatic cancer incidence
- Analysis: Odds ratio (OR) and 95% confidence interval (CI) were calculated for the outcomes of interest (dichotomous variables), p-values for difference (continuous variables)

**Table 1:** Baseline characteristics of chronic pancreatitis patients with and without history of smoking

	UNMATCHED COHORTS		MATCHED COHORTS	
	Cases (chronic pancreatitis + ever smoker) N = 41,432	Controls (chronic pancreatitis + never smoker) N = 66,852	Cases (chronic pancreatitis + ever smoker) N = 30,318	Controls (chronic pancreatitis + never smoker) N = 30,318
Age at index	54.8 +/- 14.3	55.6 +/- 15.7	54.6 +/- 14.5	54.1 +/- 15.2
White Race	27,235 (66.2%)	42,507 (65.9%)	20,125 (66.4%)	20,104 (66.3%)
Male	24,871 (60.4%)	31,754 (49.2%)	17,460 (57.6%)	17,413 (57.4%)
BMI	26.5 +/- 6.8	27.7 +/- 6.7	26.5 +/- 6.8	28.6 +/- 6.8
Alcohol abuse	10,046 (24.4%)	3,836 (5.9%)	3,996 (13.2%)	3,804 (12.5%)
T2DM	14,909 (36.2%)	16,859 (26.1%)	10,494 (34.6%)	10,888 (35.9%)
Disorders of lipoprotein metabolism	16,969 (41.2%)	18,153 (28.2%)	11,589 (38.2%)	11,818 (39%)
Long term opioid use	7,758 (18.8%)	5,413 (8.4%)	5,395 (17.8%)	3,255 (10.7%)
Cholelithiasis	4,744 (11.5%)	5,863 (9.1%)	3,319 (10.9%)	3,352 (11.1%)

**Table 2:** Outcomes of chronic pancreatitis in smokers vs. non-smokers in the propensity matched cohorts

Outcomes	Risk (n/N and %) or mean (SD) in Cases	Risk (n/N and %) or mean (SD) in Controls	Odds Ratio (OR) or p-value	95% Confidence Interval (CI)
Acute pancreatitis flare	2,815/23,468 (12%)	2,068/25,162 (8%)	<b>1.52</b>	<b>1.43, 1.62</b>
WOPN	621/30,318 (2%)	501/30,318 (1.7%)	<b>1.24</b>	<b>1.10, 1.40</b>
ICU admissions (all-cause)	3,452/30,318 (11.4%)	2,516/30,318 (8.3%)	<b>1.37</b>	<b>1.30, 1.44</b>
Mean # ICU admissions	1.90 (3.55)	2.27 (4.54)	<b>&lt; 0.001</b>	
Hospital admissions (all-cause)	16,574/30,318 (54.7%)	13,211/30,318 (43.6%)	<b>1.56</b>	<b>1.51, 1.61</b>
Pancreatic cancer	848/28,651 (3%)	1,144/28,717 (4%)	<b>0.73</b>	<b>0.67, 0.80</b>
5-year survival	4,275/30,184 (14%)	3,930/30,145 (13%)	<b>1.13</b>	<b>1.08, 1.18</b>
Median survival (days)	5006	6500	<b>&lt; 0.001</b>	

## RESULTS

- Unmatched group: 41,432 chronic pancreatitis patients who had a smoking history (cases), and 66,852 chronic pancreatitis patients who were never smokers (controls)
- After propensity matching, the cases and controls were evenly matched with regard to demographics and risk factors (**Table 1**)
- Overall mortality was 16.2% in cases vs. 15.4% in controls (OR = 1.06; 95% CI = 1.02, 1.11)
- Incidence of WOPN, inpatient admissions, ICU admissions and adjusted 5-year all-cause mortality were all higher among cases when compared to controls (**Table 2**)
- Risk of pancreatic cancer was lower among cases vs. controls

## LIMITATIONS

- TriNetX relies on ICD-9/10 and CPT codes and histopathology information is not available
- Information regarding disease specific outcomes (such as disease specific mortality) is lacking in TriNetX

## CONCLUSIONS

- Patients with chronic pancreatitis who are smokers have worse outcomes when compared to chronic pancreatitis patients who are not smokers
- The reason for the lower incidence of pancreatic cancer among smokers with chronic pancreatitis is unclear and is in contrast with existing literature
- Larger long term prospective studies would be necessary to clarify these associations



TriNetX