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ORIGINAL ARTICLE

Study of Association of Dietary Factors with Severity of Acute Pancreatitis

ALIZA ABIDI[1], HAZRAT BILAL[2], SHAZADI NEELUM AGHA[3], DANYAL ZAHOOR[4], GHULAM SHABBIR[5], IMAM BAKSH[6]
[1]FCPS, Postgraduate trainee General Surgery, Jinnah Postgraduate Medical Centre Karachi.
[2]CPS, Associate Professor General Surgery, Jinnah Postgraduate Medical Centre Karachi.
[3]FCPS, Senior Registrar General Surgery, Jinnah Postgraduate Medical Centre Karachi.
[4]FCPS Postgraduate trainee General Surgery, Jinnah Postgraduate Medical Centre Karachi.
[5]FCPS, Associate Professor and HOD of plastic surgery, Jinnah Postgraduate Medical Centre Karachi.
[6]FCPS, Associate Professor of General surgery, Mekran Medical College Turbat
Correspondence to: Aliza Abidi, Email: liz.abidi@outlook.com

ABSTRACT

Objective: To determine the association of dietary factors with severity of acute pancreatitis (AP).
Materials and Methods: A total of 250 patients who presented in General Surgery unit from Jan-2022 to Dec-2022 were included. Data regarding etiology of AP and demographics of patients was obtained. A special questionnaire was designed to obtain information regarding the dietary habits of patients based on different types of diet. The questionnaire included information regarding use of meat, fat in daily diet, dairy products use, and desserts use.
Results: Mean age of study patients was 48.3±18.5 years. Majority were females, 135 (54%) were females and 115 (46%) were males. There was significant association of meat rich diet and fat rich diet with severity of AP, 81 (60.9%) patients of mild AP had main diet as meat, 47 (68.1%) in moderate AP group and 40 (83.3%) in severe AP group had main diet as meat (p-value 0.01). 15 (11.3%) patients in mild AP, 11 (15.9%) in moderate AP and 13 (27.1%) in severe AP group reported to have use high fat usage in daily diet (p-value 0.03).
Conclusion: Meat rich and fat rich diets are independently associated with severe AP. So modification of diet in-terms of reduction in meat and fat and addition of fibrous food in daily diet can help to reduce in incidence and severity of AP in high risk patients.
Keywords: Acute Pancreatitis, dietary factors, disease severity, meat, fat.

INTRODUCTION

Acute pancreatitis (AP) is an acute pancreatic inflammatory condition with varied involvement of other regional tissues and distant organs.[1] It has been estimated that the incidence of AP ranges anywhere from 4.9 to 73.4 cases per 100000 people across the world.[2] According to the level of pancreatitis, the overall mortality rate can range anywhere from 5% to 20%. The severity of this condition can be broken down into three categories: severe, mild, and moderate.[2] When compared to the death rate associated with mild pancreatitis, which is just 1%, the mortality rate associated with severe pancreatitis is dramatically elevated by 30%. In addition to this, the death rate can reach as high as 80% in individuals who have sepsis and up to 50% in cases of severe pancreatic necrosis.[3] AP is linked to a hospital length of stay of around 30 days and an annual cost of healthcare.[4] In addition, around one fifth of patients who have had an episode of AP are at risk for developing recurrent AP, and approximately ten percent of patients progress to chronic pancreatitis.[5]

Gallstones, hypertriglyceridemia, and specific drugs are just a few of the many etiologies for developing AP. Many studies have examined how alcohol use and cigarette smoking, two significant modifiable risk factors, affect the onset and course of AP.[6, 7] Diet, on the other hand, is a potential significant modifiable risk factor but has not received as much research. The association between particular dietary components and the incidence of AP has been investigated by a few studies.[8]

It can have a substantial impact on patient counseling, risk assessment, and disease prevention when specific dietary habits are found to have the ability to change the clinical course of AP. This study examined the differences in patients' reported eating behaviors in patients of AP and their association with its severity.

MATERIALS AND METHODS

A total of 250 patients of AP who presented in General Surgery unit of Jinnah Postgraduate Medical Centre Karachi from Jan-2022 to Dec-2022. We included patients who fulfilled at-least two of the three criterion of AP e.g. abdominal pain characterising to that of AP, Serum lipase ≥ 3 times the upper limit, and imaging findings suggesting of AP and presentation in hospital within 7 days of symptoms onset. Patients having characteristics of chronic pancreatitis or suggestive of cancer were excluded. Each patient was admitted to the trial and enrolled after providing informed consent.

The etiology of AP, the length of time that organ failure lasted (if any), and the development of any local complications that occurred are all reported. A personal interview with each patient was conducted in order to collect the patients' histories of cigarette smoking and alcohol intake.

A special questionnaire was designed to obtain information regarding the dietary habits of patients based on different types of diet. The questionnaire included information regarding use of meat, fat in daily diet, dairy products use, and desserts use. We used the briefed most questionnaire of diet as it was not possible to get detailed dietary information as the patients were in acute illness.

Data analysis was performed using SPSS v25 software. Chi-square test was applied to determine the association of dietary patterns with severity of AP.

RESULTS

Mean age was study patients was 48.3±18.5 years. Majority were females, 135 (54%) were females and 115 (46%) were males. Among 250, 83 (33.2%) were obese. 77 (30.8%) patients were active smokers and 28 (11.2%) had history of alcohol abuse. Out of 250, 110 (44.0%) patients had gall-stone pancreatitis and 140 (56.0%) had non-gallstone pancreatitis. Out of 250, 133 (53.2%) mild pancreatitis, 69 (27.6%) had moderate and 48 (19.2%) severe pancreatitis (Table 1).

Table 1: Baseline Characteristics.

Age (Y)	48.3±18.5
Male/Female (%)	115 (46%)/135 (54%)
Obese	83 (33.2%)
Active Smoker	77 (30.8%)
Alcohol Abuse	28 (11.2%)
Etiology	
Gallstone	110 (44.0%)
Non-gallstone	140 (56.0%)
Severity of AP	
Mild	133 (53.2%)
Moderate	69 (27.6%)
Severe	48 (19.2%)

Association of dietary factors with severity of AP was determined, 81 (60.9%) patients of mild AP had main diet as meat, 47 (68.1%) in moderate AP group and 40 (83.3%) in severe AP group had main diet as meat (p-value 0.01). 15 (11.3%) patients in mild AP, 11 (15.9%) in moderate AP and 13 (27.1%) in severe AP group reported to have use high fat usage in daily diet (p-value

0.03). regarding daily use of fruit and vegetables, 53 (39.8%) patients in mild AP group, 26 (37.7%) in moderate AP group and 17 (35.4%) in severe AP group reported the use of fruits and vegetables three times a day. 32 (24.1%) in mild AP, 18 (26.1%) in moderate and 11 (22.9%) in severe AP group reported daily used of desserts (p-value 0.89) [Table 2].

Table 2: Association of Dietary Factors with Severity of AP.

	Severity of AP			P-value
	Mild (N=133)	Moderate (N=69)	Severe (N=48)	
Main Diet				
Meat	81 (60.9%)	47 (68.1%)	40 (83.3%)	0.01
Vegetables	52 (39.1%)	22 (31.9%)	8 (16.7%)	
Fat percentage in daily use				
High	15 (11.3%)	11 (15.9%)	13 (27.1%)	0.03
Intermediate	68 (51.1%)	36 (52.1%)	27 (56.2%)	
Low	50 (37.6%)	22 (32.0%)	08 (16.7%)	
Dairy products usage				
Daily	96 (72.2%)	51 (73.9%)	36 (75.0%)	0.91
Seldomly in a week	37 (27.8%)	18 (26.1%)	12 (25.0%)	
Fruits/Vegetables including Salads Usage				
Daily 3 servings	53 (39.8%)	26 (37.7%)	17 (35.4%)	0.85
< 3 times	80 (60.2%)	43 (62.3%)	31 (64.6%)	
Desserts Usage				
Daily	32 (24.1%)	18 (26.1%)	11 (22.9%)	0.89
Weekly	38 (28.6%)	23 (33.3%)	16 (33.3%)	
Rarely	63 (47.3%)	28 (40.6%)	21 (43.8%)	

DISCUSSION

AP is connected with a major increase in morbidity, a significant increase in mortality, and high costs due to healthcare related expenses (12). In light of the fact that there is now no disease-specific treatment available, it is of utmost importance to find modifiable risk factors that can either prevent AP or alter its potentially severe clinical course. Being an alluring modifiable risk factor for this potentially debilitating disease, the effect of diet on the development of AP has been alluded to for years in medical literature. This is because diet represents an enticing risk factor that can be modified. On the other hand, the precise influence that a person's typical diet has on the clinical course of AP and the degree of illness severity has not been investigated till now.

Setiawan et al. in a study on dietary factors for reducing the risk of AP including 2432 patients of AP, the authors reported high intake of red meat, saturated fat, cholesterol and eggs rich diet as significant dietary factors of gallstone related AP.[9] Another study by Prizment et al. on risk factors in older women with CP and AP reported that protein and fat rich diet are important factors contributing to the occurrence of AP and CP in older women.[10] Our study results support these findings as we find a significant association between meat rich and fat rich diet with severity of AP.

Another recent analysis by Dugum et al. reported that meat rich diet has a significant association with severity of AP (71.6% patients in mild, 67.4% in moderate and 84.3% in severe AP had meat rich diet), however the study did not find significant association between fat rich diet and severity of AP (12.3% patients in mild, 15.5% in moderate and 25.0% in severe AP had fat rich diet).[11]

There are a number of theorized processes that explain how a diet high in meat (and, consequently, fat) and low in vegetables can have an effect on the clinical course of AP. To begin, the pancreas receives a significant amount of stimulation from both meat and fat, which is related with an increase in the amount of cholecystokinin that is secreted. Second, specific components of the diet have the ability to affect the inflammatory cascade by adding reactive oxygen and nitrogen species, both of which have been linked to the pathogenesis of autoimmune polyarthritis (AP).[12] The pancreas can become more sensitive to oxidative stress and AP when there is an imbalance in the antioxidant level. This imbalance can be partly driven by dietary variables. This hypothesis has been supported by the findings of a prospective study that was conducted on a population-based cohort in Sweden over a period of 12 years. The study found a strong negative linear dose-response link between eating vegetables and the risk of AP that was not caused by gallstones. The researchers hypothesized that vegetables, which are high in antioxidants like vitamin C and beta-carotene, would maintain a healthy redox balance and prevent the onset of AP.[13] Finally, it has been demonstrated that a diet high in fat, which is what a diet that is predominantly centered on meat is, can cause pancreatitis in rats and exacerbate the alcohol induced organ damage.[14] In the fourth place, the makeup of gut microbiota is significantly impacted by dietary choices.[15] It is likely that nutrition may be acting as a critical disease modifying factor by affecting the composition of the gut microbiota and producing a pro-inflammatory state, hence increasing the risk of AP and making the clinical course of the disease worse. Tan et al. found that the populations of gut Enterobacteriaceae and Enterococcus were larger, while the populations of Bifidobacterium were lower, in AP patients. This was in comparison to healthy people.[16]

The most important strengths of this study are that the patients were recruited in a prospective manner, the sample size was large, all AP patients were included, no matter what was the disease etiology, the diet questionnaire was collected through a personal interview, and there were enough controls for confounders.

CONCLUSION

Meat rich and fat rich diets are independently associated with severe AP. So, modification of diet in-terms of reduction in meat and fat and addition of fibrous food in daily diet can help to reduce in incidence and severity of AP in high risk patients.

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