

Malnutrition and antioxidant status in acute and chronic pancreatitis

Laszity N., Gyökeres T.*, Németh É.*, Varga M.*, Pap Á., Antal M.

NCPH Institute of Food Hygiene and Nutrition

*Department of Gastroenterology MÁV Hospital, Budapest

Introduction

Acute pancreatitis (AP) is a hypermetabolic inflammatory disorder accompanied by high protein catabolism and increased energy requirements. The catabolic stress and absence of oral intake increase the risk of protein-calorie malnutrition (PCM). In chronic pancreatitis (CP) progressive pancreatic enzyme insufficiency causes maldigestion and nutrient deficiencies.

Oxygen free radicals have been involved in the development and progression of acute and chronic pancreatitis. Depletion of antioxidants in these patients may impair recovery and increase the risk of complications.

We measured antioxidant status and the incidence of protein malnutrition evaluating different serum biomarkers in patients with acute and chronic pancreatitis.

Patients and Methods

Patients data	Acute pancreatitis (A P) n=40	Chronic pancreatitis (CP) n=40	Control group n=20
Etiology Alcohol	18	28	
Biliary	17	11	
Other	3	3	
Age (years)	27-83	19-72	28-67
Male/female	25/15	32/13	12/8
BMI (kg/m ²)	24.7 (16.7-31.5)	22.6 (15.7-27.7)	26.3 (20.3-29.2)
CRP (mg/dl)	45 - 497	0.1 - 85	
Severity	Severe: 9 Mild-severe: 31		

	Acute pancreatitis	Chronic pancreatitis
Treatment	Jejunal feeding from 1. day (2000-1500 kcal/day) (Nutrison Standard, Nutricia)	Pancreatic enzyme supplementation Diet

In A P on admission, day 7, and 14, and in CP a control examinations were determined on day 0.

Antioxidant status

Superoxide Dismutase SOD activity (nanokatal) in erythrocytes
Total antioxidant status TAS (serum)

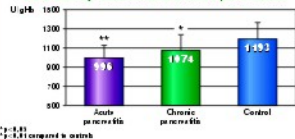
Protein status

Serum albumin, prealbumin and transferrin concentration

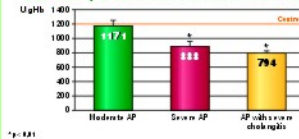
Standard laboratory tests (C-reactive protein)

Anthropometry: body weight and height - BMI

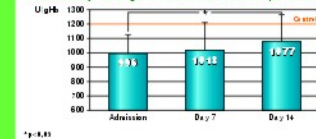
SOD activity in acute and chronic pancreatitis



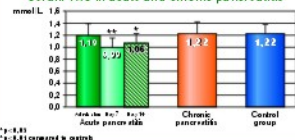
SOD activity at admission in different forms of AP



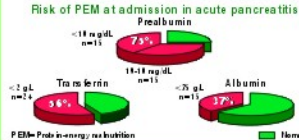
SOD activity during the treatment in acute pancreatitis



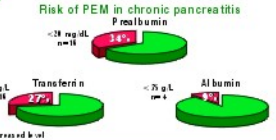
Serum TAS in acute and chronic pancreatitis



Risk of PEM at admission in acute pancreatitis



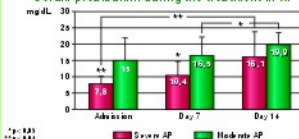
Protein status



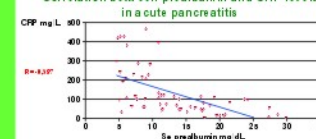
Serum prealbumin levels in acute and chronic pancreatitis



Serum prealbumin during the treatment in AP



Correlation between prealbumin and CRP levels in acute pancreatitis



Protein status in acute and chronic pancreatitis

5 mm biomarkers	Acute pancreatitis			Chronic pancreatitis	
	Admission	Day 7	Day 14	Alcoholic	Other
Prealbumin (mg/dL)	12.3 ^a ± 6.3	14.8 ± 5.0	16.1 ^a ± 6.3	16.6 ^b ± 6.3	30.2 ^b ± 5.7
Albumin (g/L)	36.4 ± 5.2	34.6 ± 4.6	36.2 ± 5.7	40.2 ± 7.3	40.9 ± 5.5
Transferrin (g/L)	1.75 ± 0.55	1.82 ± 0.65	1.82 ± 0.62	2.27 ^c ± 0.42	2.40 ^c ± 0.16

Values are mean ± SD (n=40 for acute pancreatitis, n=40 for chronic pancreatitis, n=20 for control). *p < 0.05, **p < 0.01, ***p < 0.001.

Results

- The SOD activity was significantly decreased in acute and chronic pancreatitis. In AP serum TAS were depleted during the treatment.
- Prealbumin concentrations provided the earlier and more accurate assessment of protein status than the other markers.
- Prealbumin correlated to severity of disease and inflammation in AP.
- Malnutrition developed more frequently in alcohol related pancreatitis.
- Jejunal feeding prevented nutritional deterioration in AP.

Conclusions

Serum prealbumin seems to be a sensitive biomarker of protein status and of inflammation severity.

These data call for our attention to reconsider the nutritional support and antioxidant treatment of patients with acute and chronic pancreatitis.

References

- Ingraleek Y, Young V: Transferrin (Prealbumin) in health and disease: Nutritional implications. *Annu Rev Nutr* 1994, 14: 495-522.
- Eckardt G, Andersson R: Early enteral nutrition in severe acute pancreatitis. *Scand J Gastroenterol* 2001, 36: 449-459.
- Windsor ACJ, Karwaar S, et al: Compared with parenteral nutrition, enteral feeding attenuates the acute phase response and improves disease severity in acute pancreatitis. *Gut* 1999, 42: 917-925.
- Schreiber NH, Esh D, et al: Oxidative stress in acute and chronic pancreatitis. *Am J Clin Nutr* 1995, 62: 1266-1274.