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OBESITY - RISK FACTOR FOR ABDOMINAL COMPARTMENT SYNDROME IN PATIENTS WITH ACUTE PANCREATITS

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Summary

Acute pancreatitis is one of the few surgical pathologies that over the past two decades have seen a significant evolution in terms of therapeutic management. There were also made constant efforts to identify prognostic factors in this pathology. However, the prognosis of patients with acute pancreatitis remains reserved. Increasing incidence of obesity has led to establishing correlations between it and acute pancreatitis, but also between the body-mass index and prognosis of patients with acute pancreatitis. The goal of our study was to determine whether there is a link between obesity and the evolution of patients with acute pancreatitis who develop intra-abdominal hypertension (IAH) during the episode of illness. In our research we retrospectively analyzed a total of 269 patients with acute pancreatitis. The results showed a link between obesity, measured by body mass index, and the development of intra-abdominal hypertension syndrome during the episode of acute pancreatitis, but also between the presence of obesity and prognosis of patients with acute pancreatitis who developed the syndrome of intra-abdominal hypertension, measured by the number of days of hospitalization and mortality.
Key words: acute pancreatitis, obesity, intra-abdominal hypertension, abdominal compartment syndrome

Résumé

L'obésité - facteur de risque pour le syndrome du compartiment abdominal chez les patients avec pancréatite aiguë

La pancréatite aiguë est l'une des rares pathologies chirurgicales pour laquelle on a vu une évolution significative en termes de prise en charge thérapeutique au cours des deux dernières décennies. On a fait des efforts constants afin d'identifier les facteurs prédictifs dans cette pathologie. Cependant, le pronostic des patients atteints par la pancréatite aiguë reste réservé. L'augmentation de l'incidence de l'obésité a conduit à l'établissement des corrélations entre cette dernière et la pancréatite aiguë, mais aussi entre l'indice de masse corporelle et le pronostic des patients atteints par la pancréatite aiguë. Le but de notre recherche est de déterminer s'il y a un lien entre l'obésité et l'évolution des patients atteints par la pancréatite aiguë qui développent une hypertension intra-abdominale (IAH) au cours de l'épisode de la maladie. Dans notre recherche, nous avons analysé rétrospectivement un total de 269 patients atteints par la pancréatite aiguë. Les résultats ont montré un lien entre l'obésité, mesurée par l'indice de masse corporelle, et le développement du syndrome de l'hypertension intra-abdominale pendant l'épisode de la pancréatite aiguë, mais aussi entre la présence de l'obésité et le pronostic des patients atteints par la pancréatite aiguë qui ont développé le syndrome intra hypertension -abdominal, mesurée par le nombre de jours d'hospitalisation et de mortalité.
Mots-clé: pancréatite aiguë, l'obésité, l'hypertension intra-abdominale, syndrome du compartiment abdominal

Introduction

Acute pancreatitis is one of the surgical pathologies that in the last two decades have seen a significant evolution in terms of therapeutic management. [1]

In the last decade increased incidence of obesity has led to more research in connection with its involvement as a risk factor in the onset of various diseases [2-3]. One of these is acute pancreatitis. The studies we found in literature have shown that development of cases of acute pancreatitis is largely influenced by obesity [5-6].

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Intra-abdominal hypertension (IAH) and abdominal compartment syndrome (ACS) are different notions that do not overlap, but that are evolutionary stages of the same pathophysiology process. Although over the years there have been proposed various definitions for ACS, the most accepted is the so-called triad compartment syndrome [7-9], characterized by:

1. Pathological condition caused by a sharp rise in intra-abdominal pressure over 20 to 25 mmHg (27.2 to 34 cm H2O);
2. Dysfunction of organs and systems with the occurrence of severe complications lesion; vicious circle created by the ischemia – reperfusion syndrome;
3. Abdominal surgical decompression has favorable results.

It is known that IAH / ACS is a complication of acute pancreatitis linked to increased mortality [10], so it is important to identify patients at high risk of developing complications in general and especially intra-abdominal hypertension syndrome in order to adopt a therapeutic management correctly and early. In this regard we have to identify the risk factors incriminated in the occurrence of the syndrome in patients with acute pancreatitis. One of the risk factors for acute pancreatitis, but also the unfavorable development of patients is obesity [11-12]. So the question "Is the presence of obesity in patients with acute pancreatitis increasing the risk of IAH / ACS and does it represent a negative prognostic factor for patients with acute pancreatitis associating HIA / SCA?" becomes particularly legitimate.

Material and Methods

We conducted a retrospective, observational, descriptive, single-center study in the General Surgery and Emergency III Department of the University Emergency Hospital Bucharest aiming at inpatients during the period 1 January 2005 - December 31, 2012 with the diagnosis of acute pancreatitis on admission and confirmed at discharge. Criteria for inclusion or exclusion that led to the selection of patients entered into the study are presented in table 1.

The study included 269 patients diagnosed with acute pancreatitis and IAP on admission with values greater than 5 mmHg. Depending on the presence or absence of IAH / ACS in the evolution of the 269 patients included in the study, they were divided into two groups:

1. The control group =patients who did not develop IAH syndrome during hospitalization (167 cases).
2. Group IAH / ACS = Patients who developed IAH syndrome during hospitalization (102 cases).

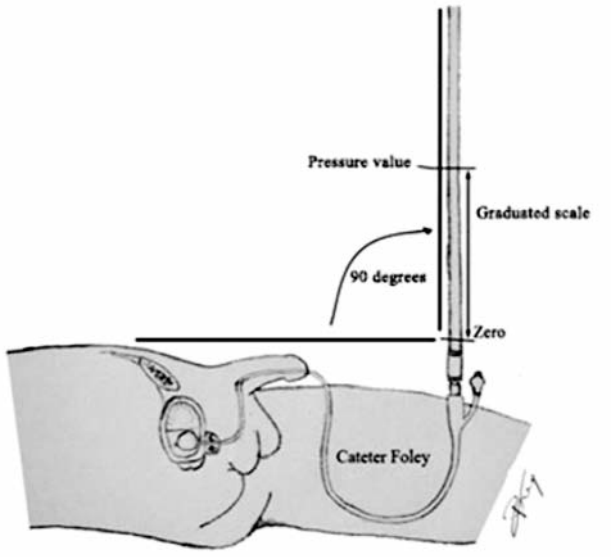


Figure 1 - Technique of IAP measurement

In our research we used transvesical measurement of IAP. The technique of measuring IAP transvesical can be achieved by several methods. In the clinic where the study was conducted the measurement was performed using a system of three-way valves between the probe bladder, the filling system, the transducer and the collecting bag. Zero reference point is located at the middle axillary line, with the patient in the supine position. After the pressure is balanced, it is measured the water column which indicates IAP (measured in cm H2O) or its value is read from the integrated-circuit pressure transducer. For expressing IAP value in mmHg conversion is required. The conversion factor from cm H2O to mmHg is 0.74 mmHg and 1.36 vice versa.

During 2005-2009 the pressure transducer did not exist in the clinic so the measure of IAP was made based on the measurement of the length of the water column (fig. 1).

Table 1 - Criteria for inclusion / exclusion of study

INCLUSION CRITERIA	EXCLUSION CRITERIA
• Outpatient Surgery Clinic III of Bucharest University Emergency Hospital with the diagnosis of: - Acute pancreatitis	• Patients who were initially admitted to another medical unit and there are no accurate records of their progress
• The existence in the observation charts of all the variables needed to monitor patients with IAH / SCA and BMI.	• Patients who were admitted from the beginning to the Surgery Clinic III of the University Emergency Hospital with a diagnosis of acute pancreatitis, but there are no accurate records of quantified variables and the attitude held
• Minimum Age 18	• Patients who have a contraindication to bladder catheterization
• IAP measured at admission > 5 mmHg	• Patients whose discharge diagnosis was acute pancreatitis but who do not present an IAP above 5 mmHg on admission

Results

We made the first analysis of the study trying to identify the extent to which BMI is a determining factor in the occurrence of intra-abdominal hypertension syndrome. Analytical analysis of BMI values linked to the number of patients revealed a moderate correlation of BMI with the emergence IAH / ACS in the evolution of patients with acute pancreatitis (Pearson r correlation coefficient = 0.3064) (fig. 2).

The second stage was to assess patient outcomes belonging to the group that developed the IAH / ACS in relation to BMI value. For this we considered factors of severity of the episode of acute pancreatitis complicated by HIA / SCA, the total number of days of hospitalization and mortality.

In terms of number of days of hospitalization for the category of patients with elevated body mass index up to 40, the correlation is an average one being approximately homogeneous scattered. For values of BMI above 40, there is an exponential increase in them (fig. 3).

Regarding mortality, figure 4 highlights the correlation between the value of BMI and it. The area under the ROC curve graph reveals a significant amount of 0.642 and thus it can be concluded that there is an increased risk of death in obese patients (fig. 4).

Discussions

Evaluation of patients with acute pancreatitis who developed IAH syndrome based on BMI value revealed a greater number of patients with elevated degree of obesity compared to those with normal BMI. The results are consistent with literature that argues that obesity predisposes to complications during the evolution of patients with acute pancreatitis [13].

BMI value represented in our research a predictive factor for a prolonged hospitalization for the patient with acute pancreatitis who developed IAH / ACS. This result leads us to ask whether obese patient approach should be much different from that of a normal weight patient and whether the therapeutic management should be established by this factor. These questions were not the subject of our study, therefore we cannot answer them but we can draw attention to the necessity of considering BMI between the elements guiding the type of management in patients with acute pancreatitis.

The literature cites a higher mortality in patients with obesity regardless of pathology incriminated in the appearance of IAH / ACS [14], our study has revealed results consistent with these studies, BMI is correlated with mortality, which means that patients with an increased BMI value have a higher risk of death during the evolution of the episode of acute pancreatitis complicated with IAH/ ACS.

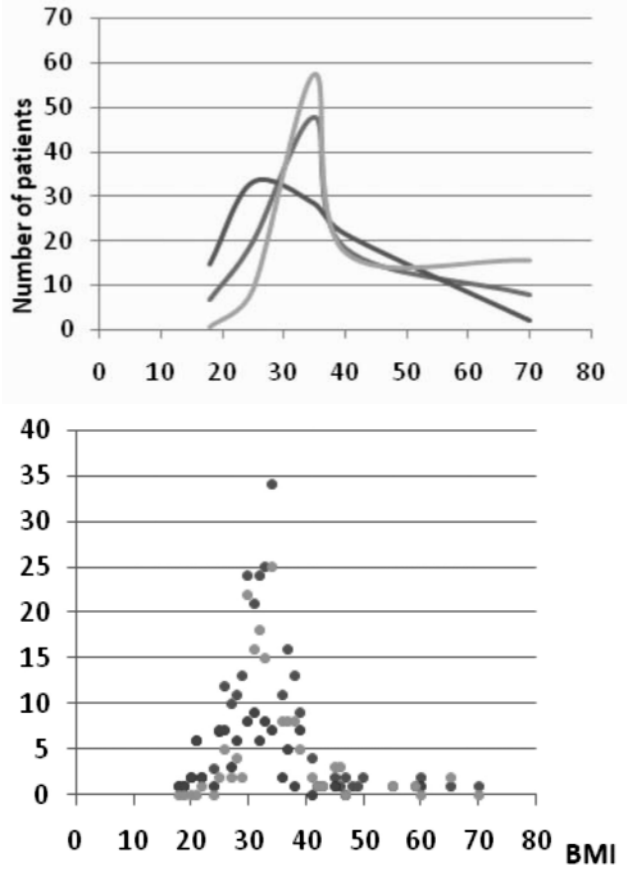


Figure 2 - The distribution of body mass index values in the studied (red=control group, green =group IAH/ACS, blue=total group)

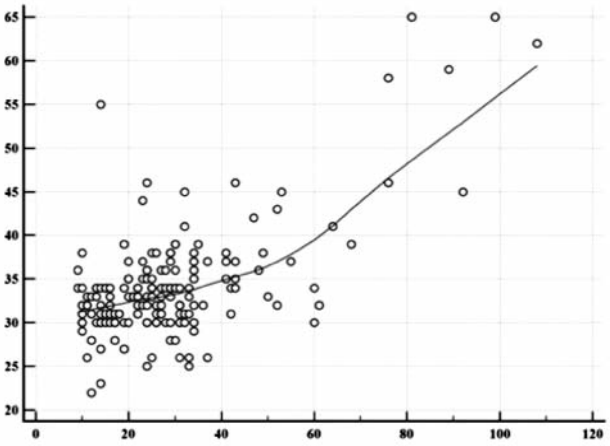


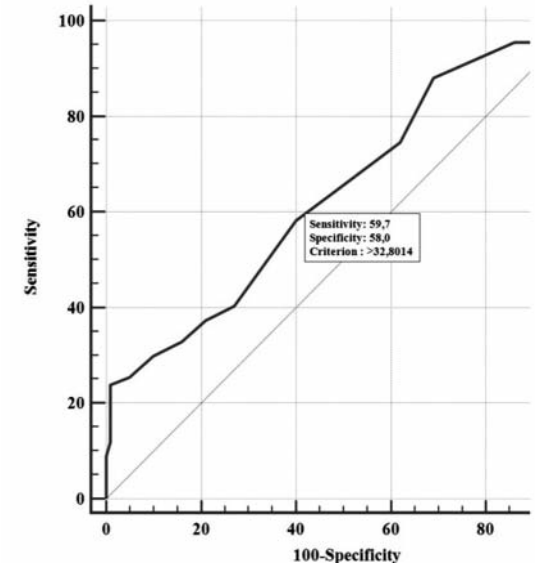
Figure 3 - Correlation of body mass index (vertical) with the total number of days of hospitalization (horizontal)

Conclusions

Obesity is a predictive factor for the occurrence of IAH syndrome in the evolution of patients with acute pancreatitis.

Obesity is a determinant factor of evolution in

Figure 4 - Body mass index correlation with mortality



Aria under the ROC curve	0,642
Standard error	0,0439
Trust interval (95% probability)	0,564 to 0,714
Calculated z	3,232
Empirical level of significance (Aria=0.5)	0,0012

patients who develop during the episode of acute pancreatitis intra-abdominal hypertension syndrome.

It is necessary to study further the impact that obesity has on the development of patient with acute pancreatitis, so that the chosen therapeutic management to be optimized.

The results of this research represent an additional argument to start campaigns for the prevention of obesity which is rapidly growing in young population and can have a major impact in the coming decades.

The development of clinical wards for patients with morbid obesity who develop acute pancreatitis should be considered, the benefits being diagnostic as well as therapeutic.

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