

Assessment of Intensivists' Knowledge on Abdominal Compartment Syndrome

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Summary: Silva JPL, Teles F – Assessment of Intensivists' Knowledge on Abdominal Compartment Syndrome.

Background and objectives: Early recognition of abdominal compartment syndrome (ACS) is essential, as delay in the diagnosis may induce a negative impact on prognosis. However, there are some evidences suggesting a low level of knowledge concerning ACS in intensive care units (ICU). The aim of this study was to evaluate the intensivist's knowledge on ACS.

Methods: We distributed 49 questionnaires, with 13 multiple choice questions, in seven ICU, which addressed the concept, diagnosis, and management of ACS.

Results: Thirty-two questionnaires were answered. Forty-seven percent of respondents have more than 16 years of medical practice and spend more than 50% of their time in ICU. Although 75% reported having knowledge of ACS' concept, only 34% had measured intra-abdominal pressure (IAP). The most used method for measurements was urinary catheterization (91%). For 37%, the frequency of measurement should be based on clinical data rather than IAP values. Regarding the indication to IAP monitoring, the choices were performing the measurement after urgent laparotomy (25%), in massive volemic replacement (18%) and in other hazardous conditions (57%). The lack of information about measurement techniques was the main reason for not measuring IAP. Most respondents (90%) suggested the measurement of IAP as a routine in ICU.

Conclusion: Intensivists' knowledge on ACS was low, as most were not able to measure, interpret the results and recognize important risk factors for IAP. These data demonstrate that educational efforts concerning ACS are necessary in order to standardize the measurement of IAP in populations at risk, aiming at a better outcome in critically ill patients.

Keywords: Intra-Abdominal Hypertension; Compartment Syndrome/diagnosis; Questionnaires.

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INTRODUCTION

Abdominal compartment syndrome (ACS) comprises a set of clinical manifestations, mainly in cardiovascular, respiratory, and renal systems, resulting from intra-abdominal hypertension (a pathological, sustained rise in intra-abdominal pressure > 12 mm Hg)¹. It has a very variable incidence, which depends on profile of studied patients².

Although intra-abdominal pressure (IAP) and its changes have been studied for nearly 150 years, the pathophysiologic implications of intra-abdominal hypertension (IAH) and its negative influence on the evolution of critical patients were only discovered in the last two decades³.

Both IAH and ACS are associated with increased mortality in critically ill patients due to multiple organ dysfunctions. Thus, delay in diagnosis of these complications may have a negative impact on these patients^{4,5}.

The first step towards diagnosis and treatment of ACS is the measurement of IAP, with transvesical technique being the most indicated method due to its simplicity, minimal invasiveness, and low cost^{6,7}.

Although the knowledge on ACS has grown substantially in recent years, recent data show a relatively low frequency of IAP measures in patients at risk for ACS in referral hospitals. The lack of knowledge of the intensive care unit (ICU) professionals on disease is one of the hypotheses to explain this fact⁸.

The aim of this study was to evaluate the knowledge of critical care physicians on diagnosis and management of abdominal compartment syndrome.

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METHODS

We conducted a descriptive and transversal study developed by collecting data from a questionnaire consisting of 13 questions. After approval by the Ethics Research Committee, the questionnaire was sent to seven secretaries of the largest intensive care units (ICUs) in the city of Maceió, which at that time had 11 units in full operation. The questionnaire addressed the following topics: (1) time of graduation in medicine, which was measured at intervals of 5 years (1-5, 6-10,

11-15, and over 16 years of graduation); (2) experience training in intensive care medicine, which was measured by the weekly workload devoted to intensive care (less than 25%, between 26% and 50%, 51% and 75%, and over 75%); (3) knowledge on abdominal compartment syndrome concept (yes or no); (4) measurement of IAP during his attendance in ICU (yes or no). If the answer is YES, proceed to item 5. If the answer is NO, proceed to question 11; (5) method of IAP measurement (intravesical, stomach, other); (6) indication of IAP measurement (urgent laparotomy, massive fluid resuscitation, mechanical ventilation, lung injury, clinical suspicion of ACS); (7) measurement frequency (0-4 hours, 4-8 hours, every 12 hours, every 24 hours, or only when clinically indicated); (8) recommendation for surgical intervention based on IAP level (12 mm Hg, 13 and 20 mm Hg, 21 and 30 mm Hg, > 31 mm Hg, or rely on clinical signs); (9) knowledge on IAH adverse effects (yes or no); (10) knowledge of the World Society of the Abdominal Compartment Syndrome definitions (yes or no); (11) frequency of ACS diagnosis during intensive care attendance (< 25%, 26%-50%, 51%-75%, > 75%). Finally, the respondent was asked to give his opinion on the need to establish a routine measurement of IAP in the intensive care units where he worked.

Data were collected and analyzed based on the definitions and recommendations of the World Society of the Abdominal Compartment Syndrome.

RESULTS

Of the 49 questionnaires sent, 32 were completed. Regarding the time of professional practice and amount of hours devoted to intensive care, 37.5% of physicians spent between 25% and 50% of their time in ICU. Other 40.5% spent more than 50% of their time attending critically ill patients, with more than half of them dedicating more than 75% of their day (Table I). Almost half of respondents (46.87%) had more than 16 years of medical practice, and a minority (6.25%) had less than five years graduation. Regarding ACS definition, 75% of intensivists reported having knowledge of ACS concept, but only 34% had measured IAP. Among these, 91% used urinary catheter as a method of choice for measurement (Table II). With regard

Table I – General Data of Sample

Total sample	32
Graduation time	
1-5 years	2 (6.2%)
6-10 years	9 (28.1%)
11-15 years	6 (18.7%)
> 16 years	15 (46.8%)
Weekly hours spend on ICU	
< 25%	7 (21.8%)
25-50%	12 (37.5%)
51-75%	6 (18.7%)
> 75%	7 (21.8%)
Night shift	26 (81.2%)
Daily shift	6 (18.8%)

Table II – Indications and Methods Used for Measurement of IAP

IAP measurement indications	
Postoperative laparotomy	25%
After fluid resuscitation	18%
Mechanical ventilation in ARDS	0%
Only in other risk condition	57%
Method used for IAP measurement	
Intravesical	91%
Intragastrical	9%
Other	0%

IAP: intra-abdominal pressure.

to indications for measuring IAP, 25% opted for measuring it after urgent laparotomy, 18% after massive fluid resuscitation, and more than half of respondents (57%) chose to measure only other risk conditions (Table II). As for those who reported having measured IAP, most of them (37%) said that the frequency of IAP measurement should be based on clinical data from patient. The remainder answered that there should be a standardized frequency, whereas 18% worked with intervals of 8h, 18% of 12h, and 27% of 4h between measurements. Regarding surgical intervention based on IAP level, 45% chose levels > 12 mm Hg, 37% > 20 mm Hg, 9% > 30 mm Hg, and 9% said to base themselves on clinical parameters and not on IAP.

Most physicians evaluated (40%) said they did not measure PIA for lack of knowledge of the measurement technique. Thirty-two percent stated that, at the units where they worked, they have never examined patients at risk for IAH/ACS. Twenty-four percent said they did not measure PIA for lack of knowledge on how to interpret it, and only one percent considered it a waste of time. When asked about knowledge of the main adverse effects of IAH, 65.6% said they were aware, while 34.4% said ignoring such effects. With respect to the consensus definitions by the World Society of the Abdominal Compartment Syndrome, the vast majority (78.2%) claimed to be unaware of such definitions. Ninety percent of intensivists stated that the frequency of ACS diagnosis made into the ICU where they worked was small (less than 25%). Most respondents (87.8%) stated that IAP measurement should be routine at ICUs in which they worked.

DISCUSSION

In this study, approximately 47% of respondents have practiced medicine for over 16 years and most (77.3%) devoted more than 50% of their time to intensive care, which indicates that this sample is composed of professionals that should be familiar with the diagnosis and management of ACS.

It is known that ACS signs and symptoms in critically ill patients may be confused with those of primary disease patients, which makes IAP measurement crucial for its diagnosis. It was found that most respondents (75%) claimed to have knowledge of ACS' concept. However, only 34% of them had measured IAP during their medical attendance in ICU. When asked

about the reasons for not performing measurement, most replied that it was not routine at the units in which they worked. In a previous study also evaluating critical care physicians, it was found that 98.5% of respondents were aware of the ACS' concept and 75.8% had performed IAP measurement during their time of medical practice⁸. In recent analysis carried out in Germany, it was observed that although most intensivists are familiar with the theoretical knowledge of ACS, 25% had never measured IAP, which was considered a result of lack of information about ACS⁹. The main reasons for professionals of some intensive care units not measuring IAP are: lack of knowledge about the importance of IAH/ACS and difficulties in interpreting the results obtained from measurements¹⁰.

Among professionals who have measured IAP in our study, most performed intravesical measurement (91%), which is the method recommended by the international guidelines for ACS, as this technique is considered the least invasive, low cost, easy to perform, not entail greater risks to the patient, and can be performed even outside the intensive care units, as in the wards^{11,12}.

Current guidelines recommend IAP measurement under the following conditions: (1) need for resuscitation (shock, severe burn); (2) increased content of hollow viscera (gastroparesis, ileus, colonic pseudo-obstruction); (3) increased intra-abdominal contents (ascites, hemoperitoneum, acute pancreatitis); (4) sepsis with organ dysfunction; (5) acute respiratory failure, mainly secondary to acute respiratory distress syndrome (ARDS)¹³. Mechanical ventilation, especially when dealing with high levels of positive end-expiratory pressure (PEEP), may increase IAP, which explains the higher prevalence of ACS in patients with ARDS¹⁴. Despite this fact, none of the respondents indicated the measurement for patients with ARDS. Moreover, when asked in which patients they would indicate IAP measurement, more than half of respondents (57%) did not indicate it for clinical conditions, such as sepsis with significant fluid replacement. This finding is of concern because, currently, the fluid resuscitation, which is part of the septic shock treatment, is the leading cause of IAH in intensive care units¹⁵.

As for the frequency with which the IAP should be measured, the current recommendation, based on the last conference on IAH/ACS, is that IAP should be measured every 4 hours, if the first result is high. This frequency is warranted to confirm the diagnosis and for monitoring the outcome of eventual therapeutic measures aimed at reducing IAH. In our study, only 27% of respondents said that measurement should

be performed every 4 hours. Most (37%) responded that the interval should be based on clinical and physical examination of patients. However, it has been shown that the clinical examination sensitivity in ACS is low¹⁶.

Currently, there are few options available for treatment of ACS. In some patients, IAH is caused by intraperitoneal accumulation of fluid, and percutaneous drainage in these patients may be an option¹⁷. Other therapies that have proven effective include ultrafiltration (hemodialysis), use of neuromuscular blockers, and decompressive laparotomy¹⁸⁻²⁰. When questioned about the best time for surgery, 37% of respondents chose to intervene with IAP levels above 21 mmHg and 9% decided to intervene based solely on patient's clinical findings.

Only a small proportion of respondents (21.8%) have knowledge of the definitions made by the World Society of the Abdominal Compartment Syndrome. This proves the need for dissemination of the guidelines that guide the management of IAH and ACS. Interestingly, despite the low theoretical and practical knowledge of the professionals interviewed about IAH/ACS, we found that most of them (87.8%) considered evaluation of IAP important in patients at risk and suggested that it should be applied routinely in ICUs in which they worked. Lack of protocols was the main reason for not measuring IAP by most of these professionals, indicating the importance and need for creating this routine in ICUs.

Our findings are similar to those of other national and international researches, which demonstrate that intensivists have basic knowledge about the concept and diagnostic methods in ACS, but very little practical application (IAP measurement). Furthermore, it was shown that they have a very low knowledge of disease important aspects, such as the main causes of ACS and measurement frequency of IAP.

These findings highlight the need for educational campaigns in order to emphasize ACS early diagnosis impact on prognosis of critically ill patients, as well as to develop protocols for assessing IAP in ICUs.

CONCLUSIONS

The knowledge of intensivists on ACS was low, as most did not know how to measure IAP, interpret the result of measurements, and did not know which patients were at risk for disease. The methods for measuring IAP should be more widespread, aiming at better management of critically ill patients.

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