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IMPORTANCE OF THE APPLICATION OF THE EXTENDED FOCUSED ASSESSMENT WITH SONOGRAPHY FOR TRAUMA (EFAST) PROTOCOL IN A TRAUMATOLOGY REFERRAL HOSPITAL IN THE SOUTHERN REGION OF RIO DE JANEIRO

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ABSTRACT

INTRODUCTION: To demonstrate the need to apply the EFAST protocol in a regional hospital of high complexity in traumatology in the South of Rio de Janeiro. Analyze the costs involved in the hospitalization and treatment of trauma patients at this hospital.

METHODOS: Epidemiological, observational, and retrospective study, assessing the need for radiological or surgical interventions in the care of traumatized patients in a traumatology referral hospital. The analysis of hospitalization costs, unnecessary exams and non-therapeutic surgeries.

RESULTS: No national EFAST payment table was found. There is an expenditure of 20.9% more with the unnecessary use in exams and when comparing values between the use of ultrasound as the first diagnostic method instead of computed tomography, the hospital could save 79.12% per patient.

DISCUSSION: It is important to prepare your own pay table for EFAST. After data analysis, there are possible financial and therapeutic advantages of applying the EFAST protocol in the emergency department of a referral hospital in the southern region of Rio de Janeiro.

KEYWORDS: EFAST EXAM, COST-BENEFIT, TRAUMA CENTERS, ULTRASONOGRAPHY, INTERVENTIONAL.

INTRODUCTION

Trauma represents a significant public health problem and is among the main causes of mortality in the world with an important human and economic cost.[1] The possibility of non-surgical treatment in polytrauma patients appears to decrease exploratory laparotomies. Studies question the mandatory nature of therapeutic laparotomies in patients suffering from abdominal injuries, demonstrating that in select cases, non-operative treatment can be used satisfactorily. The application of portable devices to detect a serious injury can alter the natural course of the disease and assist in making therapeutic decisions. Except in clinical conditions such as hemodynamic instability, signs of peritonitis or evisceration where laparotomy is indicated, other diagnostic methods such as diagnostic peritoneal lavage (DPL), ultrasound (US), abdominal computed tomography (CT) and videolaparoscopy (VL) can be used in emergency care. Therefore, new ways are sought to manage trauma in a less interventionist, more humanistic and less burdensome way to the health system.[1,2]

Ultrasonography was first used in Europe in trauma patients in the 1970s. However, it was not immediately adopted in the United States, where it was only in the 1990s that it was included in routine trauma assessment, when it became "Focused Assessment with Sonography in Trauma - FAST" and, since then, it has spread throughout the world. As it is a reproducible diagnostic tool, free of ionizing radiation, realizable at the bedside with dynamic images in real time, non-invasive and less costly, [3,4] the largest trauma reference centers in the world have started their use as initial patient screening of the trauma victim.

The use of ultrasound (Focused Assessment with Sonography in Trauma - FAST and EFAST - Extended Focused Assessment with Sonography in Trauma) in the emergency room allows for a quick diagnosis and correct conduct with the pa-

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tient, despite the low precision, also having high accuracy in relation to other diagnostic methods, avoiding expenses with other exams and unnecessary surgeries.[5,6]

The EFAST has been recommended by several international societies and is even included in the secondary evaluation of the Advanced Trauma Life Support (ATLS). The presence of a positive FAST test denotes intracavitary bleeding and, possibly, the need for exploratory laparotomy, if the patient is hemodynamically unstable, or further diagnosis with computed tomography in a hemodynamically stable patient, if available.[7]

The use of ultrasound does not replace other imaging techniques or surgery, when necessary. The objective is to early identify if there is fluid in the cavities - mainly in the pericardial sac, in the pleural space, in the hepatorenal space, in the splenorenal space and in the suprapubic window - and to assist in the therapeutic approach. With that, an algorithm was proposed that is subdivided in: the positive findings, with the diagnostic follow-up in hemodynamically stable patients, needing to complete the evaluation with computed tomography, when it is available; and in those hemodynamically unstable, one should proceed to exploratory laparotomy on an emergency basis. In the negative findings of the FAST exam, when the patient is hemodynamically stable, one can go for complementation with CT and/or clinical observation; and when hemodynamically unstable, it is necessary to investigate another cause of bleeding (extra-abdominal) or intervene through exploratory laparotomy.[3]

EFAST has become widespread as a preferential test over DPL in unstable patients, due to its lower cost, the fact that it is less invasive, faster, decreasing the rate of non-therapeutic laparotomies, the possibility of frequent reevaluations and of concomitant resuscitation. . EFAST can be considered an extension of the abdominal examination in polytrauma patients, being of fundamental importance in the initial evaluation.[7]

In the last ten years, this bedside ultrasound technology also known as "point of care" has started to become a reality in some hospitals in Brazil. Today, with portable, lighter, more accurate equipment and a growing number of radiologists - whether or not interested or having had proper training, this technique has been widely disseminated and used in large hospitals in Rio de Janeiro.[8]

The objective of this research is to demonstrate that the use of the EFAST protocol, in addition to reducing the costs and episodes of non-therapeutic laparotomies, can also reduce the number of more expensive tests, resulting in benefits for both the medical team and patients in hospitals specialized in the urgent and emergency care network, a reference in trauma. In addition, this exam is not restricted to the initial trauma assessment, it can also be used to monitor and assess the evolution of the patient's clinical condition. [9]

Therefore, it is considered important to implement and apply the EFAST protocol at the trauma reference hospital in the southern region of Rio de Janeiro, as there is still no provision for the implementation of this protocol. Although there are many auxiliary methods used in the diagnosis of intra-abdominal injuries in trauma, in most hospitals and in the reference hospital studied, computed tomography is performed as an initial assessment test and/or laparotomy in which the operative finding would not justify the surgical intervention, emphasizing the importance of implementing the EFAST protocol for possible optimization in the use of financial resources in health, reduction of exposure to ionizing radiation and reduction of non-therapeutic exploratory procedures.[7] It should also be noted that this hospital has a boarding program and medical residency in several areas such as general surgery, vascular surgery and other specialties.

METHODS

This is an epidemiological, observational and retrospective study, evaluating the need for radiological or surgical interventions in the care of traumatized patients. The analysis of hospitalization costs, superfluous exams and non-therapeutic surgeries was also carried out.

The hospital covered in this research is a regional reference pole for high complexity in traumatology and has a capacity of 176 beds, of which 25 are beds for the adult emergency sector, 45 for surgical clinic and 13 for intensive and intermediate care units, 10 with average of 2515 attendances performed by general surgery in 2017.[11] It meets the demand of the entire South Fluminense region, in addition to having an internship and medical residency program in several areas such as general surgery, vascular surgery, among other specialties.

An interview was conducted with a person in charge of the billing sector, with the following questions: "is there a specific payment table for the EFAST protocol?", "What transfers does this hospital receive from the Municipal Health Department for: non-therapeutic laparotomy and admission to the surgical clinic / for computed tomography / ultrasonographies performed? ",“ do doctors in the emergency department have as a hiring prerequisite having training in the ATLS and/or EFAST protocol", "does this hospital offer any continuing education program in EFAST and/or ATLS for professionals that have already been hired?".

The studies that support the application of the EFAST protocol were sought in platforms, journals and scientific articles. Data collection was carried out based on documentary research or primary sources, based on the analysis of the accounts in cost and management reports and financial statements, in which information was obtained regarding the costs and the various hospital procedures.

As inclusion criteria, we considered the costs of patients with clinical suspicion, hospitalized or in the emergency ward, regardless of age and sex, who were victims of blunt trauma, including the polytraumatized ones. The patients, regardless of age and sex, victims only of trauma to the brain or upper and/or lower limbs were excluded.

The information was stored in a Microsoft Excel® data-

base and subjected to statistical analysis. The results of quantitative and qualitative variables were described using means, absolute values, percentages, predictive values, sensitivity, specificity, accuracy and likelihood ratios. Fisher's exact test was used to verify the strength of associations, as appropriate.

RESULTS

According to verification in the billing sector, in the most recent data, 15.7% of laparotomies in victims of abdominal trauma were non-therapeutic in the year 2017. It is worth mentioning that this "non-therapeutic" classification is given by the surgeon himself after performing the procedure. There is still an extra expenditure of 20.9% with the superfluous use in exams - such as computed tomography performed on a patient who would have a negative EFAST, that is, there would be no sign of free liquid in the cavity - and even so, the exam would be performed. . Despite studies not showing absolute values, all converge to the same result.[8,9]

In consultation with the billing sector of the reference trauma hospital in the region, the amounts paid for the use of ultrasound in the efast protocol were not found, given that such a procedure has not yet been implemented in the unit. therefore, the billing sector made a search in the national payment table system, in which no table referring to the EFAST protocol was also found.

In view of this, data were collected on the values of tests and procedures, for comparison purposes only, in the billing sector of the reference hospital, chosen for this research, with the following results:

Costs for procedures and examinations provided	
Chest ultrasound (extracardiac)	R$ 24,20
Pelvic ultrasound (gynecological)	R$ 24,20
Total abdomen ultrasound	R$ 37,95
Computed tomography of the chest	R$ 136,41
Computed Tomography of the upper abdomen	R$ 138,63
Computed Tomography of the pelvis	R$ 138,63
Exploratory laparotomy + hospital stay (five days) *	R$ 637,19

* Hospitalization in surgical clinic regarding exploratory laparotomy.

Table 1 - Costs for procedures and exams provided at a public reference hospital in the South Fluminense region.
Source: Billing sector of a public hospital in the South Fluminense region

When comparing values between the use of ultrasound as the first diagnostic method instead of computed tomography, the hospital would save 79.12% per patient, in addition to avoiding displacement of the patient in a serious condition and exposure to ionizing radiation.

In addition, in the absence of the EFAST protocol in a trauma referral hospital, such as the one analyzed in this study, there may be a greater number of non-therapeutic laparotomies, which bring high costs, as mentioned above; and unnecessary occupation of beds for a longer time, reaching, on average, five days of hospitalization. This amount is financed by the Unified Health System (SUS), since the amount consists of the payment of the professional who will perform the procedure (R$ 139.99) and the hospital expenses (R$ 497.20) .[12, 13]

At the hospital covered in this study, training in the internationally recommended EFAST and/or Advanced Trauma Life Support (ATLS) protocol is not a prerequisite for hiring professionals, nor does it have an ATLS/EFAST education program for doctors already hired.

In order to carry out a "point of care" ultrasound course in emergency and ICU, which includes the EFAST protocol, it is essential that the hospital offers training, which would cost, on average, the amount of R$ 3,440.00 per professional. However, this value could change after bidding14. It is worth mentioning that this training would initially be for physicians who assist trauma in the emergency department of the reference hospital studied, thus, it would not be necessary to hire new professionals, ultrasonographers or radiologists to be on call.[7]

DISCUSSION

The analyzed hospital is of great importance in the South Fluminense region, not only because it is a reference center for high complexity in traumatology in the region, with the highest volume of care in the district, but also due to its technical and scientific importance.

Literature searches were carried out. However, consistent financial data on cost and effectiveness in the use of EFAST were not found, both internationally and nationally.

The use of the EFAST protocol would decrease the initial exposure to expendable tomography, which can reduce costs, since, according to the analysis carried out in this study, there is a great expense with the unnecessary use in exams. Given that, although the analyzed literature does not show absolute values, they tend to the same result.[8,9] In addition to computed tomography being a more expensive diagnostic method than ultrasonography, having been demonstrated by our study, it exposes the patient to ionizing radiation, which is another aspect favorable to the use of EFAST, at least as an initial screening method in trauma.

Data found in the survey, referring to the percentage of exploratory laparotomies, corroborate what is found in the bibliography, since the number of non-therapeutic surger-

ies in the analyzed hospital is 15%, while the one found in the study is 14% .[15]

In abdominal trauma, the use of peritoneal lavage was recommended and, with the advent of EFAST, a sensitivity ranging from 28% to 100% and specificity from 94% to 100% was evidenced, leading to a decrease in the use of peritoneal lavage diagnosis by up to 9% .[16] Demonstrating, therefore, its great efficacy in the emergency scenario, including reducing the patient's length of stay in the hospital, demonstrating that the length of hospital stay is long when preventable exams are performed.

According to a prospective study carried out in a hospital in the southern suburb of Paris, which receives 500 trauma patients a year, an average of 7000 euros is saved in the diagnostic cost. Another gain was in relation to the time spent in the emergency ward, because, while a patient who undergoes computed tomography stays on average 30-60 minutes in that location, the one who goes through EFAST remains for an average period of 20-35 minutes, a gain that we cannot measure, since no data were found in the researched hospital.[17]

The average length of stay in the hospital of reference for this study, after non-therapeutic laparotomy, is 4-5 days, as described in the literature, [18] generating a cost, with both exams, procedures and hospitalizations that are not necessary and may aggravate the situation of overcrowding and waste of resources in SUS.

The literature corroborates what was scored in this research, since there is no table with fixed values for payment of EFAST, being in charge of the service provision to determine such value. However, it should not be seen as an extension of the physical examination, since prior preparation is necessary to exercise the "point of care" technique .[19]

Although the initial cost of training in "point of care" is high, this value can be offset by saving resources by not spending on more expensive initial exams, with the possibility of paying over a specific table for the EFAST protocol for polytrauma patients, as well as the value assigned to the average length of stay for a patient after non-therapeutic laparotomy. Furthermore, it is a continuous education process, and thus, after training the first group, there is a multiplier effect.[18]

Studies also show that EFAST can be used for the testing of pneumothorax, cardiac tamponade and free abdominal fluid in a trauma sector proven by the high specificity and high positivity in each exam performed, corroborating, once again, the importance of its application in a trauma reference hospital. [20,21]

It is also worth mentioning that the ATLS also demonstrates the efficacy in the use of EFAST, being recommended for investigating the presence of bleeding in abdominal trauma, hemothorax, cardiac tamponade, among others. [22] Many professionals are not trained to apply the EFAST protocol, which means that the diagnostic method used may not be the most recommended and/or more expensive at that time.

CONCLUSION

With the implementation of the protocol, there is the possibility of optimizing the use of SUS resources, with the tendency of decreasing hospital stay and more expensive procedures, re-routing the number of vacancies, increasing patient safety.

It is estimated, with this work, the savings of 79.12% per patient in initial exams and 22% for each non-therapeutic laparotomy, which can be shocking in this scenario.

In addition, ATLS is recommended internationally, and when one of the proposed steps is missed, there may be a delay in diagnosis or even worsening of the patient's prognosis, being recommended to follow this protocol, which is the most current evidence in the care of traumatized patients and highlights the importance of applying EFAST in the emergency department.[23]

Therefore, after data analysis, we noticed the need to prepare a specific table for payment for performing EFAST, since it cannot be understood as an extension of the physical examination. Moreover, there are possible financial and therapeutic advantages with the application of the EFAST protocol in the emergency sector of a referral hospital in the South Fluminense region in addition to the immaterial benefit of providing a complete and up-to-date teaching-learning environment for both interns, residents and non-radiologists.[2]

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