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### Abdominal ultrasound (FAST examination) in children with blunt torso trauma. A need or overestimation?

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**English key words:** abdominal injuries; Emergency Service Hospital; ultrasonography.

**Spanish key words:** traumatismo abdominal; Servicio de Urgencias Hospitalario; ecografía.

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# Abdominal ultrasound (FAST examination) in children with blunt torso trauma. A need or overestimation?

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**Original article:** Holmes JF, Kelley KM, Wootton-Gorges SIL, Utter GHP, Abramson IPP, Rose JSS, *et al.* Effect of abdominal ultrasound on clinical care, outcomes, and resource use among children with blunt torso trauma: a randomized clinical trial. *JAMA*. 2017;317:2290-6.

## Abstract

**Authors' conclusions:** the use of FAST echo in the initial evaluation in the emergency room of stable children with blunt torso trauma does not improve the detection of intra-abdominal injuries nor does it decrease the stay in the emergency department, nor does it reduce hospital costs compared with the standard management of these cases without FAST echo.

**Reviewers' commentary:** according to the results obtained, performing FAST echo in children with blunt torso trauma in a situation of hemodynamic stability is inefficient and does not change the prognosis of the patients, and therefore there is no evidence to change clinical attitude or current recommendations.

**Key words:** abdominal injuries; Emergency Service Hospital; ultrasonography.

**Ecografía abdominal (eco FAST) en niños con traumatismo toracoabdominal cerrado. ¿Necesidad o sobredi-mensión?**

## Resumen

**Conclusiones de los autores del estudio:** el uso de eco FAST en la evaluación inicial en urgencias de niños estables con traumatismo toracoabdominal cerrado no mejora la detección de lesiones intraabdominales, ni disminuye la estancia en el departamento de urgencias, ni reduce los costes hospitalarios en comparación con el manejo estándar de estos casos sin eco FAST.

**Comentario de los revisores:** según los resultados obtenidos, realizar eco FAST en los niños con traumatismo toracoabdominal cerrado en situación de estabilidad hemodinámica es ineficiente y no cambia el pronóstico de los pacientes; por tanto, no existe evidencia para cambiar la actitud clínica y las recomendaciones actuales.

**Palabras clave:** traumatismo abdominal; Servicio de Urgencias Hospitalario; ecografía.

## STRUCTURED ABSTRACT

**Objective:** to determine whether FAST examination during initial evaluation of children with blunt torso trauma improves clinical care.

**Design:** randomised clinical trial (RCT).

**Setting:** level I trauma centre at the University of California Davis Medical Center.

**Study population:** 925 patients aged less than 18 years with blunt torso trauma and haemodynamically stable.

**Intervention:** the study included 925 patients aged less than 18 years with blunt torso trauma who were haemodynamically stable. The inclusion and exclusion criteria were complex and appropriate for the identification of a study population with an approximate 5% risk of intra-abdominal injury. Participants were randomised to two groups: those that underwent FAST examination (intervention group [IG]) and those that did not undergo FAST examination at the outset and instead received standard care for stable blunt torso trauma (control group [CG]).

**Outcome measurement:** the outcome variables were: performance of abdominal computed tomography (CT) scans (%),

rate of missed intra-abdominal injuries (%), emergency department length of stay (hours), and hospital charges (in US dollars). The sample size calculation took into account every primary outcome assuming an  $\alpha$  error of 0.05 and a beta error of 0.2 (power of 80%). The authors used the Fisher exact and Student t tests in the statistical analysis.

**Main results:** of the 925 patients under study, 50 had intra-abdominal injuries (5.4%), 95% confidence interval (95 CI): 4 to 7.1; including 40 in who free intraperitoneal fluid was detected by abdominal CT scan (80%; 95 CI: 66 to 90) and 9 that required laparotomy (0.97%; 95 CI: 0.44 to 1.8). The proportion of patients that underwent an abdominal CT scan in the IG was 241 out of 460 (52.4%), compared to 254 out of 465 in the CG (54.6%), with a difference of -2.2% between the groups (95 CI: -8.7 to 4.2). There was one case of missed intra-abdominal injury in the IG and none in the CG, which corresponds to a difference of 0.2% (95 CI: -0.6 to 1.2). The mean length of stay was 6.03 hours in the IG and 6.07 hours in the CG, with a difference of -0.04 hours (95 CI: -0.47 to 0.4 hours). The median hospital charges in the IG was 46 415 US dollars, compared to 47 759 in the CG (a difference of -1 180 dollars; 95 CI: -6651 to 4291).

**Conclusion:** the use of FAST in paediatric emergency care does not improve the care of patients with blunt torso trauma who are stable, increase the detection of missed intra-abdominal injuries or decrease the length of stay in the emergency department or hospital charges. The data obtained in the study does not support the routine use of FAST in the paediatric emergency department.

**Conflicts of interest:** none disclosed.

**Funding source:** the study was supported by grant H34MC19682 from the Emergency Medical Services for Children.

## COMMENTARY

**Justification:** a 2015 Cochrane review<sup>1</sup> on the use of FAST in adult patients with thoraco-abdominal trauma in emergency departments showed that it reduced the need for thoraco-abdominal CT, especially in patients that were haemodynamically stable at the time of assessment, with a low sensibility and a high specificity, and no impact on mortality. The reviewed study is mainly justified by its focus on the paediatric population.

**Validity or scientific rigour:** the clinical trial was carried out correctly. There was a clear definition of the population under study and the intervention. Patients were appropriately randomised in blocks. Masking was not possible due to the nature of the intervention. The included and excluded patients were comparable, missing data were minimal and the authors used appropriate tests in the statistical analysis. The evaluators that performed FAST were different in the group

that underwent this diagnostic test at the time of emergency care. There was an appropriate followup of cases, but the measures taken to control for biases were not clearly explained. The analysis of the trial was correct and the control of covariates in the study design was well established and defined.

**Clinical relevance:** the results of the study revealed no significant differences in the management of stable patients with thoraco-abdominal trauma between the compared groups: FAST and observation. Use of FAST did not lead to increased detection of intra-abdominal injuries or changes in length of stay or health care costs. Although the results were not statistically significant, they may still be relevant. If we consider these data in light of the only review on FAST published to date, which showed that existing studies are quite heterogeneous and of low to intermediate quality, the low sensibility that was found suggests the possibility that false negatives may be frequent, so that FAST would not be useful for screening purposes. On the other hand, due to its high specificity, the presence of free peritoneal fluid would warrant an aggressive approach. As for its cost-effectiveness, other studies have reported slight decreases in costs, but these were not statistically significant, which was also the case with mortality.<sup>1</sup>

**Applicability to clinical practice:** based on the findings of the study, performance of FAST examinations in haemodynamically stable children with thoraco-abdominal trauma is inefficient and has no impact on patient outcomes, so there is no evidence that warrants changing the current approach and recommendations for its management, which involve observation and performance of an abdominal CT scan in cases where intra-abdominal injury is suspected.<sup>1-3</sup> It is possible that in regional hospitals lacking a paediatric intensive care unit or round-the-clock availability of a paediatric surgeon, early diagnosis of free intra-abdominal fluid by means of FAST could guide decision making regarding the need for urgent surgery or performance of a diagnostic test with a higher specificity, such as computed tomography.<sup>2,3</sup>

**Conflicts of interest:** the authors of the commentary have no conflicts of interest to declare.

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