



The value of official reinterpretation of trauma computed tomography scans from referring hospitals[☆]



Chinwendu Onwubiko, David P. Mooney^{*}

Department of Surgery, Boston Children's Hospital, Harvard Medical School, Boston, MA

ARTICLE INFO

Article history:

Received 11 March 2015

Received in revised form 23 July 2015

Accepted 2 August 2015

Key words:

Trauma
radiology
computed tomography

ABSTRACT

Introduction: Historically, computed tomography (CT) scans of injured children obtained at referring emergency departments were not reinterpreted by trauma center radiologists at our institution, creating a dilemma for trauma physicians: rescan, use the outside interpretation, or interpret scans themselves. In 2010, our radiologists began reinterpreting all referring hospital trauma CT scans; this study examines the effect of that change.

Methods: Transferred patients who had undergone an abdomen/pelvis CT (CTAP) scan between December 2010 and December 2012 were identified in our trauma registry. Pediatric radiologist reinterpretations were compared to referring hospital radiologist reports.

Results: We identified 168 patients transferred to our institution with a CTAP. Seventy patients were excluded owing to lack of: complete study, referring hospital interpretation, or reinterpretation. Of the remaining 98 cases, 12 new injuries were identified: 3 splenic and 3 liver injuries, 1 adrenal hematoma, 2 pelvic fractures, 1 spinal fracture, 1 duodenal hematoma and 1 jejunal perforation. Three patients had solid organ injuries upgraded (grade II to III liver laceration; 2 renal lacerations with active extravasation initially missed), and 4 patients downgraded to no injury.

Conclusion: Reinterpretation of referring hospital CT scans by pediatric radiologists is beneficial to appropriate management of pediatric trauma patients with concern for blunt abdominal trauma.

© 2016 Elsevier Inc. All rights reserved.

Imaging studies, including computed tomography (CT) scans, are often performed in injured children prior to transfer to a pediatric trauma center. These studies may or may not be reinterpreted by pediatric trauma center radiologists. If not, the personnel providing care for the patient may be forced to interpret the studies themselves and/or rely upon the interpretation of the outside hospital radiologist (if available), potentially increasing the risk of missed injuries.

One solution to this dilemma has been to perform repeat CT scans upon arrival to the pediatric trauma center [1]. However, this leads to increased costs and increased radiation exposure [2], the latter especially important in children [3]. Another solution is to defer obtaining a CT scan until arrival at a pediatric trauma center [4]. However, this is difficult in practice, as for many children the need for tertiary care may not be known until after a CT scan is performed. The purpose of this study is to evaluate the benefit of a third possible solution: having outside hospital trauma CT scans officially reinterpreted by pediatric radiologists upon arrival to the pediatric trauma center.

1. Methods

This study was performed at a level I pediatric trauma center that accepts transfers from hospitals throughout the 6 New England states. In 2010, our institution instituted a policy of official pediatric radiological reinterpretation of trauma CT scans performed at referring institutions prior to transfer. After obtaining institutional review board approval, we reviewed our hospital's trauma registry to identify trauma patients 21 years of age or younger admitted between December 2010 and December 2012 who were originally evaluated at another institution and underwent a CT scan of the abdomen/pelvis (CTAP) prior to transfer. CTAP scans that were reinterpreted by our staff pediatric radiologists were compared to the radiology reports from the referring hospital (when available) and differences in interpretation were recorded. For the purpose of this study, a difference was defined as a new finding, reversal of a finding, or change in the interpretation of the extent of injury. Differences were classified as significant (e.g. splenic laceration) or nonsignificant (e.g. incidental renal cyst) based on the potential of the finding having immediate impact on patient management. If a difference was noted between the reports, the patient's records were further reviewed to determine what impact, if any, the difference in interpretation had on the patient's clinical course.

The interpretation reports from the original radiologist usually arrived with the patient in the documentation sent from the referring hospital. Typically images were loaded and reinterpretations were performed upon patient arrival in a different location in the hospital

[☆] Presented in part at the 15th Annual John M. Templeton Jr. Pediatric Trauma Symposium, Pittsburgh, PA.

^{*} Corresponding author at: Department of Surgery, Fegan 3, Boston Children's Hospital, 300 Longwood Ave, Boston, MA 02115. Tel.: +1 617 355 0535; fax: +1 617 730 0298.

E-mail addresses: David.Mooney@childrens.harvard.edu, mooneydavidp@gmail.com (D.P. Mooney).

and any printed previous interpretations would not be available to our radiologists. However, because of the retrospective nature of this study, it is not possible for us to know with certainty if the radiologists reviewed the report from the referring hospital during their own interpretation or how often the original interpretations were made available to them. In many occasions, the clinical concern was noted in the “clinical background” portion of the report (i.e. 12 year old male with reported splenic laceration and L 10th rib fracture), indicating that the radiologist was at least generally aware of the injury reported (if present).

Studies were rated by our pediatric radiologists using a quality score rating system to give providers a sense of any technical issues that may affect the strength of the reinterpretation of the referred CTAPs. This scoring system was usually included as part of the interpretation of the CTs originally performed at referral centers. The radiology technical quality score rating system is as follows: 1, technically adequate; 2, technically limited but adequate for the specific clinical indication provided; and 3, nondiagnostic. All images were reviewed and interpreted to the best of the radiologist’s ability regardless of quality score with the limitations noted in the report. For studies that were not given a quality score, note was made of any comments the radiologist dictated regarding imaging quality.

2. Results

We identified 168 patients transferred to our institution with a CTAP performed prior to transfer. Sixty-eight patients were excluded because there was no CT interpretation sent from the referring institution (61) or there was no documented interpretation by our pediatric radiologists (7). An additional 2 patients were excluded because the full pelvis was not included in the imaging; this resulted in a study population of 98 patients. The average age was 11.7 years, with a range from 1 to 17 years; the majority (65.3%) of patients was male. Motor vehicle collisions were the most common mechanism of injury, followed by falls and bicycle-related injuries (Fig. 1).

Of the 98 CTAP reinterpretations, 27 (27.5%) differed from the original interpretation (Table 1). Twenty-three scans had differences of interpretation related to the traumatic injuries reported; one patient had both a difference in report of traumatic injury and an incidental finding. Twenty of the differences were significant in that if these

Table 1

Differences reported by pediatric radiologists on reinterpretation of referring hospital trauma CTAP.^a

Type of finding	N
Injuries identified	14
Renal vascular extravasation	2
Upgraded SOI	1
Splenic laceration	3
Liver laceration/contusion	3
Pelvic fracture	2
Bowel injury	1
Adrenal hematoma	1
Thoracic spine fracture	1
“Possible” injuries ruled in	1
Duodenal hematoma	1
“Possible” injuries ruled out	4
Lumbar spine fracture	1
Ureteral injury	1
Liver laceration	2
Injuries overcalled	4
Spleen laceration	1
Liver laceration	1
Bowel injury	1
Thoracic spine fracture	1
New incidental findings	5

^a SOI, solid organ injury.

were found in isolation, they would have changed the management of the patient. There were 11 newly identified injuries, including 7 solid organ injuries (3 splenic lacerations, 3 liver lacerations/contusions, and one adrenal hematoma), 3 fractures (2 pelvic and 1 thoracic spine) and 1 bowel injury. The patient with a bowel injury subsequently underwent exploratory laparotomy and was found to have a jejunal perforation that was repaired. One CTAP reinterpreted as demonstrating a splenic laceration was originally interpreted as no injury, though pelvic free fluid in the male patient suggestive of an injury was noted by the referring radiologist. Three patients had an undergrading of their organ injury severity (a grade III liver laceration originally reported by the referring radiologist as a grade II and 2 cases of active extravasation from a renal laceration that was not noted on the initial interpretation). There were 4 instances where the original interpretation of injury by the referring radiologist was reinterpreted as normal by the pediatric radiologist. Five CTAP initially felt to be normal were reinterpreted as

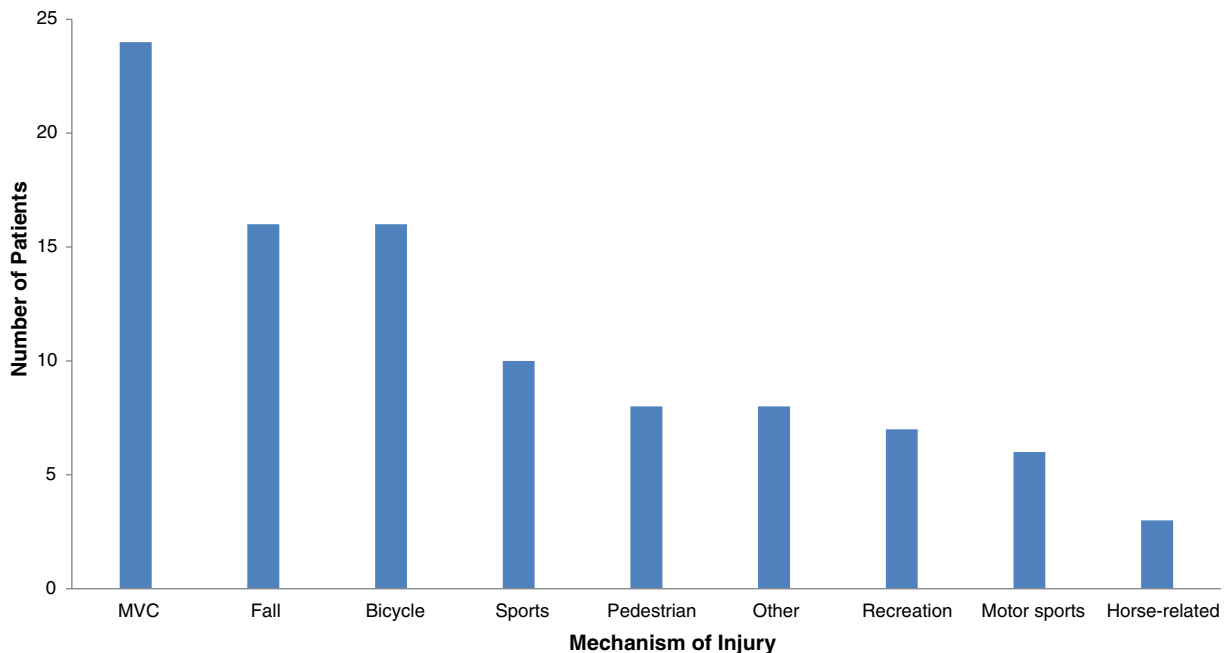


Fig. 1. Mechanisms of injury for patients receiving abdomen/pelvis CT scans prior to transfer to our institution.

Download English Version:

<https://daneshyari.com/en/article/6216667>

Download Persian Version:

<https://daneshyari.com/article/6216667>

[Daneshyari.com](https://daneshyari.com)