

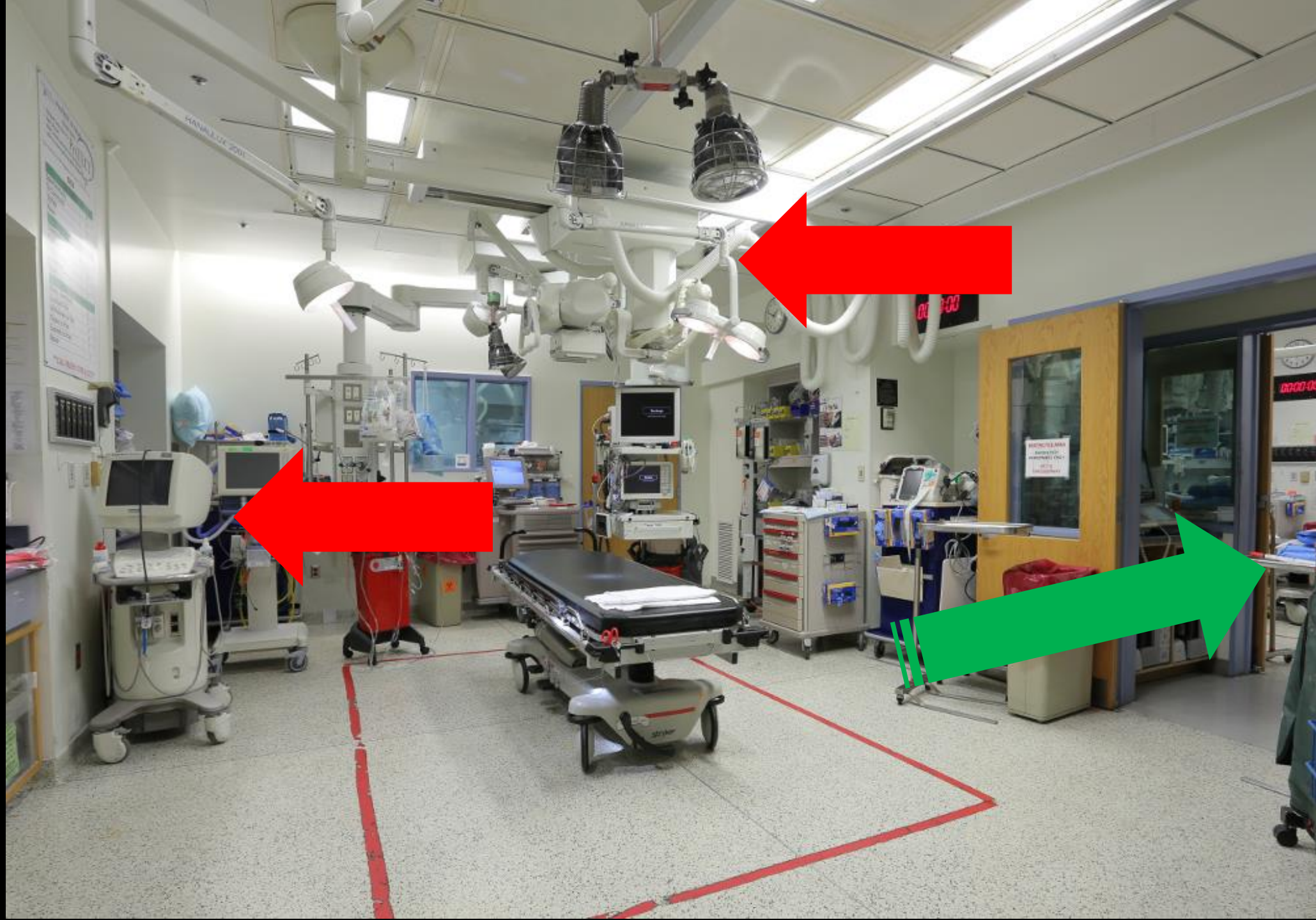


**TRAUMA RADIOLOGY 2024**

# Imaging in the Trauma Room



**Fausto Labruto**  
Associate Professor  
Director of Emergency Radiology



**CR** { AP Chest x-ray  
Pelvic x-ray

**US** eFAST

## Table 7 Section 4: Conventional Radiography

From: [European Society of Emergency Radiology: guideline on radiological polytrauma imaging and service \(short version\)](#)

**Key question:** What is the significance of conventional X-rays and under what conditions are conventional X-rays preferred to computer tomography in the Emergency Trauma Room treatment of polytrauma patients?

No	Statement(s)	Cons	Grade	Cons
4.1	For the clarification of polytrauma, CT should be preferred to X-ray	100% strong	GoR A	100% strong
4.2	In addition to an eFAST, conventional X-ray should also be immediately available	100% strong	GoR A	100% strong

*Literature:* detected = 893, excluded = 845, full-text: rated = 18, excluded = 7, included = 11 (guideline: [15, 19, 24, 47, 48]; level 2: [49, 50]; level 3: [51,52,53]; level 5: [46])

*Comments:* None

# Standards of practice and guidance for trauma radiology in severely injured patients

Second edition

Faculty of Clinical Radiology



The Royal College of Radiologists

## Digital radiography

Digital radiography (DR) must be available in the emergency room. A chest X-ray (CXR) might precede an MDCT scan if there is doubt about the side or presence of a pneumothorax in a patient with respiratory compromise. Once the decision is taken to request an emergency MDCT, plain films of the abdomen or pelvis are usually irrelevant and extremity imaging should be delayed until life-threatening injuries have been diagnosed and treated. The British Orthopaedic Association and British Society of Spine Surgeons do not recommend plain films of the cervical-spine in SIPs and their standard of practice for cervical-spine clearance is CT.<sup>10</sup>

Cervical spinal injury precautions and pelvic binders should remain in place until the MDCT has been fully assessed.

Where severe injury is to the spine only, MDCT or an MRI scan might be required but a plain-film series of the cervical spine might also be indicated.

### Standard 4

Digital radiography must be available in the emergency room.

# Chest X-ray

**A B C**

**A = Airways**





Sim



# UNRECOGNIZED MISPLACEMENT OF ENDOTRACHEAL TUBES BY GROUND PREHOSPITAL PROVIDERS

David D. Wirtz, MD, MPH, Christine Ortiz, MD, David H. Newman, MD,  
Inna Zhitomirsky

## ABSTRACT

**Objective.** Endotracheal intubation by emergency medical services (EMS) is well established. Esophageal misplacement is a catastrophic complication that has until recently been studied by using methods that have called into question the accuracy of the reported data. The purpose of our study was to determine the incidence of unrecognized endotracheal tube misplacement, reasons for deferred intubations in the field, and to report outcomes in those patients with unrecognized misplacement. **Methods.** This was a prospective observational study with a consecutive sample. All arriving with an endotracheal tube or in whom endotracheal intubation was performed within 10 minutes of arrival were included, and a physician immediately determined placement. Hospital records were reviewed to determine outcome of those patients in whom the tube was misplaced. Unrecognized esophageal misplacement triggered communication to the medical director of the transporting agency. **Results.** During the enrollment period, 192 patients were evaluated. Overall, 132 of 192 (69%) were intubated in the prehospital environment, and 60 were intubated within 10 minutes of arrival in the emergency department. Among prehospital intubation attempts, 12 of 132 (9%; 95 CI 5.3–15.2), 11 esophageal, and 1 hypopharyngeal were misplaced. Right mainstem intubation occurred in an additional 20 of 132 (15%; 95 CI 10.0–22.3). Among patients arriving with unrecognized esophageal misplacement of the endotracheal tube, one patient survived

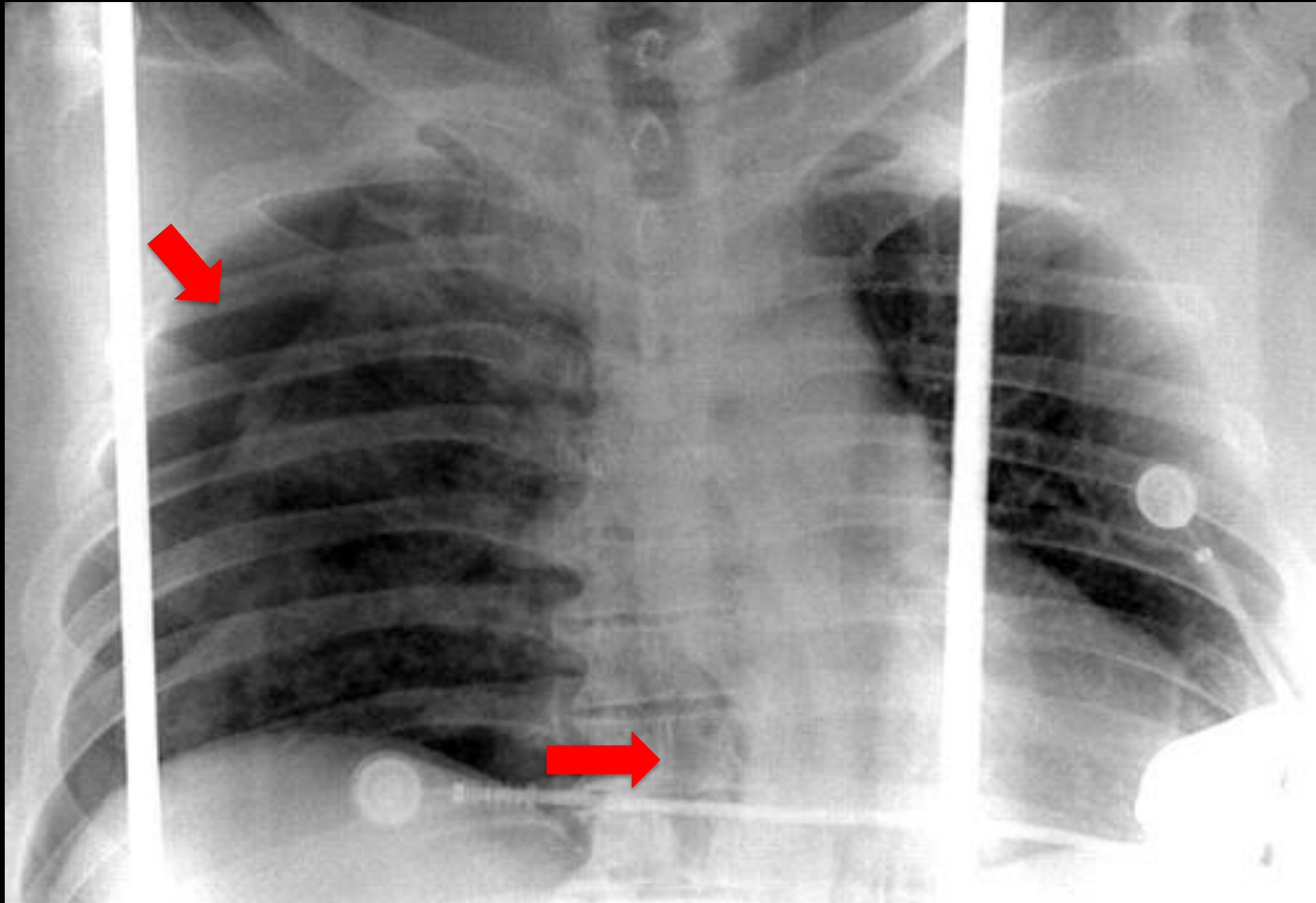
to hospital discharge. **Conclusion.** The rate of esophageal misplacement of endotracheal tubes in the prehospital environment in our urban setting and the poor clinical course of patients with unrecognized misplacement is consistent with previous reports, suggesting that the benefit of prehospital airway management does not clearly supercede the potential risks. **Key words:** intubation, intratracheal; prehospital emergency care; allied health personnel; emergency medical technicians.

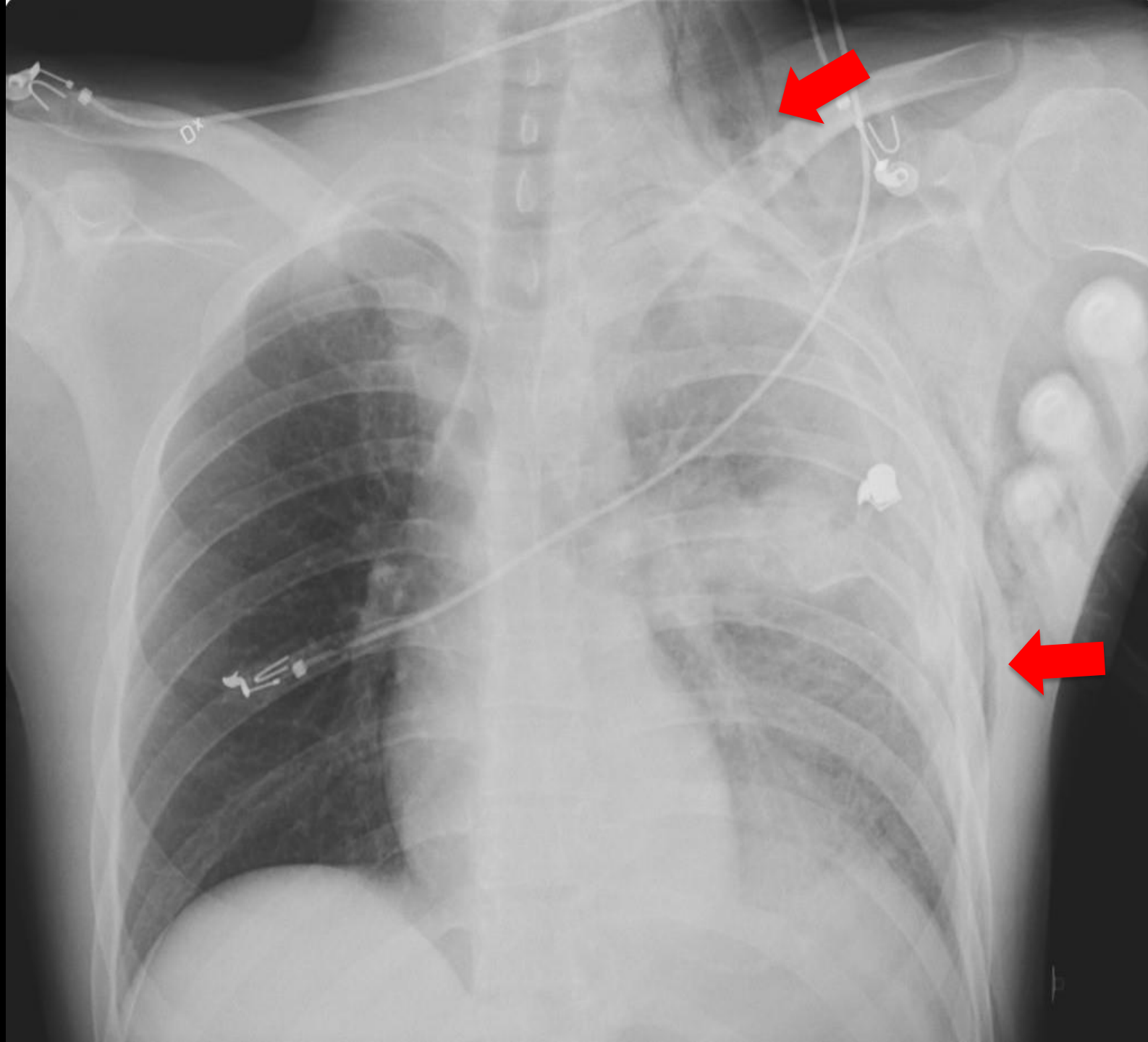
PREHOSPITAL EMERGENCY CARE 2007;11:213–218

## INTRODUCTION

Placement of endotracheal tubes by emergency medical service (EMS) providers in the prehospital environment is a well-established procedure. The potential benefits of prehospital endotracheal intubation are unclear because randomized trials are lacking. Unrecognized esophageal misplacement is a potentially catastrophic complication. Self-reporting bias and imperfect reference standards call in to question the accuracy of previously reported data.<sup>1–9</sup> Recent studies have used physician confirmation of tracheal placement on arrival of ground EMS, often using direct laryngoscopy and/or end-tidal capnometry as reference standards. These reports have

**B = Breathing**

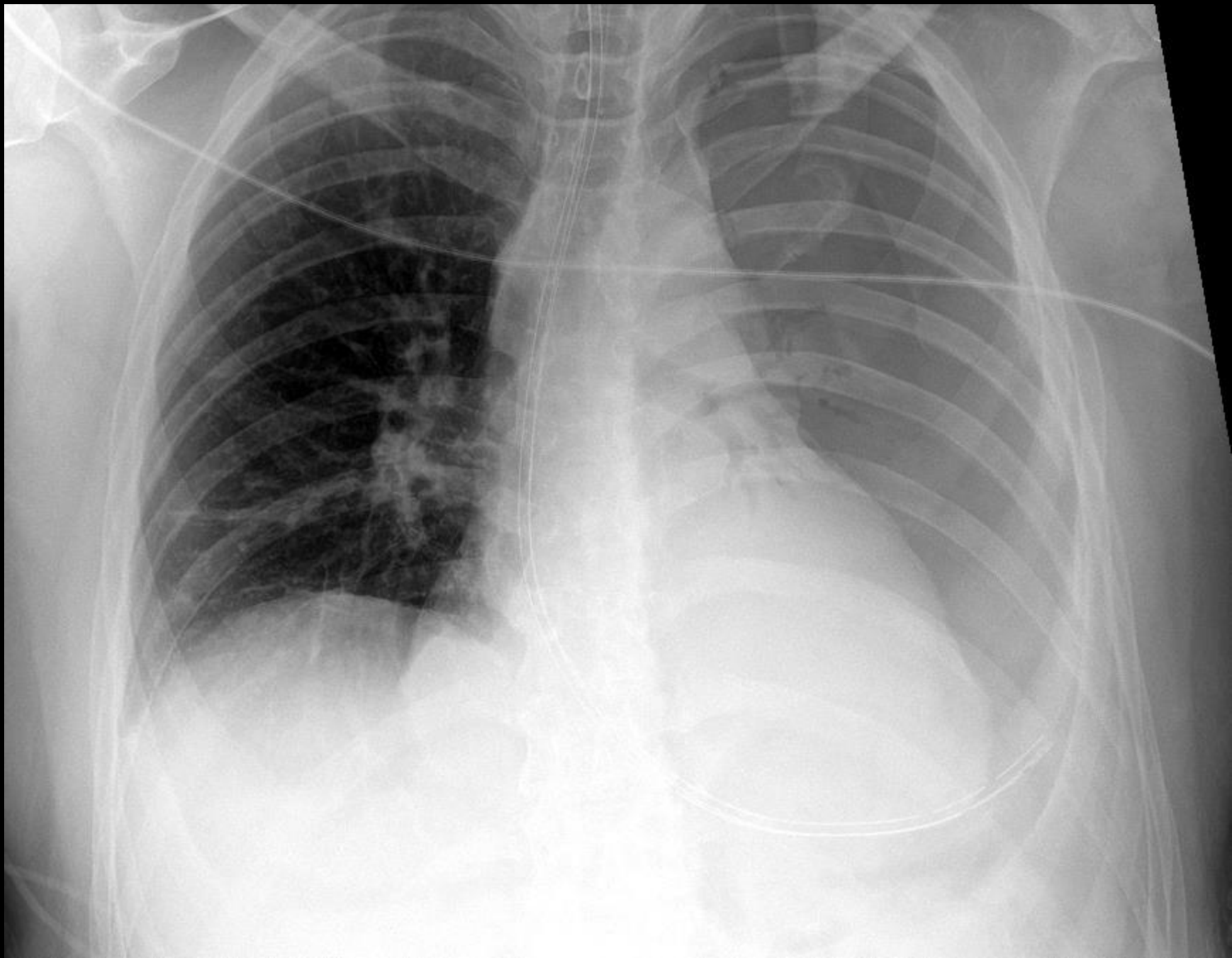


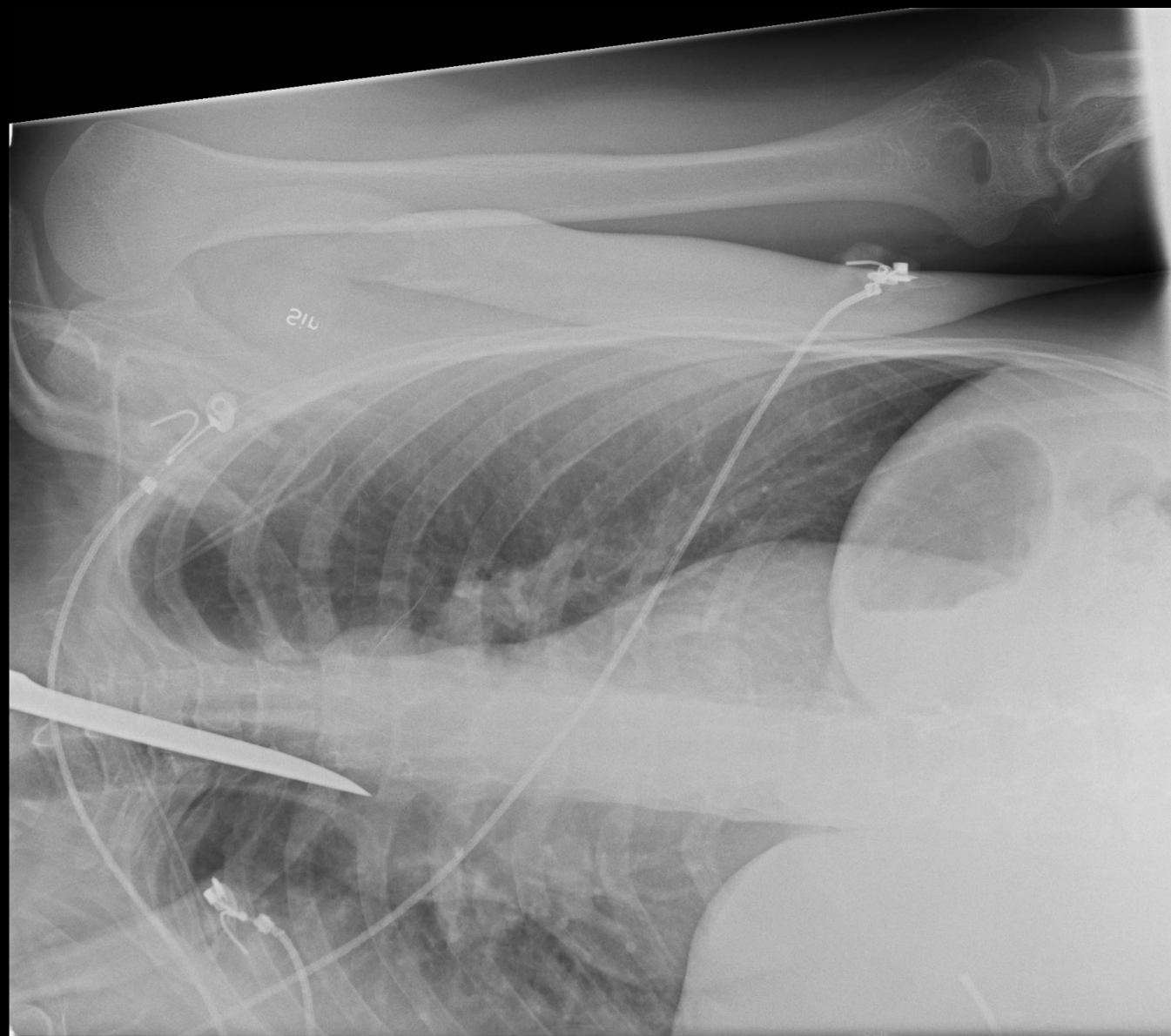
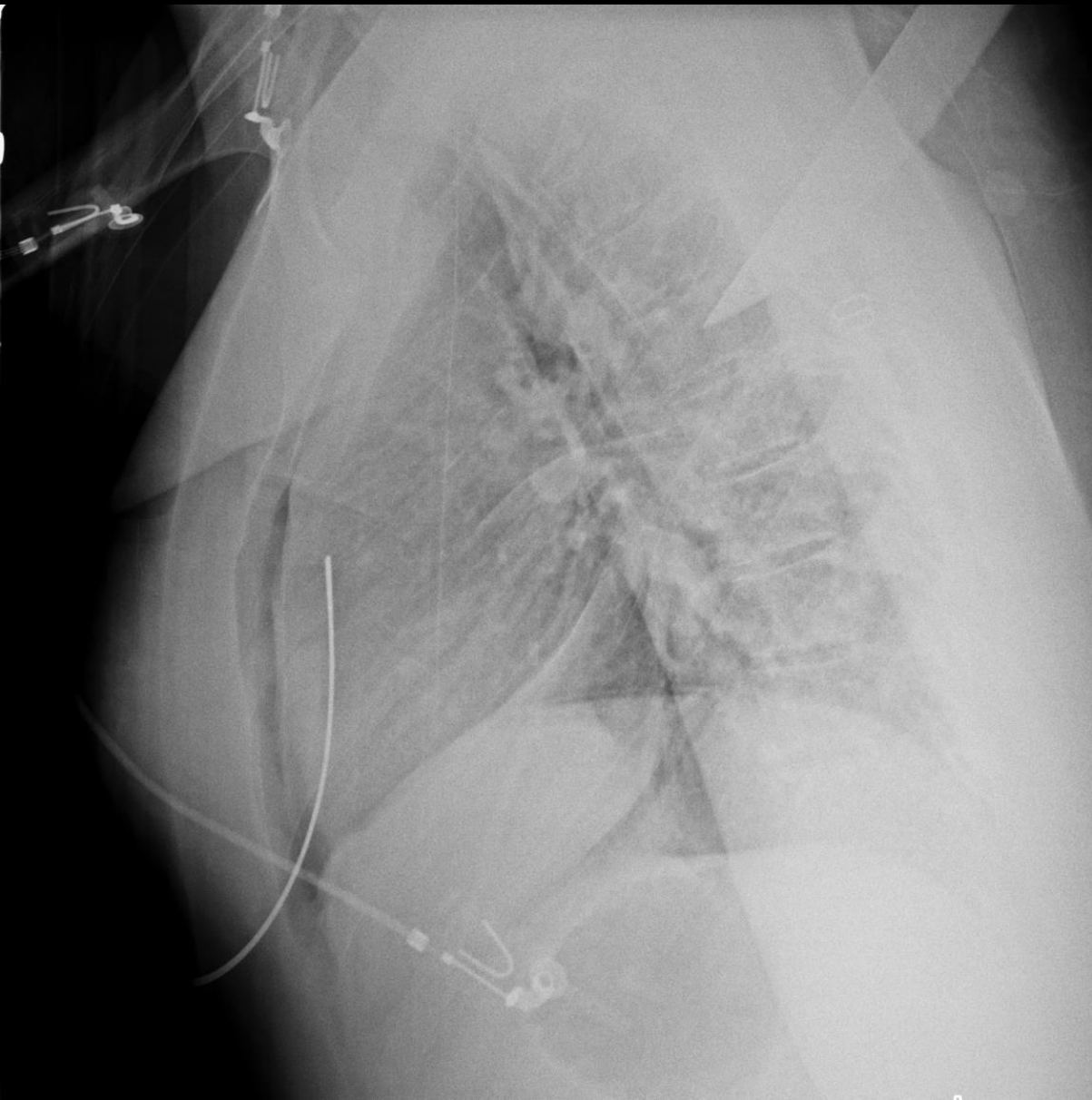




**C = Circulation**









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BRIEF ARTICLE

## Initial assessment of chest X-ray in thoracic trauma patients: Awareness of specific injuries

Tjeerd S Aukema, Ludo FM Beenen, Falco Hietbrink, Luke PH Leenen

10.5005/jp-journals-10030-1009

OBSERVATIONAL RETROSPECTIVE STUDY

## Radiologist vs Surgeon: Misdiagnoses in Radiologic Evaluation by On-duty Surgeons in the Emergency Room

Adonis Nasr, Irene Tomoko Nakano, Ana Valeria Brunetti Rigolini, Guilherme Massaaki Pianovski Kato  
Phillipe Geraldo Teixeira de Abreu Reis

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Available Online at: [www.jrmds.in](http://www.jrmds.in)  
eISSN No. 2347-2367; pISSN No. 2347-2545



## A Comparison between an Emergency Medicine Specialist and a Radiology Specialist in Reading Chest Radiography

A comparison between an emergency medicine specialist and a radiology specialist in reading chest radiography

Seyed Mohammad Hosseininejad<sup>1</sup>, Seyyed Hosein Montazar<sup>2</sup>, Farzad Bozorgi<sup>3\*</sup>, Iraj Goli Khatir<sup>2</sup>, Zahra Mardanshahi<sup>4</sup>, Amirali Avish<sup>2</sup>

# **FAST and eFAST**

## ULTRASONIC SCANNING IN THE DIAGNOSIS OF SPLENIC HAEMATOMAS

J. Kvist Kristensen, B. Buemann and E. Kühl

*From Department of Surgery H (Heads: P. A. Gammelgaard, F. R. Mathiesen & B. L. Sørensen),  
Department of Surgery S (Head: A. Gammeltoft), and the Department of Radiology (Heads:  
O. Petersen, M. Eiken & S. Brünner), Gentofte Hospital, DK 2900 Hellerup, Denmark*



## Table 6 Section 3: Extended Focused Assessment with Sonography for Trauma (eFAST)

From: [European Society of Emergency Radiology: guideline on radiological polytrauma imaging and service \(short version\)](#)

**Key question: What significance does the eFAST examination have in the Emergency Trauma Room treatment of polytrauma patients?**

No	Statement(s)	Cons	Grade	Cons
3.1	eFAST should be used as part of the Primary Survey	100% strong	GoR A	100% strong
3.2	eFAST should be implemented simultaneously with other measures, i.e. without additional expenditure of time for the overall care. If this is not possible, eFAST should not delay CT	100% strong	GoR A	100% strong

*Literature:* detected = 699, excluded = 681, full-text: rated = 18, excluded = 6, included = 12 (guideline: [15, 19, 37,38,39]; level 1: [40]; level 2: [41, 42]; level 3: [43, 44]; level 4: [45]; level 5: [46])

*Comments:* eFAST ought to be a screening for diagnostic findings requiring immediate treatment. With this meaning eFAST is a filter to (maybe temporarily) exclude (very few) patients from CT-scanning because of reasons where the time effort of CT is expected to lead to higher mortality. Such findings in unstable patients may be tension pneumothorax, pericardial tamponade, massive bleeding in the pleural or peritoneal spaces

# Standards of practice and guidance for trauma radiology in severely injured patients

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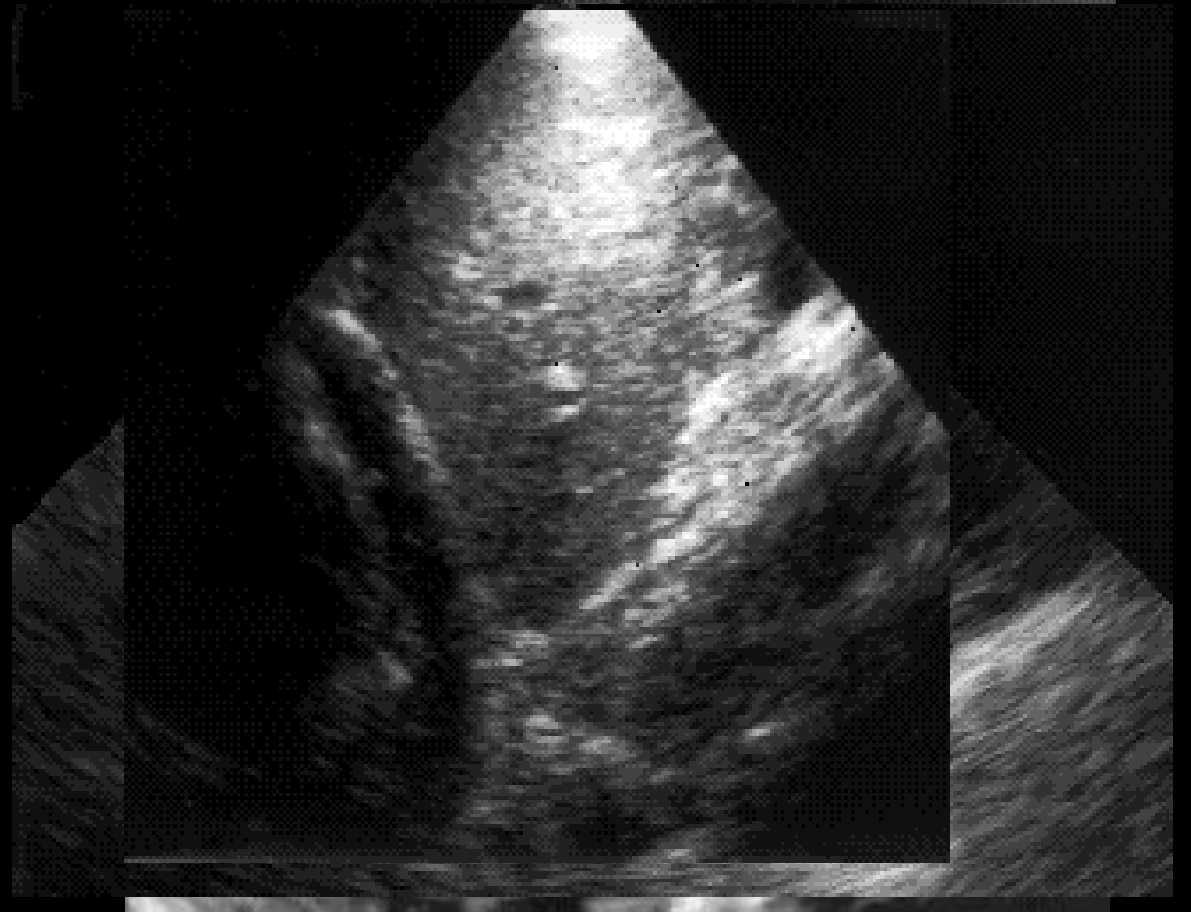
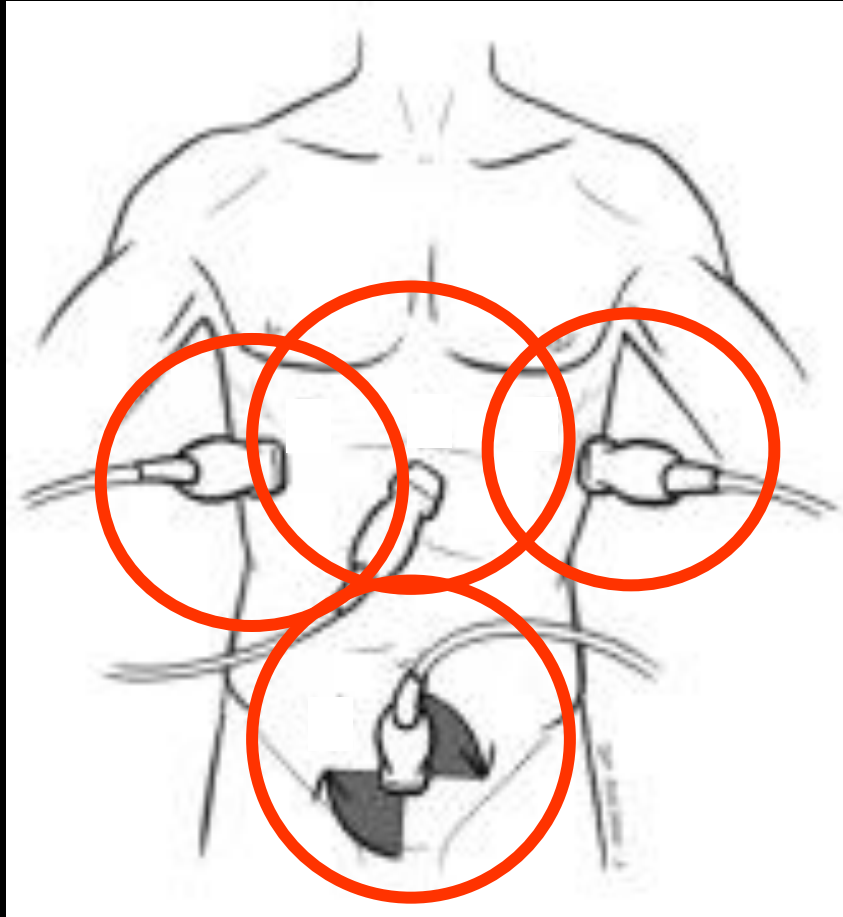
## FAST

Focused abdominal sonography in trauma (FAST) does not add any further information to that obtained from a CT scan and should not be performed if it would delay transfer to CT. FAST is a poor discriminator of the requirement or otherwise for laparotomy in trauma. Studies have shown negative predictive values of only 50–63% for FAST in unstable patients.<sup>11,12</sup> FAST does have value in the diagnosis of pericardial effusion and, in experienced hands, might detect free intra-abdominal fluid in an otherwise non-compromised patient. It has an important role in triage when managing multiple SIPs simultaneously or in a major incident scenario. As with all

imaging, a report on a FAST scan should be documented and the designation of the operator recorded. In computerised triage of calls, SIPs must be given top priority and it should be confirmed explicitly when a patient can be safely received by the imaging department.

### Standard 5

If there is an early decision to request MDCT, FAST and DR should not cause any delay.





Normal Lung



M Mode Marker  
at Pleura

Pneumothorax



No Motion  
Chest Wall  
Waves

Positive  
Motion Lung  
Beach

Seashore Sign

No Motion  
Chest Wall

No Motion  
Lung

Barcode/Stratosphere Sign



**Table 1**  
**Minimum volume of free fluid detection**

<b>Authors</b>	<b>View/Position</b>	<b>Volume (mL)</b>
Goldberg et al <sup>6</sup>	Right lateral decubitus	100
Branney et al <sup>4</sup>	Morrison pouch/supine	619
Paajanen et al <sup>7</sup>	Perihepatic/perisplenic	>500
Abrams et al <sup>8</sup>	Morrison pouch	
	Supine	668
	5° Trendelenburg	443

**Table 2**  
**Reported sensitivity, specificity, and predictive value**

<b>Author</b>	<b>N</b>	<b>Mechanism of Injury</b>	<b>End Point</b>	<b>Reference</b>				<b>Sensitivity</b>	<b>Specificity</b>	<b>Predictive Value</b>		
				<b>CT</b>	<b>DPL</b>	<b>OR</b>	<b>Clinical Observation</b>			<b>Positive</b>	<b>Negative</b>	<b>Accuracy</b>
McGahan et al, <sup>23</sup> 1997	500	Blunt, penetrating	Fluid, intervention	X		X		63	95	—	—	85
Healey et al, <sup>24</sup> 1996	800	Blunt	Fluid, intervention	X	X	X		88	98	72	99	97
Tiling et al, <sup>25</sup> 1990	808	Blunt						89	100	—	—	98
Gaarder et al, <sup>26</sup> 2009	104	Blunt, penetrating	Fluid, intervention	X	X	X	X	62	96	84	88	88
Patel et al, <sup>27</sup> 2007	1277	Blunt	Fluid	X	X	X	X	69	95	69	95	—

- Burns
- Surgical emphysema
- Non-cooperative patient
- Difficult habitus
- Difficult abdomen
- Retroperitoneal bleedings
- Pelvic bleedings





## A Prospective Study of Surgeon-Performed Ultrasound as the Primary Adjuvant Modality for Injured Patient Assessment

Rozycki, Grace S. MD, FACS; Ochsner, M. Gage MD, FACS; Schmidt, Judy A. RN, DNSc; Frankel, Heidi L. MD; Davis, Thomas P. MC, USNR; Wang, Dennis MD; Champion, Howard R. FRCS (Edin)

[Author Information](#) ☺

*The Journal of Trauma: Injury, Infection, and Critical Care* 39(3):p 492-500 **September 1995.**

# Pelvic X-ray



The Royal College of Radiologists

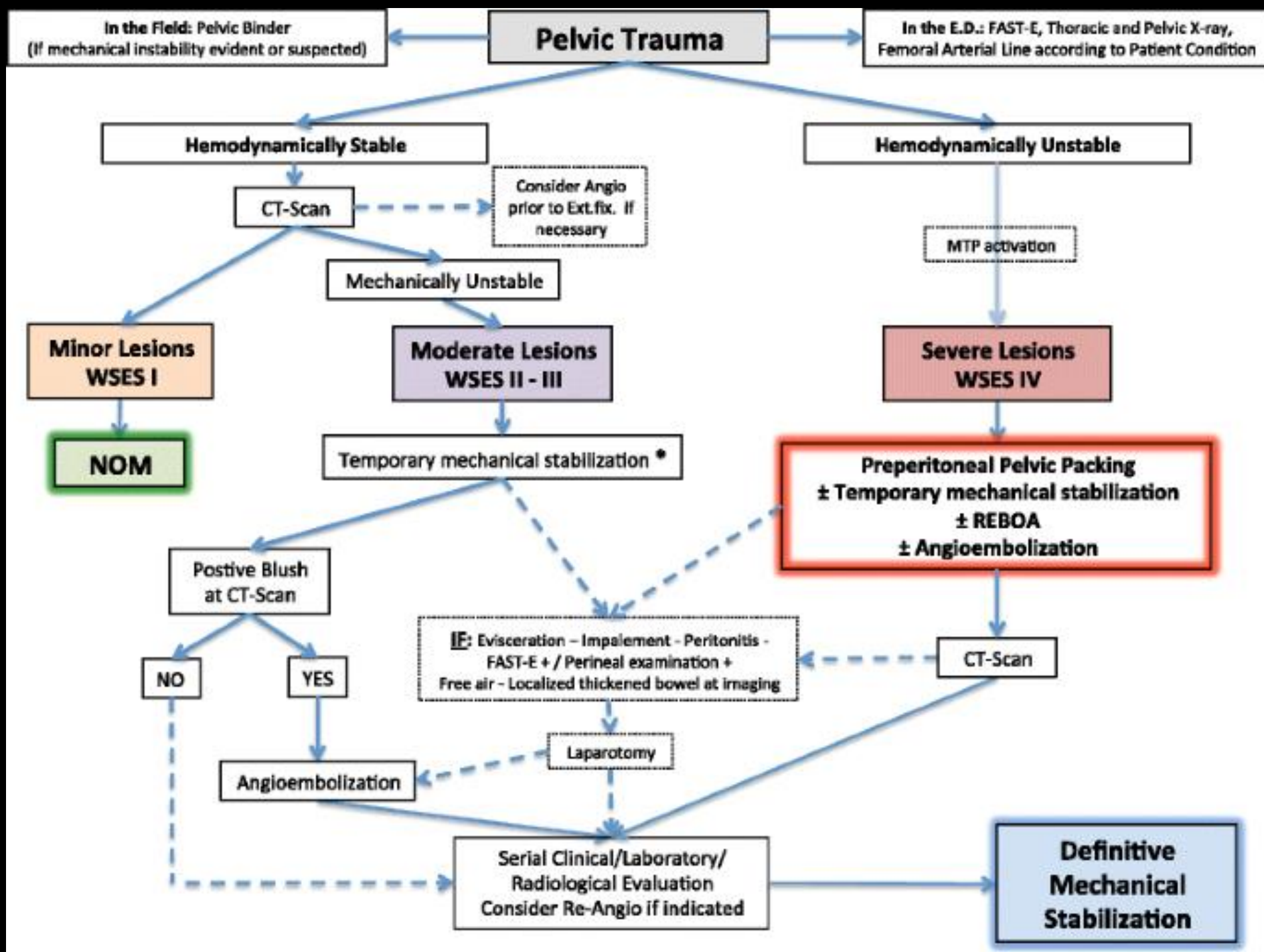
The guideline standards of practice and guidance for trauma radiology in severely injured patients of The Royal College of Radiologists [23] provide several recommendations on the subject of conventional radiography. In the emergency room, the possibility of digital radiography must be available. In addition, conventional radiography must not delay a whole-body computed tomography scan. However, as soon as the decision on WBCT has been made, conventional radiography of the abdomen or pelvis does not provide any additional information.



# Grading

- Minor (WSES grade I)  
hemodynamically and mechanically stable lesions
- Moderate (WSES grade II, III)  
hemodynamically stable but mechanically unstable lesions  
WSES grade II: APC II – III and LC II – III pelvic ring injuries  
WSES grade III: VS and CM hemodynamically stable pelvic ring injuries
- Severe (WSES grade IV)  
hemodynamically unstable independently from mechanical status









# Pelvic radiography in ATLS algorithms: A diminishing role?

February 2008 · 3(1):11

DOI: [10.1186/1749-7922-3-11](https://doi.org/10.1186/1749-7922-3-11)

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 Matthias P. Hilty ·  Isabelle Behrendt ·  Lorin M Benneker · [Show all 8 authors](#) ·  Aristomenis K Exadaktylos





Injury

Volume 38, Issue 5, May 2007, Pages 559-563



# Is routine portable pelvic X-ray in stable multiple trauma patients always justified in a high technology era?

[Boris Kessel](#)<sup>a</sup>  , [Roger Sevi](#)<sup>b</sup>, [Igor Jeroukhimov](#)<sup>c</sup>, [Alex Kalganov](#)<sup>b</sup>, [Tawfik Khashan](#)<sup>a</sup>, [Itamar Ashkenazi](#)<sup>e</sup>, [Gabriel Bartal](#)<sup>d</sup>, [Ariel Halevi](#)<sup>c</sup>, [Ricardo Alfici](#)<sup>e</sup>









The American Journal of Emergency Medicine

Volume 32, Issue 1, January 2014, Pages 18-23



Original Contribution

# The diminishing role of pelvic x-rays in the management of patients with major torso injuries

[Chih-Yuan Fu MD](#) , [Shang-Yu Wang MD](#)  , [Yu-Pao Hsu MD](#) , [Chien-Hung Liao MD](#) , [Being-Chuan Lin MD](#) , [Shih-Ching Kang MD](#) , [Kuo-Ching Yuan MD](#) , [I-Ming Kuo MD](#) , [Chun-Hsiang Ouyang MD](#) , [Shang-Ju Yang MD](#) 

# Imaging in the Trauma Room

Chest X-ray

Pelvic X-ray

eFAST

Should be  
available, but  
not delay the CT

# Imaging in the Trauma Room

Chest X-ray

A B C

Pelvic X-ray

Mechanic  
stability

eFAST

. B C

Main rationale

# Imaging in the Trauma Room

Chest X-ray

Probably

Pelvic X-ray

Probably  
not

eFAST

No

Should be read  
by a radiologist?



NEW!  
TMC NEW ZEALAND

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