

DIU d'échographie et techniques ultrasonores

ECAU 2015 – 2016
Nîmes

15 au 18 Mars 2016



ECAU 3P

FAST échographie



X. BOBBIA

*Division Anesthésie Réanimations
Douleur Urgences*



FAST

- ⊗ FAST ?
- ⊗ PEC du PTG à l'admission
- ⊗ PFAST
- ⊗ Limites et perspectives

FAST

- ⊗ FAST ?
- ⊗ PEC du PTG à l'admission
- ⊗ PFAST
- ⊗ Limites et perspectives

FAST ?

Focused Abdominal Sonography for Trauma



Focused Assessment of the Sonography examination of Trauma patient

FAST?

Utilisation de l'échographie avec méthode
standardisée dans la prise en charge des patients
polytraumatisés

FAST?

Utilisation de l'échographie avec méthode standardisée
dans la prise en charge des patients polytraumatisés

Dépistage échographique d'épanchement séreux
(3P)

- ⊗ Péritoine
- ⊗ Plèvre
- ⊗ Péricarde

FAST?

Utilisation de l'échographie avec méthode standardisée dans la
prise en charge des patients polytraumatisés

Dépistage échographique d'épanchement séreux
(3P)

- ⊗ Péritoine
- ⊗ Plèvre
- ⊗ Péricarde
- ⊗ + DTC

FAST : Intérêt?

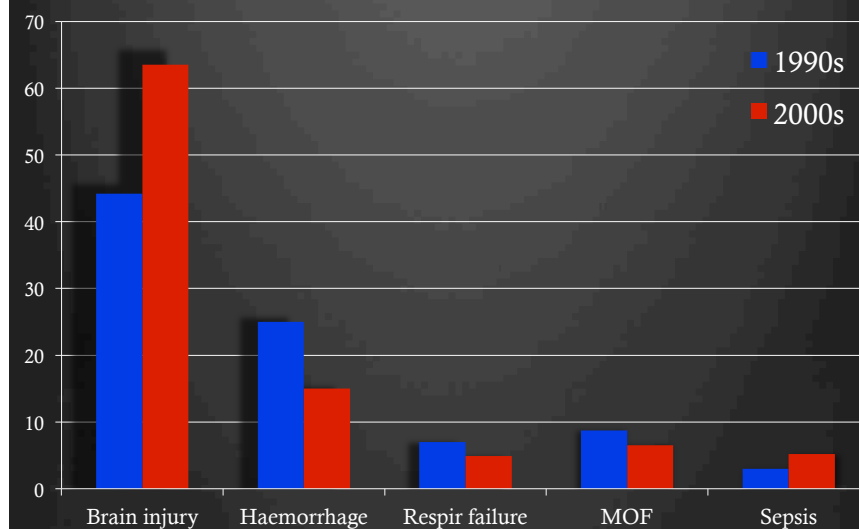
Polytraumatisé - Causes de mortalité Quelles lésions?

Region	Seattle (n = 390) (%)	Monterrey (n = 265) (%)	Kumasi (n = 252) (%)
Head	47	22	22
Thorax	25	37	10
Abdomen	20	34	6
Extremity	8	7	57
Unknown	0	0	5

^a $p < 0.001$ ($df = 6$) for differences among the groups (unknowns excluded).

Mock et al J trauma 1998

PTG - Epidémiologie



Pfeifer et al - injury 2009

FAST - Réalisation



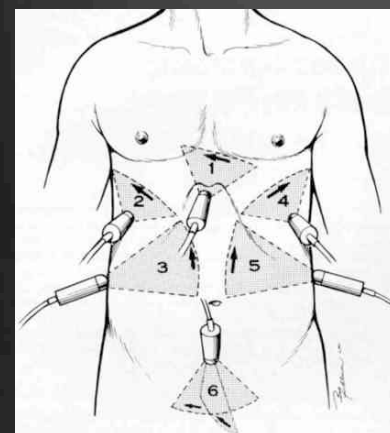
Examen avec une seule sonde



FAST - Réalisation

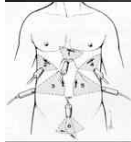
Prospective Analysis of a Rapid Trauma Ultrasound Examination Performed by Emergency Physicians

, O. John Ma MD Mateer, James R. MD; Ogata, Masaaki MD; Kefer, Michael P. MD; Wittmann, Dietmar MD; Aprahamian, Charles MD



The Journal of Trauma: Injury, Infection, and Critical Care
Numéro : Volume 38(6), June 1995, pp 879-885

FAST - Réalisation



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Location	Total Examinations	True Positifs	True Négatifs	False Négatifs	False Positives	Se (%)	Sp (%)	Accuracy (%)
Intrapéritonéal	245	32	207	5	1	86	99	98
Pleural	240	25	214	1	0	96	100	99
Péricardial	245	6	238	0	1	100	99	99
Rétropéritonéal	245	1	243	1	0	50	100	99
TOTAL	975	64	902	7	2	90	99	99

FAST - Réalisation

The Indeterminate Abdominal Sonogram in Multisystem Blunt Trauma

417 patients 28 (6.7%) résultats indéterminés

Factors	n
Patient factors (n = 20)	
Subcutaneous emphysema	14
Obesity	6
Sonographer factors (n = 8)	
Equivocal for free fluid	4
Unable to generate adequate images for interpretation ^a	4

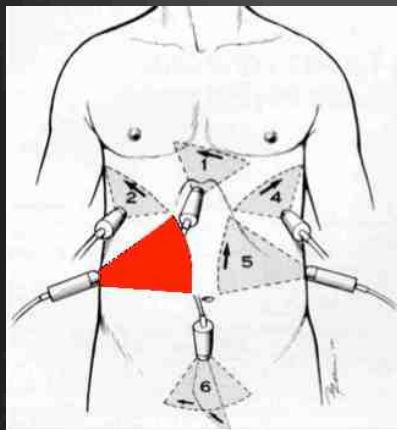
^a Without a discernable cause (e.g., obesity).

Boullanger et al – J Trauma 1998

FAST - Réalisation

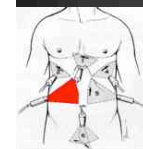
Early Detection of Hemoperitoneum by Ultrasound Examination of the Right Upper Quadrant: A Multicenter Study

Rozycki, Grace S. MD; Ochsner, M. Gage MD; Feliciano, David V. MD; Thomas, Bruce DO; Boullanger, Bernard R. MD; Davis, Frank E. MD; Falcone, Robert E. MD; Schmidt, Judith A. DNSc



The Journal of Trauma: Injury, Infection, and Critical Care
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FAST - Réalisation



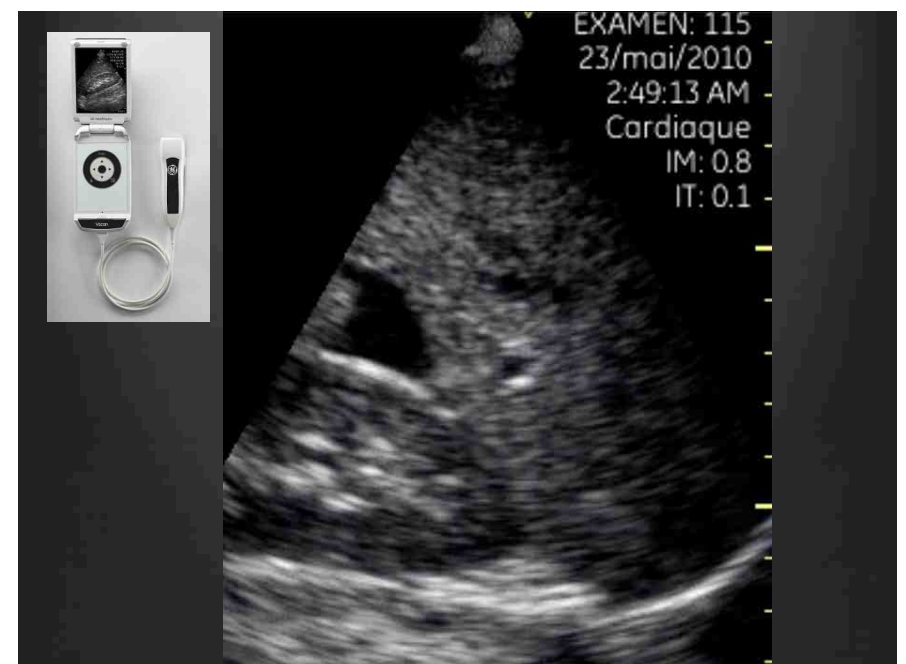
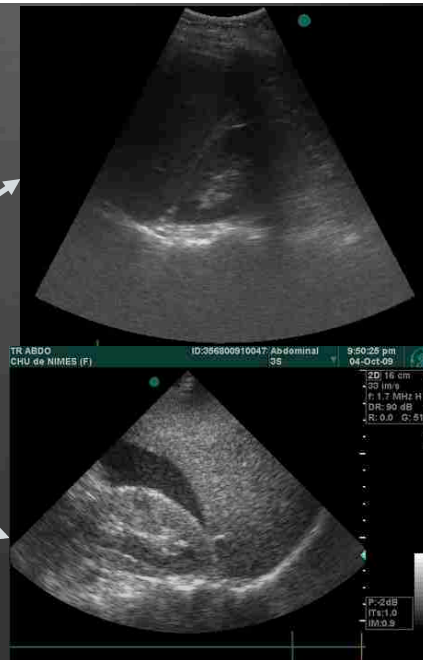
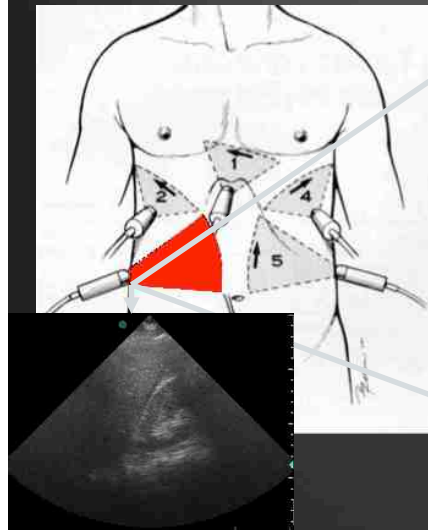
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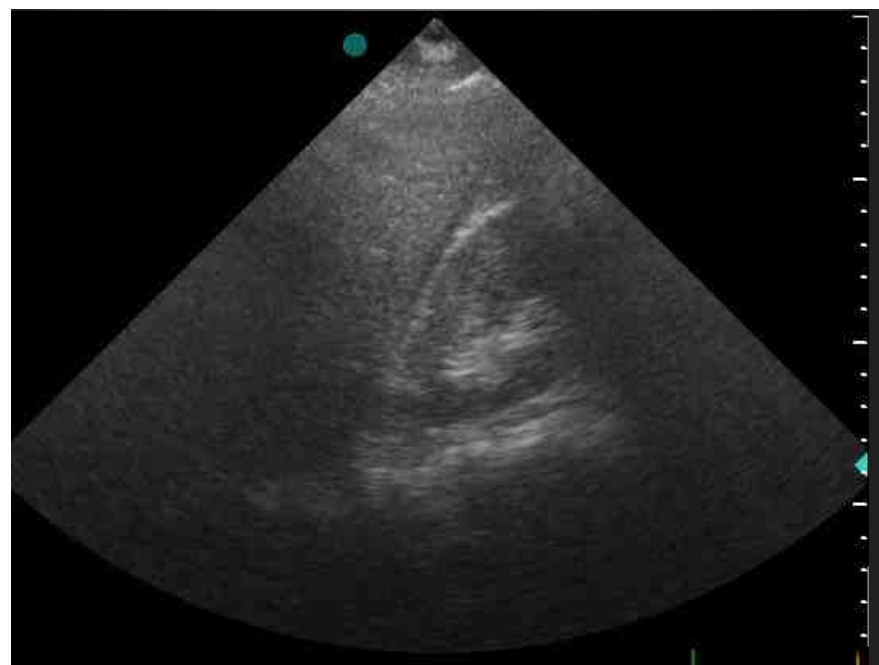
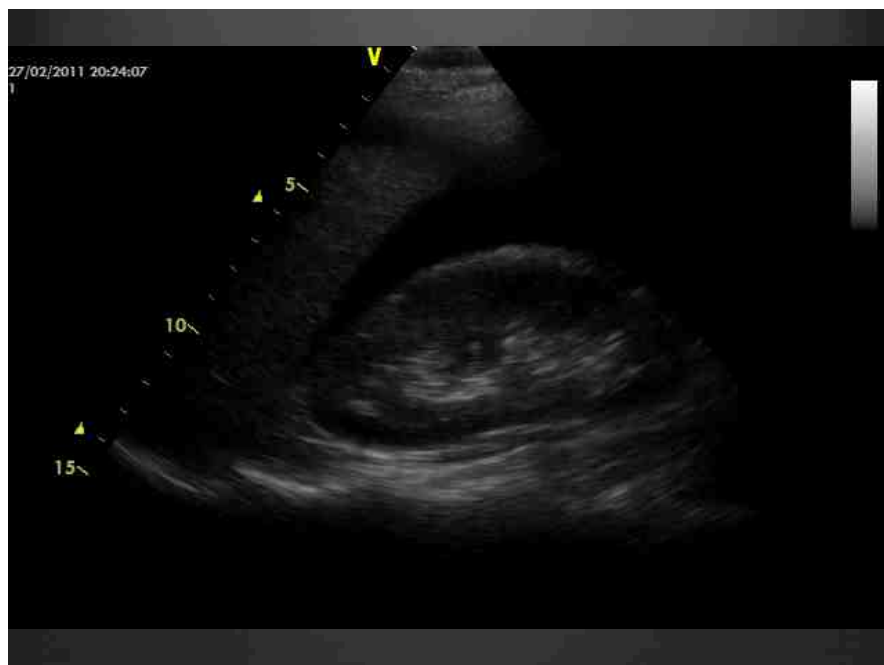
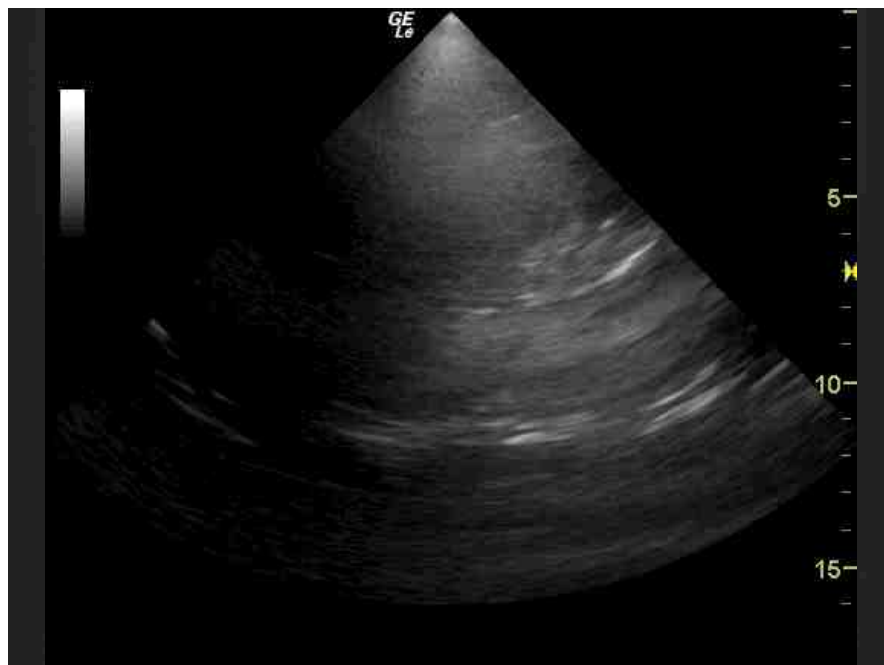
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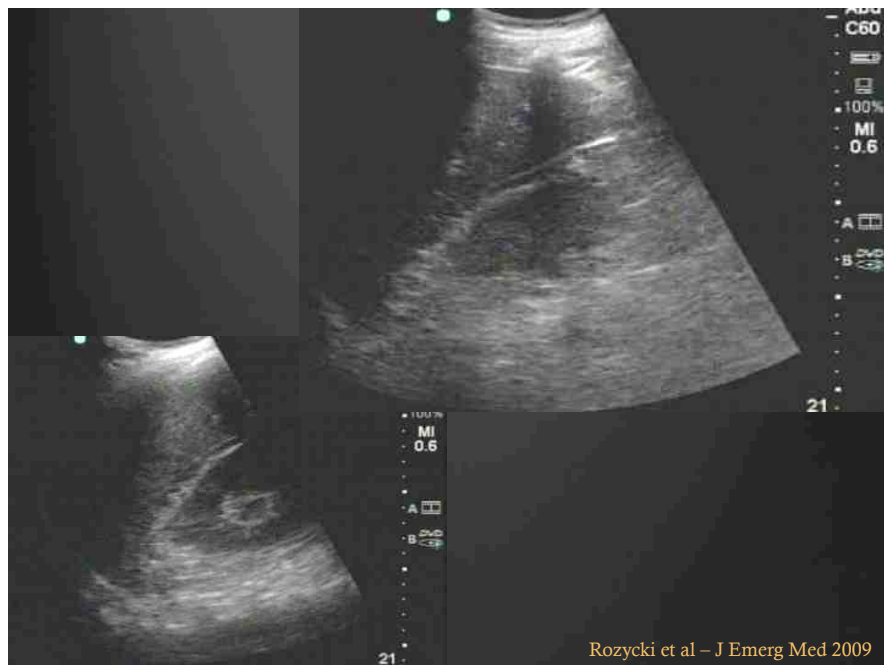
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Intra-abdominal injuries	Number of patients	Region			P value
		RUQ	LUQ	Pelvis	
Multiple	114	97 (85,5%)	63 (55,3%)	49 (43%)	0,001
Single					
Spleen	69	49 (71%)	23 (33%)	21 (30,4%)	0,001
Liver	53	41 (77,4%)	18 (34%)	20 (37,7%)	0,001
Hollow viscera only	26	16 (61,5%)	7 (26,9%)	19 (73,1%)	0,578
Rétropéritonéal only	13	10 (76,9%)	4 (30,7%)	2 (15,4%)	0,013
TOTAL	275	213 (77,5%)	115 (41,8%)	111 (40,4%)	

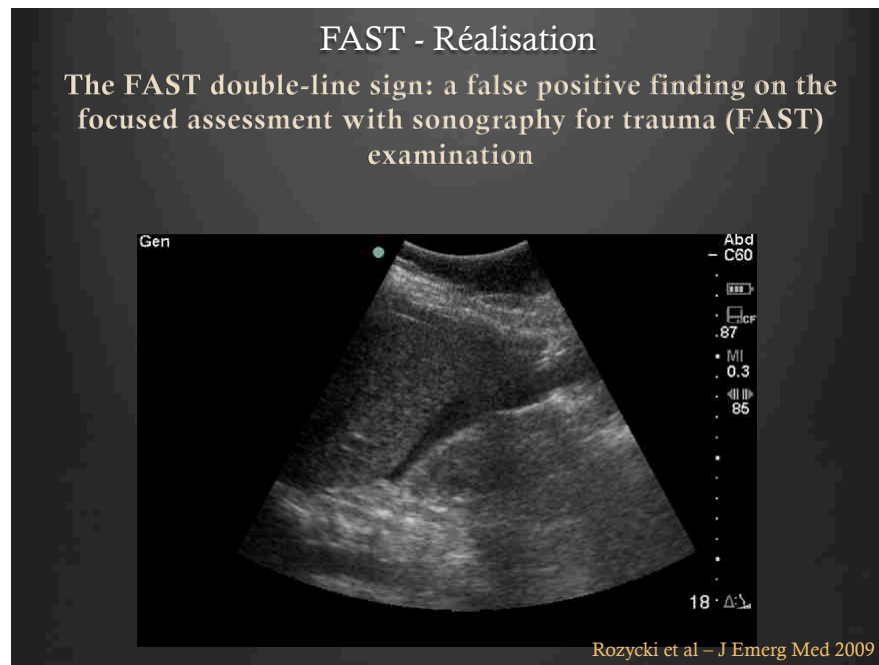
FAST - Réalisation







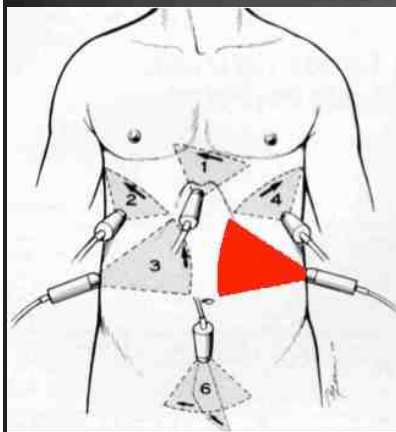
Rozycki et al – J Emerg Med 2009



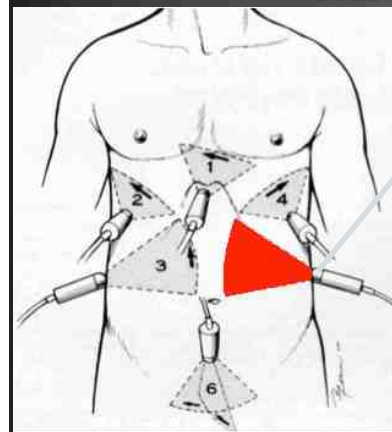
Rozycki et al – J Emerg Med 2009



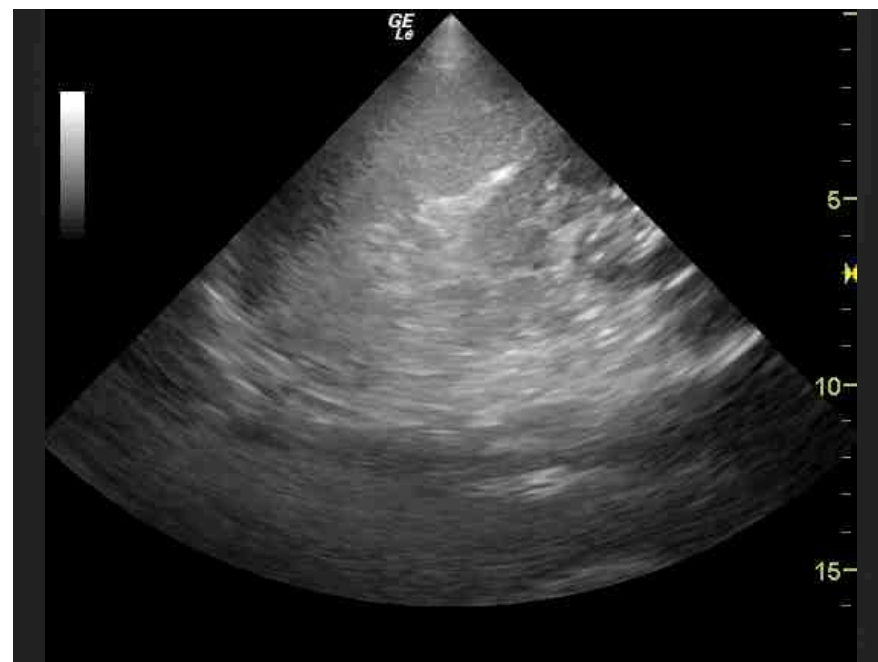
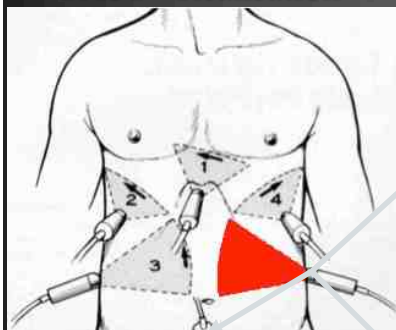
FAST - Réalisation

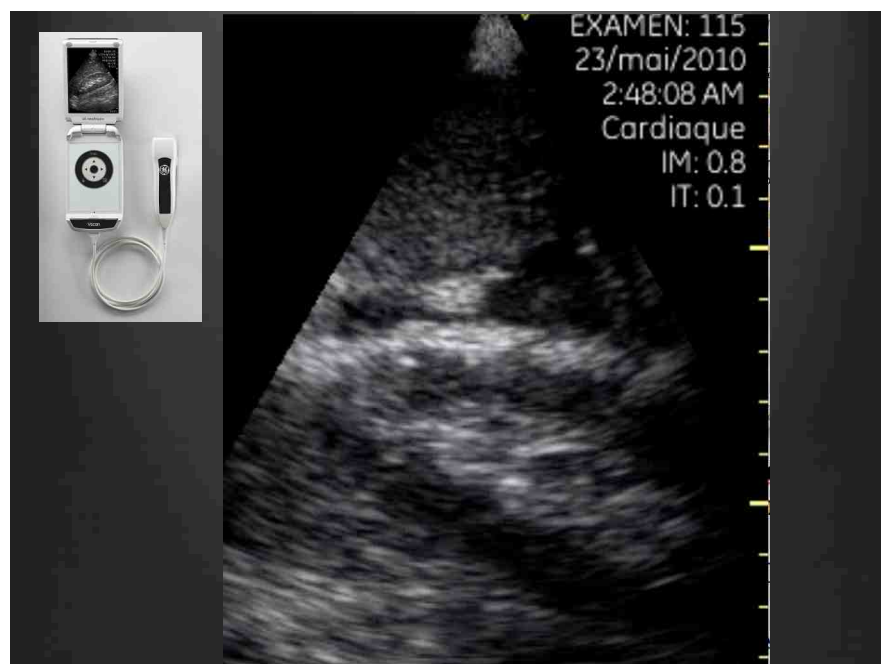
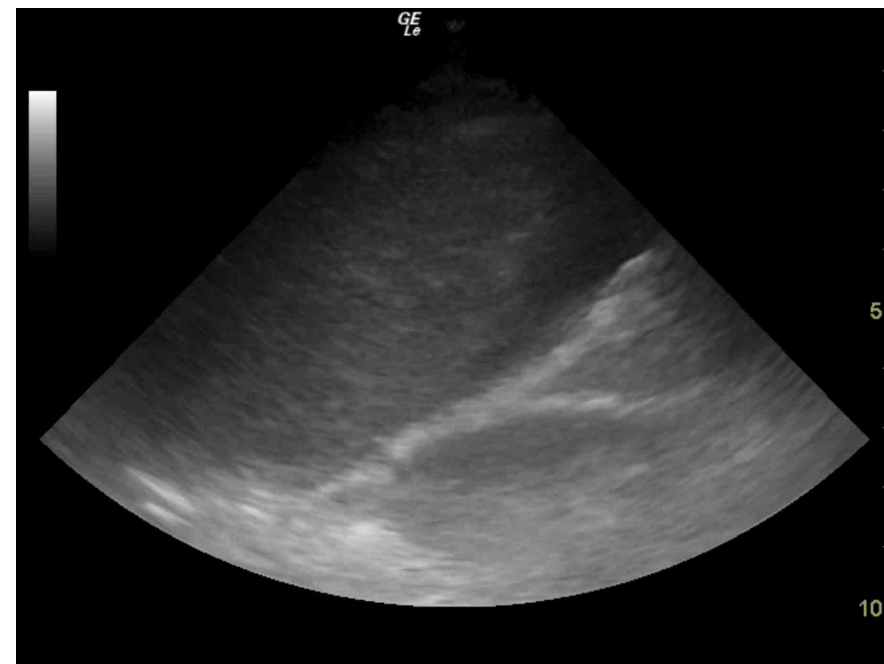
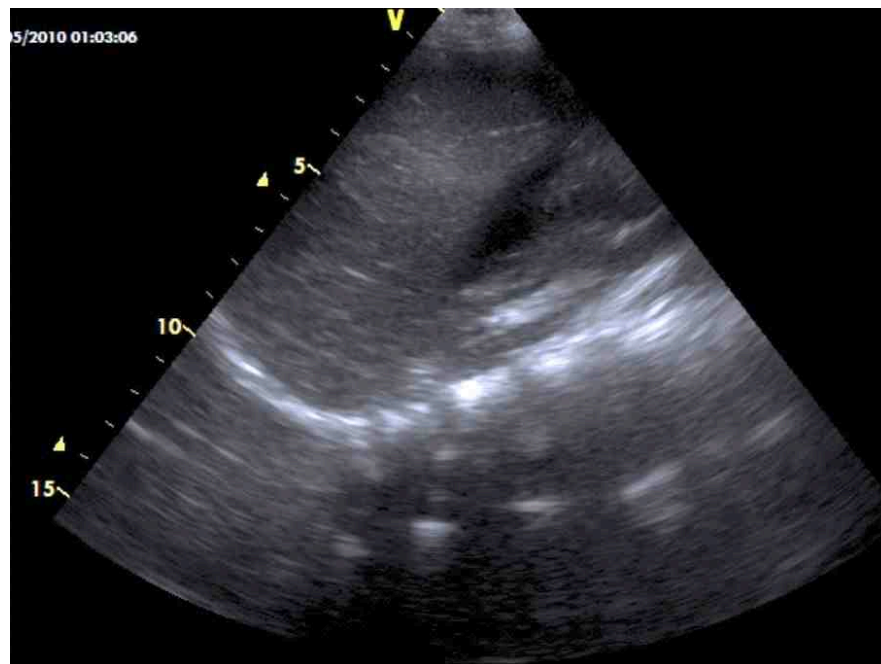


FAST



FAST - Réalisation







FAST - Réalisation

Blunt Abdominal Trauma: Should US Be Used Detect Both Free Fluid and Organ Injuries?

TABLE 2
US Findings Compared with CT or Surgical Findings in 205 Hemodynamically Stable Patients

US Findings vs CT or Surgical Findings [†]	Initial US Examination				Second US Examination*	
	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Sensitivity (%)	NPV (%)
Free fluid at US vs free fluid at CT (n = 83)	93 (77/83)	95 (115/121)	93 (77/83)	95 (115/121)	96 (80/83)	98 (118/121)
Free fluid and/or organ injury at US vs organ injury at CT or surgery (n = 99)	72 (71/99)	88 (93/106)	85 (71/84)	77 (93/121)	84 (83/99)	87 (106/122)
Free fluid at US vs organ injury at CT or surgery (n = 99)	65 (64/99)	82 (87/106)	77 (64/83)	71 (87/122)	68 (67/99)	72 (87/119)
Organ injury at US vs organ injury at CT or surgery (n = 99) [‡]	41 (39/99)	94 (100/106)	87 (39/45)	62 (100/160)	55 (54/99)	72 (115/160)
Spleen injury (n = 44) [‡]	27 (12/44)	98 (157/161)	75 (12/16)	85 (157/189)	34 (15/44)	85 (160/189)
Liver injury (n = 41) [‡]	51 (21/41)	99 (158/159)	95 (21/22)	89 (158/178)	73 (30/41)	94 (164/175)
Kidney/adrenal gland injury (n = 20) [‡]	40 (8/20)	98 (182/186)	67 (8/12)	94 (182/194)	55 (11/20)	95 (185/194)
Other organ injuries (n = 12) ^{‡§}	8.0 (1/12)	100 (193/193)	100 (1/1)	95 (193/204)	33 (4/12)	96 (193/201)

Note.—Numbers in parentheses are the data used to calculate the percentages. Patients who underwent immediate surgery after the initial US examination and did not undergo CT were excluded from this analysis.
* The specificity and PPV of findings at second US could not be calculated because the radiologist was aware of CT results at the time of this examination.
[†] Numbers are those of patients verified to have this finding at CT or surgery.
[‡] Only parenchymal injuries, not the presence of free fluid, were considered.
[§] Including bowel, mesenteric, bladder, and pancreatic injuries.

Poletti et al Radiology. 2003

FAST – limites et perspectives

Blunt Abdominal Trauma: Does the Use of a Second-Generation Sonographic Contrast Agent Help to Detect Solid Organ Injuries?

Pierre-Alexandre Poletti¹, Alexandra Platon¹, Christoph D. Becker¹, Gilles Mentha², Bernard Vermeulen³,
Léo H. Buhler² and François Terrier¹

210 traumatismes abdominaux
stable

AJR 2004; 183:1293-1301

Injuries	Sensitivity (%) of Admission Sonography	Detection Rate (%)	
		Control Sonography	Contrast-Enhanced Sonography
All solid organs ^a	40 (35/88)	57 (50/88)	80 (70/88)
Spleen			
Grade I	25 (1/4)	25 (1/4)	25 (1/4)
Grade II	31 (4/13)	46 (6/13)	62 (8/13)
Grades III-V	55 (6/11)	64 (7/11)	100 (11/11)
Liver			
Grades I and II	28 (4/14)	50 (7/14)	71 (10/14)
Grade III	31 (5/16)	56 (9/16)	88 (14/16)
Grade IV	88 (7/8)	88 (7/8)	100 (8/8)
Kidney and adrenal gland			
Grades I and II	28 (2/7)	43 (3/7)	57 (4/7)
Grades III-V	56 (5/9)	67 (6/9)	100 (9/9)

FAST – Péritoine - Performance

Surgeon-Performed Bedside Organ Assessment With Sonography After Trauma (BOAST): A Pilot Study From the WTA Multicenter Group

Table 3 Number of Organ Injuries on BOAST/Number of Organ Injuries on Initial CT Scan CT Organ Grade

Organ	I	II	III	IV	V
Liver	0/20 = 0%	8/26 = 31%	8/15 = 53.3%	6/10 = 60%	1/1 = 100%
Spleen	0/8 = 0%	4/12 = 33.3%	11/20 = 55%	1/4 = 25%	None
Kidney	0/6 = 0%	1/4 = 25%	3/5 = 60%	3/4 = 75%	None
135 Organs	0/34 = 0%	13/42 = 31%	22/40 = 55%	10/18 = 55.5%	1/1 = 100%

8 min

Rozycki et al J Trauma. 2005