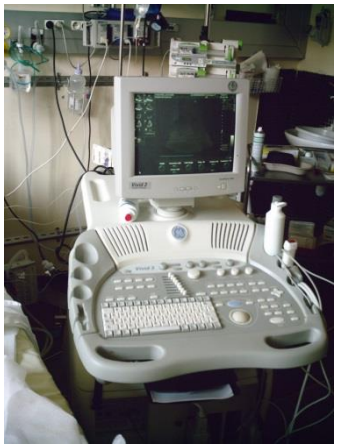
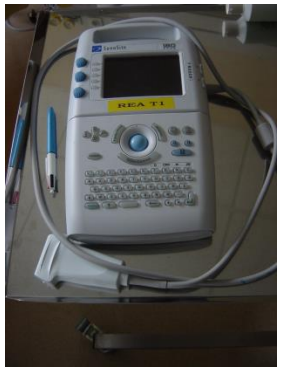
Echographie et transport aérien





Eric Maury

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Latest news

24.01.2014
Evidence rapidly building on utility of ultrasound in areas other than cardiolog...
A Review in this month's edition of Global Heart (the journal of the World...

24.01.2014
Almost 200 years later, are we living in the final days of the stethoscope
An editorial in this month's edition of Global Heart (the journal of the World...

Ultrasound training should be implemented early into medical education program...
A review in this month's edition of Global Heart (the journal of the World...

All the news >

World Heart Day

Champion Advocates Programme

Ground Miles Challenge

Point-of-Care Ultrasound in Medical Education — Stop Listening and Look

Scott D. Solomon, M.D., and Fidencio Saldana, M.D.

Harvard Medical School Students Using a Handheld Ultrasound Machine in a Teaching Exercise.

A generation of physicians will need to be trained to view this technology as an extension of their senses, just as many generations have viewed the stethoscope. That development will require the medical education community to embrace and incorporate the technology throughout the curriculum.

Respiratory Sound	Clinical Characteristics	Clinical Correlation
Normal tracheal sound	Hollow and nonmusical, clearly heard in both phases of respiratory cycle	Transports intrapulmonary sounds, indicating upper-airway patency; can be disturbed (e.g., become more noisy or even musical) if upper-airway patency is altered; used to monitor sleep apnea; serves as a good model of bronchial breathing
Normal lung sound	Soft, nonmusical, heard only on inspiration and on early expiration	Is diminished by factors affecting sound generation (e.g., hypoventilation, airway narrowing) or sound transmission (e.g., lung destruction, pleural effusion, pneumothorax); assessed as an aggregate score with normal breath sound; rules out clinically significant airway obstruction*
Bronchial breathing	Soft, nonmusical, heard on both phases of respiratory cycle (mimics tracheal sound)	Indicates patent airway surrounded by consolidated lung tissue (e.g., pneumonia) or fibrosis
Stridor	Musical, high-pitched, may be heard over the upper airways or at a distance without a stethoscope	Indicates upper-airway obstruction; associated with extrathoracic lesions (e.g., laryngomalacia, vocal-cord lesion, lesion after extubation) when heard on inspiration; associated with intrathoracic lesions (e.g., tracheomalacia, bronchomalacia, extrinsic compression) when heard on expiration; associated with fixed lesions (e.g., croup, paralysis of both vocal cords, laryngeal mass or web) when biphasic
Wheeze	Musical, high-pitched; heard on inspiration, expiration, or both	Suggests airway narrowing or blockage when localized (e.g., foreign body, tumor); associated with generalized airway narrowing and airflow limitation when widespread (e.g., in asthma, chronic obstructive lung disease); degree of airflow limitation proportional to number of airways generating wheezes; may be absent if airflow is too low (e.g., in severe asthma, destructive emphysema)
Rhonchus	Musical, low-pitched, similar to snoring; lower in pitch than wheeze; may be heard on inspiration, expiration, or both	Associated with rupture of fluid films and abnormal airway collapsibility; often clears with coughing, suggesting a role for secretions in larger airways; is nonspecific; is common with airway narrowing caused by mucosal thickening or edema or by bronchospasm (e.g., bronchitis and chronic obstructive pulmonary disease)
Fine crackle	Nonmusical, short, explosive; heard on mid-to-late inspiration and occasionally on expiration; unaffected by cough, gravity-dependent, not transmitted to mouth	Unrelated to secretions; associated with various diseases (e.g., interstitial lung fibrosis, congestive heart failure, pneumonia); can be earliest sign of disease (e.g., idiopathic pulmonary fibrosis, asbestosis); may be present before detection of changes on radiology
Coarse crackle	Nonmusical, short, explosive sounds; heard on early inspiration and throughout expiration; affected by cough; transmitted to mouth	Indicates intermittent airway opening, may be related to secretions (e.g., in chronic bronchitis)
Pleural friction rub	Nonmusical, explosive, usually biphasic sounds; typically heard over basal regions	Associated with pleural inflammation or pleural tumors
Squawk	Mixed sound with short musical component (short wheeze) accompanied or preceded by crackles	Associated with conditions affecting distal airways; may suggest hypersensitivity pneumonia or other types of interstitial lung disease in patients who are not acutely ill; may indicate pneumonia in patients who are acutely ill

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

Edward W. Campion, M.D., *Editor*

Fundamentals of Lung Auscultation

Abraham Bohadana, M.D., Gabriel Izbicki, M.D., and Steve S. Kraman, M.D.

- Progrès technologiques
- International Lung Sounds Association
- Auscultation trachéale

often as necessary. The development of robust acoustic devices for use at the bedside — as exemplified by electronic stethoscopes paired with small convenient recorders, perhaps in the form of a smartphone with an app — may provide the long-awaited portable objective means to record, analyze, and store lung sounds just as any other clinical information is measured and stored. This

Intensive Care Med
DOI 10.1007/s00134-014-3460-z

EDITORIAL

Paul H. Mayo
Eric Maury

Echography is mandatory for the initial management of critically ill patients: We are not sure

However, we are concerned that the dominance of ultrasonography will displace training time required for other important aspects of critical care medicine. We particularly highlight our concern that the widespread use of ultrasonography may degrade the importance of the history and physical examination in the urgent evaluation of the patient with cardiopulmonary failure. Ultrasonography is an extension of the physical examination, but not its replacement. It should always be combined with the time honored skills of visual assessment, palpation, auscultation, and, on occasion, olfaction. Unlike the radiologist or consultative cardiologist, the intensivist deploys all aspects of the physical examination in conjunction with point of care ultrasonography in order to integrate the results into a rational diagnostic and management strategy.

L'échographie pour étendre
l'examen clinique
Pas pour s'y substituer

Echographie

- Rapide
- Non irradiant
- Reproductible
- Moins coûteux que CT MRI
- Au lit du patient
- Extension examen clinique

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

CURRENT CONCEPTS

Point-of-Care Ultrasonography

Christopher L. Moore, M.D., and Joshua A. Copel, M.D.

Specialty	Ultrasound Applications
Anesthesia	Guidance for vascular access, regional anesthesia, intraoperative monitoring of fluid status and cardiac function
[illegible]diology	Echocardiography, intracardiac assessment
Critical care medicine	Procedural guidance, pulmonary assessment, focused echocardiography
[illegible]atology	Assessment of skin lesions and tumors
Emergency medicine	[illegible] guidance
Endocrinology and endocrine surgery	Assessment of thyroid and parathyroid, procedural guidance
General surgery	Ultrasonography of the breast, procedural guidance, intraoperative assessment
Gynecology	Assessment of cervix, uterus, and adnexa; procedural guidance
Obstetrics and maternal–fetal medicine	Assessment of pregnancy, detection of fetal abnormalities, procedural guidance
Neonatology	Cranial and pulmonary assessments
Nephrology	Vascular access for dialysis
Neurology	Transcranial Doppler, peripheral-nerve evaluation
Ophthalmology	Corneal and retinal assessment
Orthopedic surgery	Musculoskeletal applications
Otolaryngology	Assessment of thyroid, parathyroid, and neck masses; procedural guidance
Pediatrics	Assessment of bladder, procedural guidance
Pulmonary medicine	Transthoracic pulmonary assessment, endobronchial assessment, procedural guidance
Radiology and interventional radiology	Ultrasonography taken to the patient with interpretation at the bedside, procedural guidance
Rheumatology	Monitoring of synovitis, procedural guidance
Trauma surgery	FAST, procedural guidance
Urology	Renal, bladder, and prostate assessment; procedural guidance
Vascular surgery	Carotid, arterial, and venous assessment; procedural assessment

N Engl J Med 2011;364:749-57.

Imagine

- Les cardiologues sans echographie
- Les obstétriciens sans echographie

Echographie du patient aigu

- Pour gagner du temps
- Pour sécuriser les procédures

- Evaluation hémodynamique
- Aide à l'insertion des cathéters
- Exploration abdominale
- Exploration pleuro pulmonaire
- ……

Ultrasonography in ICU

- Evaluation hémodynamique
- Taille des ventricules
- Fraction d’ éjection
- ITV, Stroke volume, débit cardiaque pression artérielle pulmonaire
- E/A, E/E’

Intensive Care Med (2005) 32:9–10
DOI 10.1007/s00134-005-2833-8

EDITORIAL

Bernard P. Cholley
Antoine Vieillard-Baron
Alexandre Mebazaa

Echocardiography in the ICU: time for widespread use!

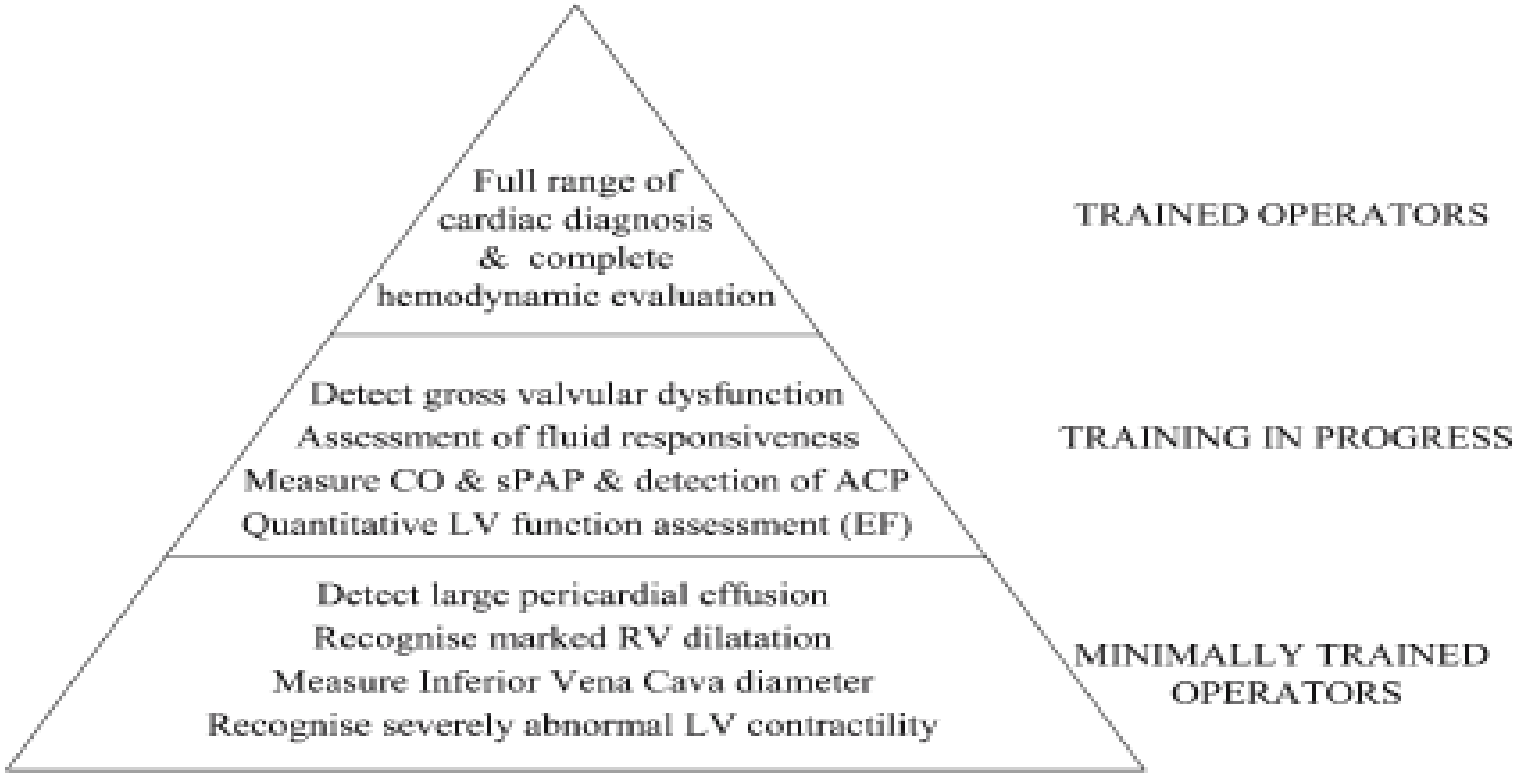
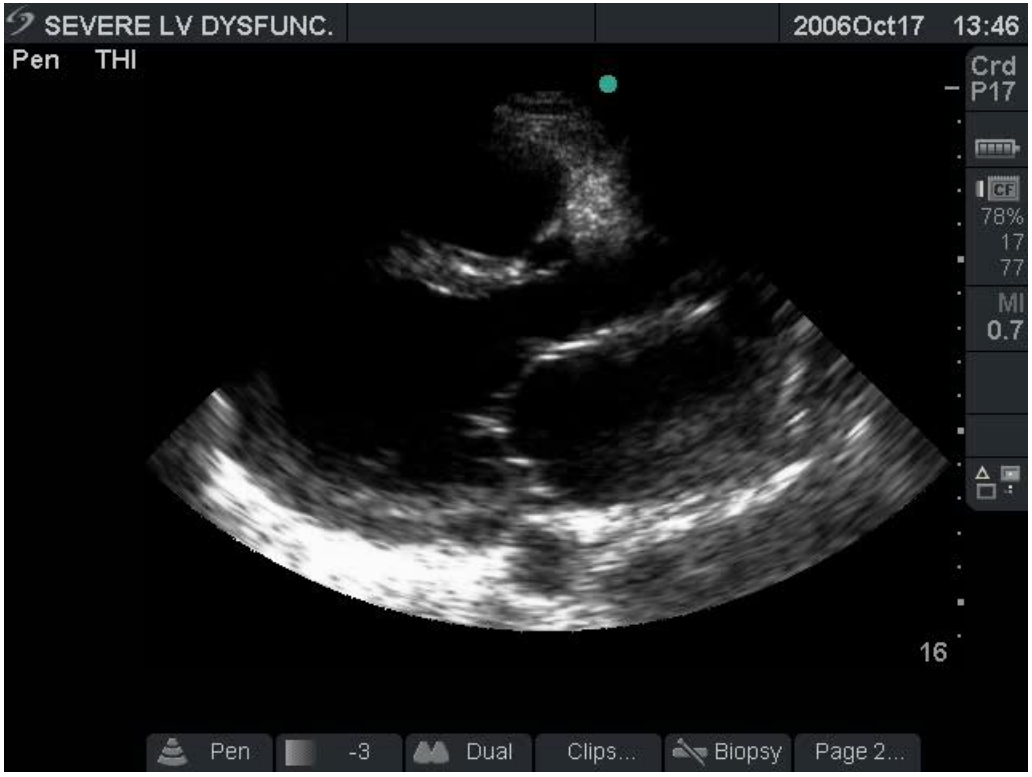


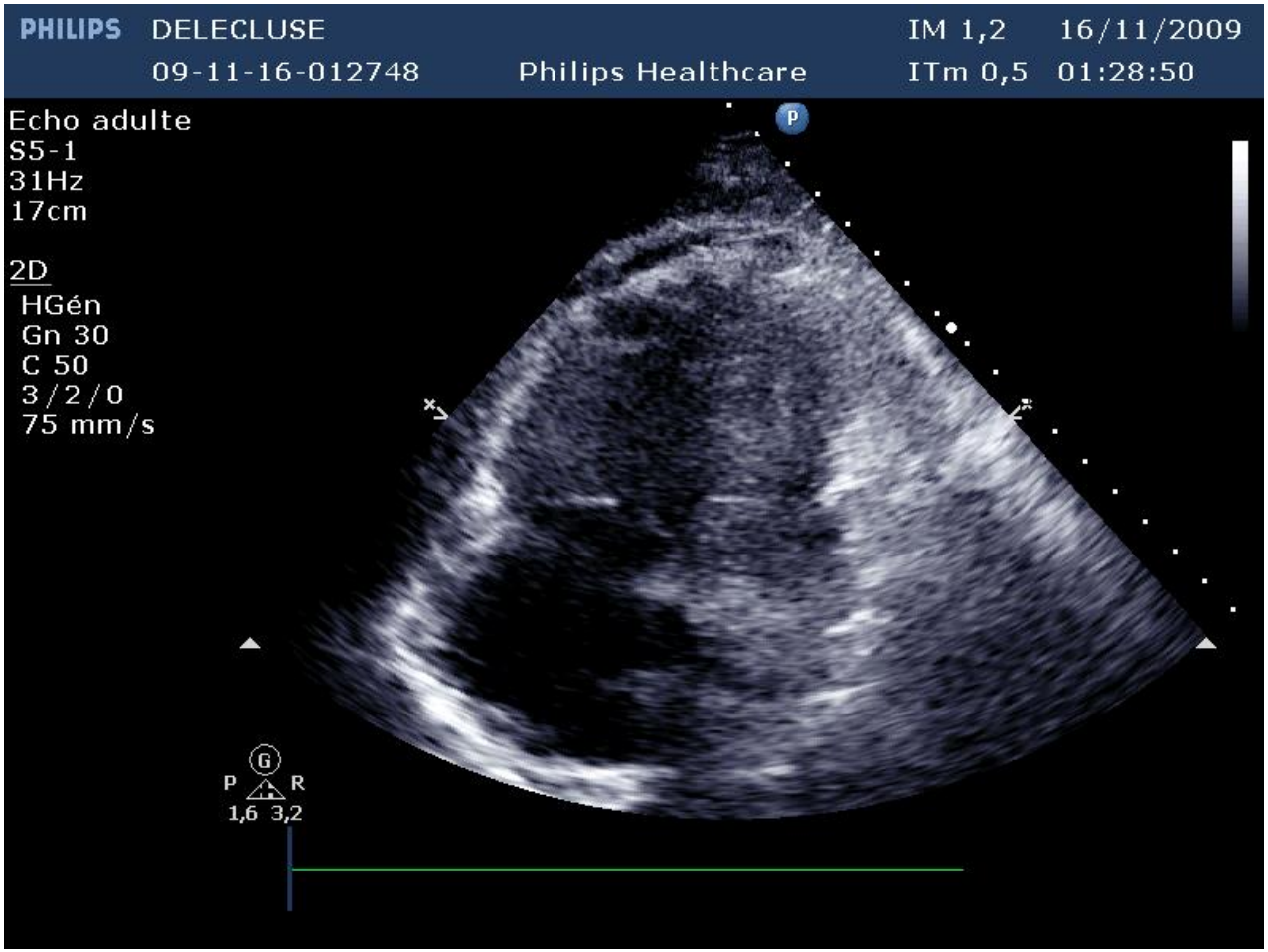
Fig. 1 The "pyramid" of echocardiography skills in the intensive care unit (ICU). At the *top* are trained operators who have gone

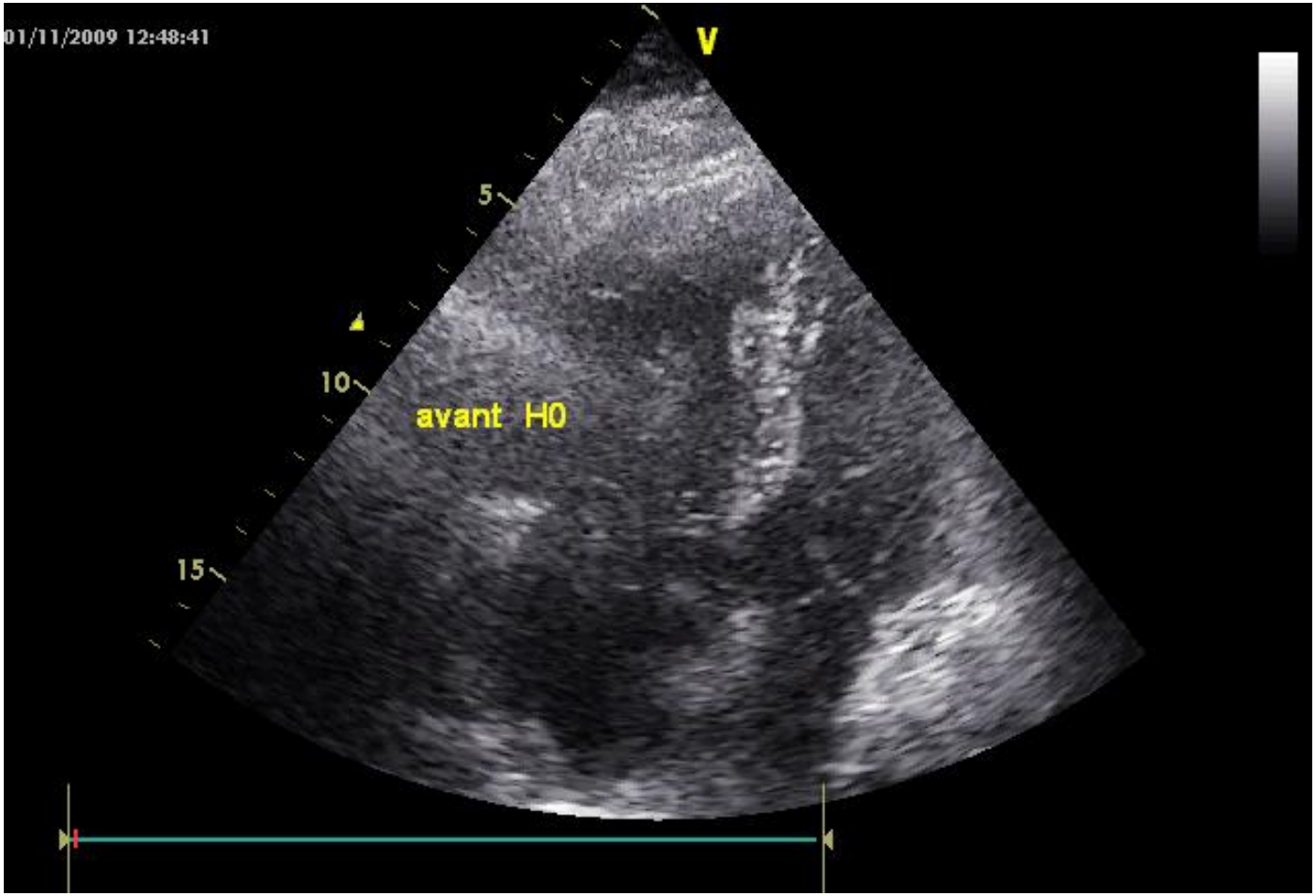
Fraction d’éjection très altéree



Tamponnade

Right ventricle dilation

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Un petit coup d'œil sur la veine cave!!

Intensive Care Med (2007) 33:1795–1799
DOI 10.1007/s00134-007-0742-8

BRIEF REPORT

Philippe Vignon
Anthony Dugard
Julie Abraham
Dominique Belcour
Guillaume Gondran
Frédéric Pepino
Benoît Marin
Bruno François
Hervé Gastinne

Focused training for goal-oriented hand-held echocardiography performed by noncardiologist residents in the intensive care unit

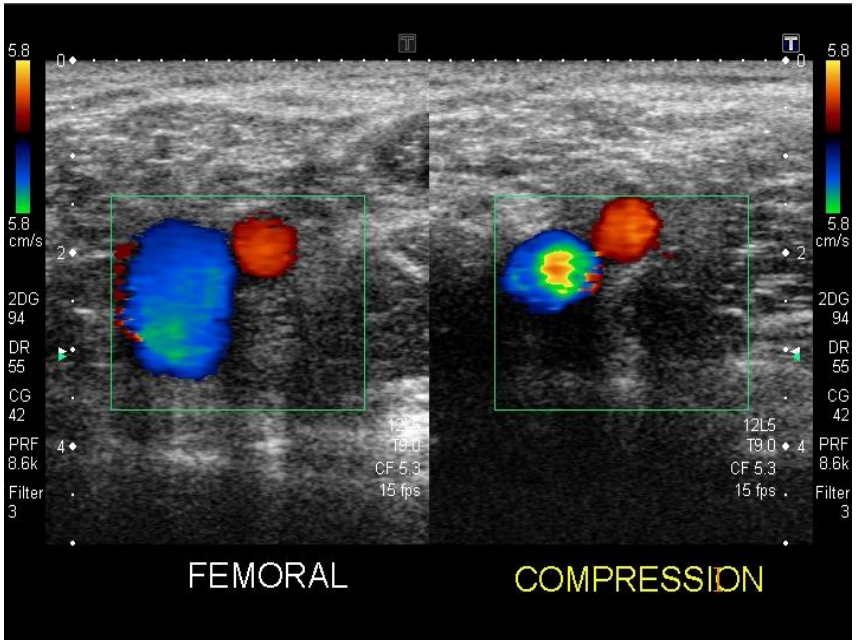
Table 2 Clinical questions addressed using hand-held echocardiography; *LV* left ventricle; *RV* right ventricle

Clinical questions	Cases identified by the experienced intensivist (*n*)	Questions not addressed by residents/ experienced intensivist (*n*) [a]	Discrepant positive results yielded by residents (*n*) [b]	Discrepant negative results yielded by residents (*n*) [b]	Kappa values for all addressed clinical questions [c]
LV systolic dysfunction	26 (43%)	3/0	4	3	0.76 ± 0.09 (0.59-0.93)
LV dilatation	13 (21%)	4/0	4	3	0.66 ± 0.12 (0.43-0.90)
RV dilatation	13 (21%)	5/1	1	4	0.71 ± 0.12 (0.46-0.95)
Pericardial effusion	6 (10%)	2/1	2	1	0.68 ± 0.18 (0.33-1.03)
Tamponade	1 (2%)	–	0	0	–
Pleural effusion	43 (70%)	13/1	2	1	0.71 ± 0.09 (0.53-0.88)

[a] Due to inadequate imaging quality or undetermined interpretation; [b] When compared with the interpretation of the experienced intensivist; [c] Numbers in parentheses are 95% confidence intervals

8 hours of training

Deep venous thrombosis



Internal jugular vein
Sub clavian vein
Femoral vein
Poplitean vein

Sensitivity >90%
In case of obstructive thrombosis
Limb swelling

CHEST Original Research

CRITICAL CARE

Accuracy of Ultrasonography Performed by Critical Care Physicians for the Diagnosis of DVT

Pierre D. Kory, MD, MPA; Crescens M. Pellecchia, DO; Ariel L. Shiloh, MD; Paul H. Mayo, MD, FCCP; Christopher DiBello, MD; and Seth Koenig, MD

- Sensitivity:86%
- Spécificity:96%
- Accuracy: 95%
- Training: 4hours

Echographie en reanimation

- Evaluation hémodynamique
- Aide à l'insertion des cathéters
- Exploration abdominale
- Exploration pleuro pulmonaire
- Doppler trans crânien

Ultrasound for vascular access

- Who has never accidentally punctured artery during a venous cannulation attempt ?
- Who has never induced a pneumothorax after insertion of a venous sub clavian catheter?
- Who always reaches the vein at first pass?
- If I was a critically ill patient, I would like this procedure to be performed with an optimal mastery.

To see or not…

NICE technology appraisal guidance Issued: September 2002

TA49 Guidance on the use of ultrasound locating devices for placing central venous catheters

View the summary and implementation tools

Next

IJV

1 Guidance

1.1 Two-dimensional (2-D) imaging ultrasound guidance is recommended as the preferred method for insertion of central venous catheters (CVCs) into the internal jugular vein (IJV) in adults and children in elective situations.

1.2 The use of two-dimensional (2-D) imaging ultrasound guidance should be considered in most clinical circumstances where CVC insertion is necessary either electively or in an emergency situation.

1.3 It is recommended that all those involved in placing CVCs using two-dimensional (2-D) imaging ultrasound guidance should undertake appropriate training to achieve competence.

1.4 Audio-guided Doppler ultrasound guidance is not recommended for CVC insertion.

Anatomical landmarks are sufficient

Complications

Complication	Frequency		
	Internal Jugular	Subclavian	Femoral
		percent	
Arterial puncture	6.3–9.4	3.1–4.9	9.0–15.0
Hematoma	<0.1–2.2	1.2–2.1	3.8–4.4
Hemothorax	NA	0.4–0.6	NA
Pneumothorax	<0.1–0.2	1.5–3.1	NA
Total	6.3–11.8	6.2–10.7	12.8–19.4

McGee, Gould, NEJM 2003; 348: 1123

Acta Neurol Scand 2002: 105: 235–239
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ACTA NEUROLOGICA
SCANDINAVICA
ISSN 0001-6314

Case report

Stroke after internal jugular venous cannulation

Reuber M, Dunkley LA, Turton EPL, Bell MDD, Bamford JM. Stroke after internal jugular venous cannulation.
Acta Neurol Scand 2002: 105: 235–239. © Munksgaard 2002.

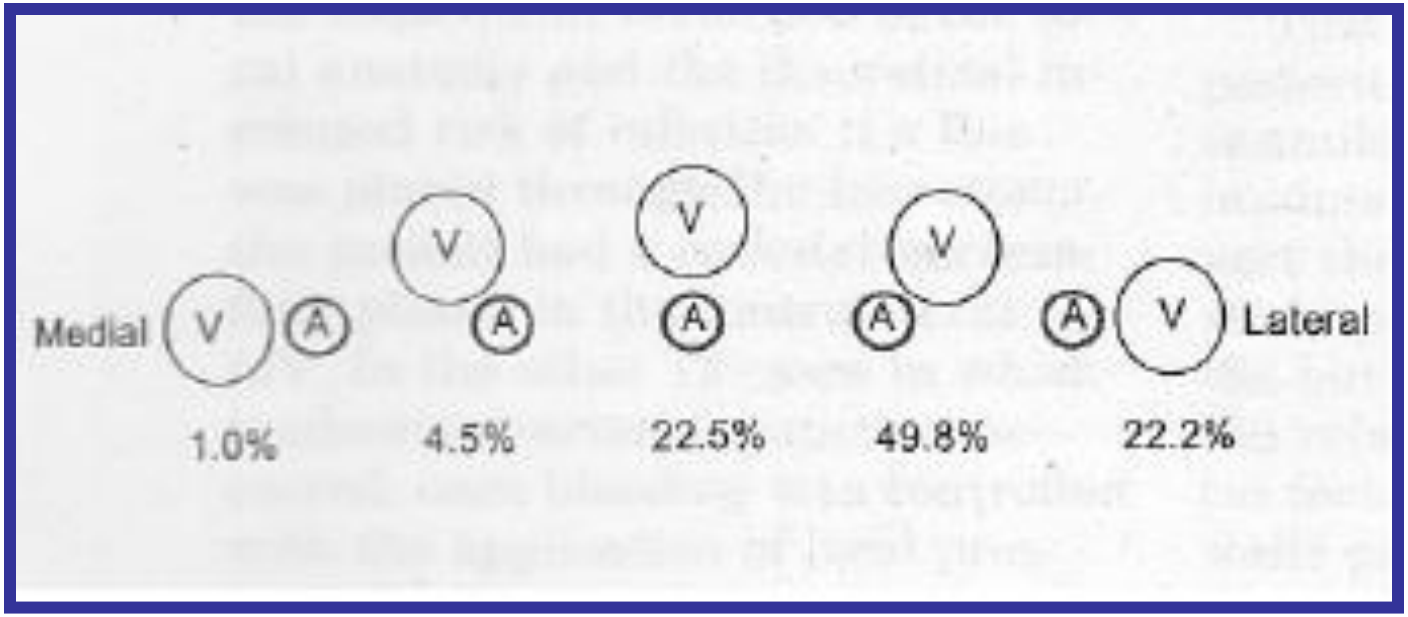
M. Reuber, L. A. Dunkley, E. P. L. Turton, M. D. D. Bell, J. M. Bamford

Case 3 – A 73-year old patient was admitted to hospital for a nephrectomy. Right IJV-cannulation was attempted for perioperative fluid management. The searching needle punctured the carotid artery but was withdrawn immediately and firm pressure applied for 15 min. No haematoma was evident. Twenty-four hours postop the patient developed a left hemiparesis. A cranial CT scan showed exten-

Carotid artery puncture inocuity?

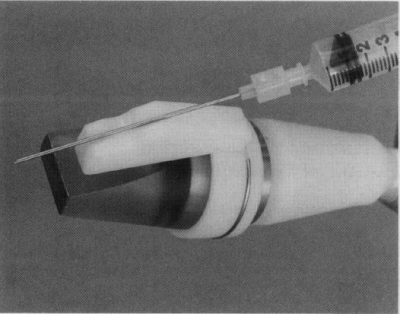
Why such a rate of complications?

Anatomical variability



The carotid artery and the internal jugular vein

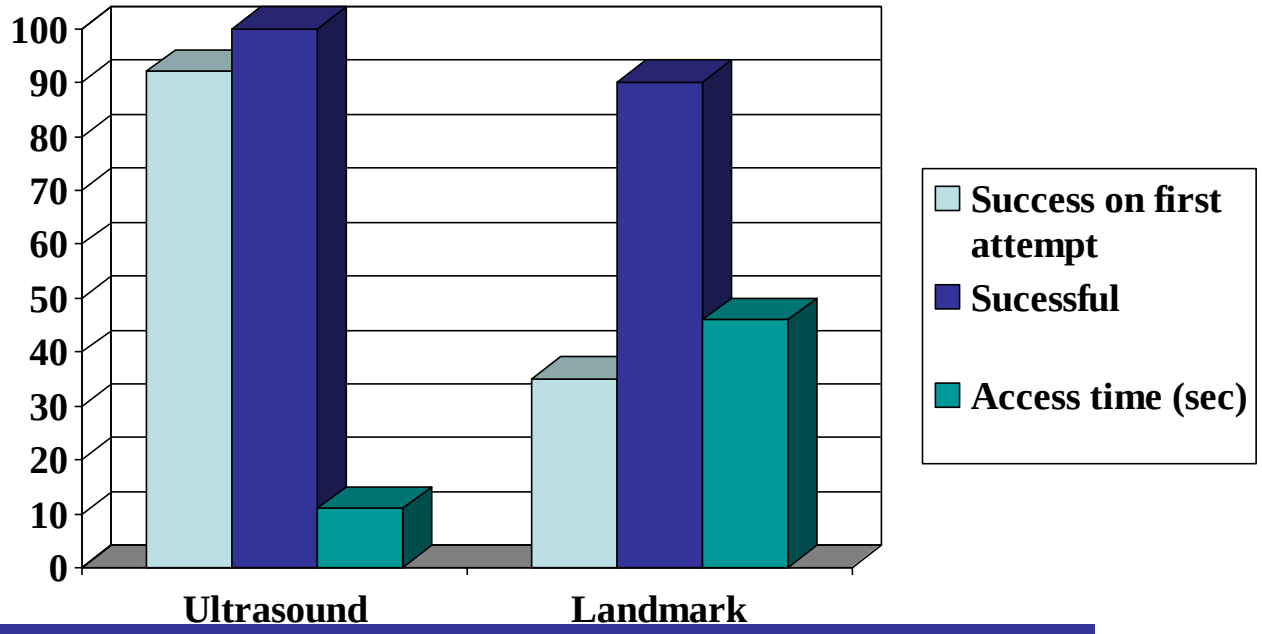
Gordon et.al., JVIR 1998; 9:333



Ultrasound-Assisted Cannulation of the Internal Jugular Vein

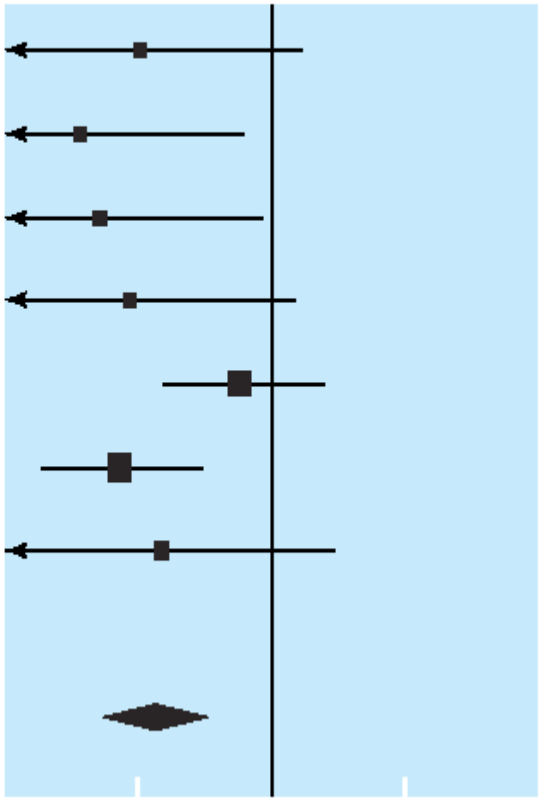
A Prospective Comparison to the External Landmark-Guided Technique

Bart G. Denys, MD; Barry F. Uretsky, MD; and P. Sudhakar Reddy, MD



Internal jugular vein cannulation1230 patients

Circulation 1993;87:1557–1562



Study	Two dimensional ultrasonography (n/N)	Landmark method (n/N)	Weight (%)	Relative risk (95% CI random)
Failed catheter placement (adults, internal jugular vein)				
Mallory et al 1990[w9]	0/12	6/17	8.8	0.11(0.01 to 1.73)
Nadig et al 1998[w10]	0/36	13/37	8.8	0.04(0.00 to 0.62)
Slama et al 1997[w11]	0/37	10/42	8.7	0.05(0.00 to 0.89)
Soyer et al 1993[w12]	0/24	5/23	8.5	0.09(0.01 to 1.49)
Sulek et al 2000[w13]	3/60	5/60	28.6	0.60(0.15 to 2.40)
Teichgräber et al 1997[w14]	2/50	26/50	28.7	0.08(0.02 to 0.31)
Troianos et al 1991[w15]	0/77	3/83	7.9	0.15(0.01 to 2.93)
Total (95% CI)	5/296	68/312	100.0	0.14(0.06 to 0.33)

Test for heterogeneity: χ^2=6.86, df=6, P=0.33

Test for overall effect: z=-4.50, P=0.0001

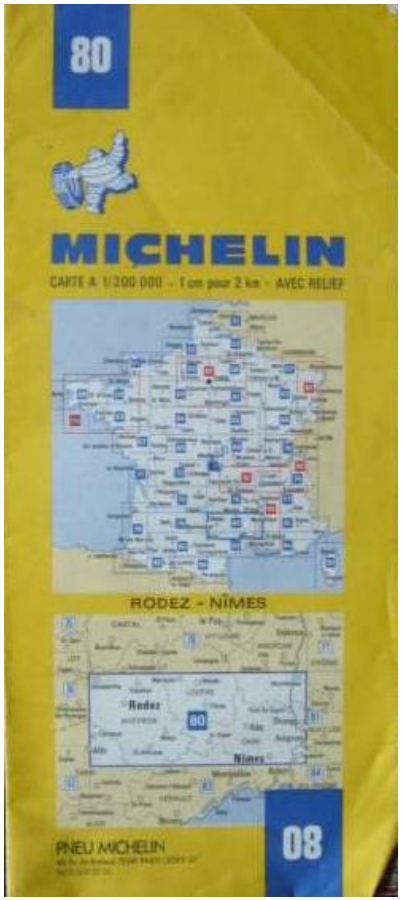
Hind BMJ 2003;327:361.

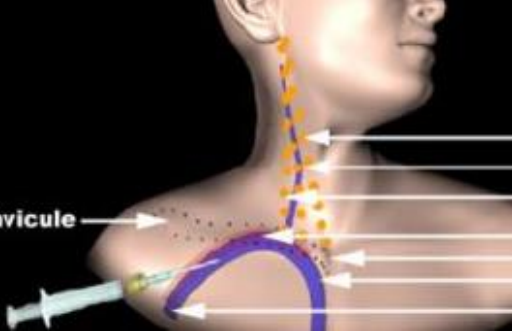
Landmark

Ultrasonography

Static/skin mark

Dynamic

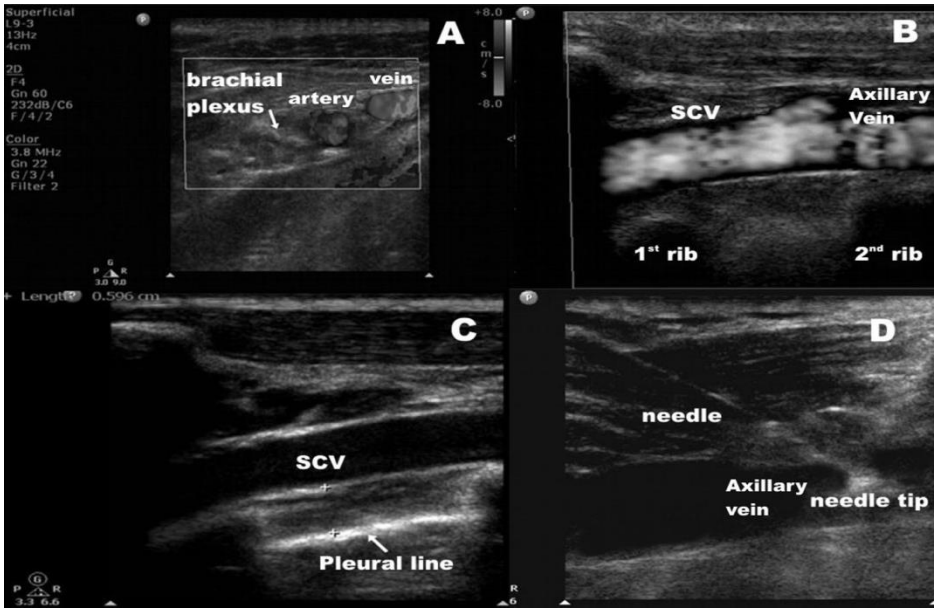




Real-time ultrasound-guided subclavian vein cannulation versus the landmark method in critical care patients: A prospective randomized study*

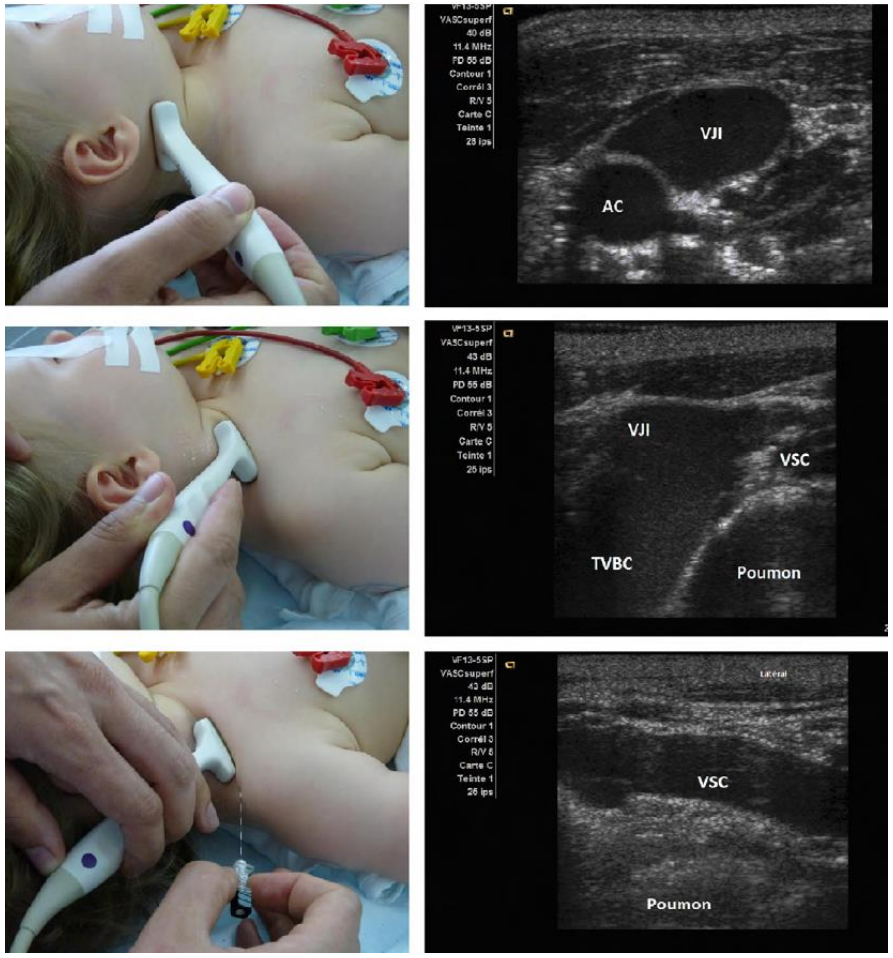
Mariantina Fragou, MD; Andreas Gravvanis, MD, PhD; Vasilios Dimitriou, MD, PhD; Apostolos Papalois, MD, PhD; Gregorios Kouraklis, MD, PhD; Andreas Karabinis, MD, PhD; Theodosios Saranteas, MD, DDS, PhD; John Poularas, MD; John Papanikolaou, MD; Periklis Davlouros, MD, PhD; Nicos Labropoulos, MD, PhD; Dimitrios Karakitsos, MD, PhD

Crit Care Med 2011 Vol. 39, No. 7



Outcome Measures	Ultrasound Group (n = 200)	Landmark Group (n = 201)[b]
Access time (sec)	26.8 ± 12.5 (16.4–39.2)	44.8 ± 54.9 (30.1–70.4)
Success rate	200 (100%)[a]	176 (87.5%)
Average number of attempts	1.1 ± 0.3 (1.1–1.5)[a]	1.9 ± 0.7 (1.5–2.7)
Artery puncture	1 (0.5%)[a]	11 (5.4%)
Hematoma	3 (1.5%)[a]	11 (5.4%)
Pneumothorax	0 (0%)[a]	10 (4.9%)
Hemothorax	0 (0%)[a]	9 (4.4%)
Catheter misplacement	19 (9.5%)	22 (11%)
Injury of the brachial plexus	0 (0%)[a]	6 (2.9%)
Phrenic nerve injury	0 (0%)[a]	3 (1.5%)
Cardiac tamponade	0 (0%)	1 (0.5%)

Sus clavicular access



Randomized, controlled clinical trial of point-of-care limited ultrasonography assistance of central venous cannulation: The Third Sonography Outcomes Assessment Program (SOAP-3) Trial*

Truman J. Milling, Jr, MD; John Rose, MD; William M. Briggs, PhD; Robert Birkhahn, MD, MS; Theodore J. Gaeta, DO, MPH; Joseph J. Bove, MD; Lawrence A. Melniker, MD, MS

Table 2. Comparison of cannulation success with dynamic ultrasound (D), static ultrasound (S), and anatomical landmark (LM) guidance

Primary Outcome	D n = 60	S n = 72	LM n = 69
Cannulation success[a] odds ratio (95% CI), compared with LM	53.5 (6.6–440)	3.0 (73–91)	—
Unadjusted success percentages	98	82	64

Table 3. First-attempt success, number of attempts, time to cannulation, and complications with dynamic ultrasound (D), static ultrasound (S), and anatomical landmark (LM) guidance

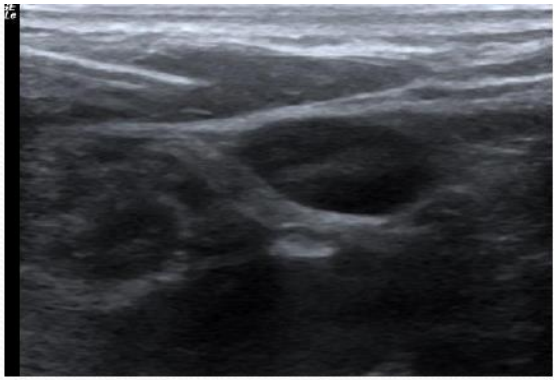
Secondary Outcomes	D n = 100	S n = 72	LM n = 69
Odds ratio for first-attempt success, compared with LM	3.4 (1.6–7.2)	5.8 (2.7–13)	—
Unadjusted first-attempt success percentage	62	50	23
Mean number of attempts, including 40 dynamic rescues	2.3 (1.6–3)	2.9 (2.3–3.5)	5.2 (4.1–6.3)
Mean time to cannulation, in secs, including 40 dynamic rescues	109 (47–171)	126 (89–163)	250 (184–316)
Complication rate, %	3 (0–8)	3 (0–8)	13 (5–21)[a]

Static <dynamic

Conclusions: Ultrasound assistance was superior to LM techniques. D outperformed S but may require more training and personnel. All central cannula placement should be conducted with ultrasound assistance. The 2001 Agency for Healthcare Research and Quality Evidence Report dismissing static assistance was incorrect. (Crit Care Med 2005; 33:1764–1769)

Device?

- In plane:



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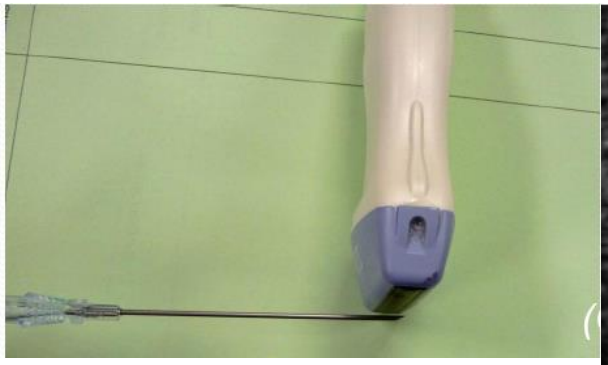
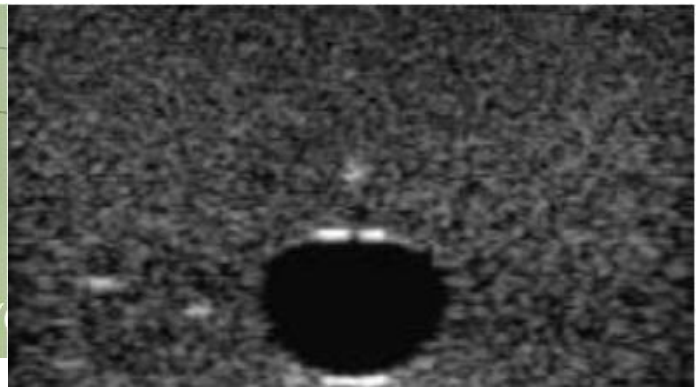
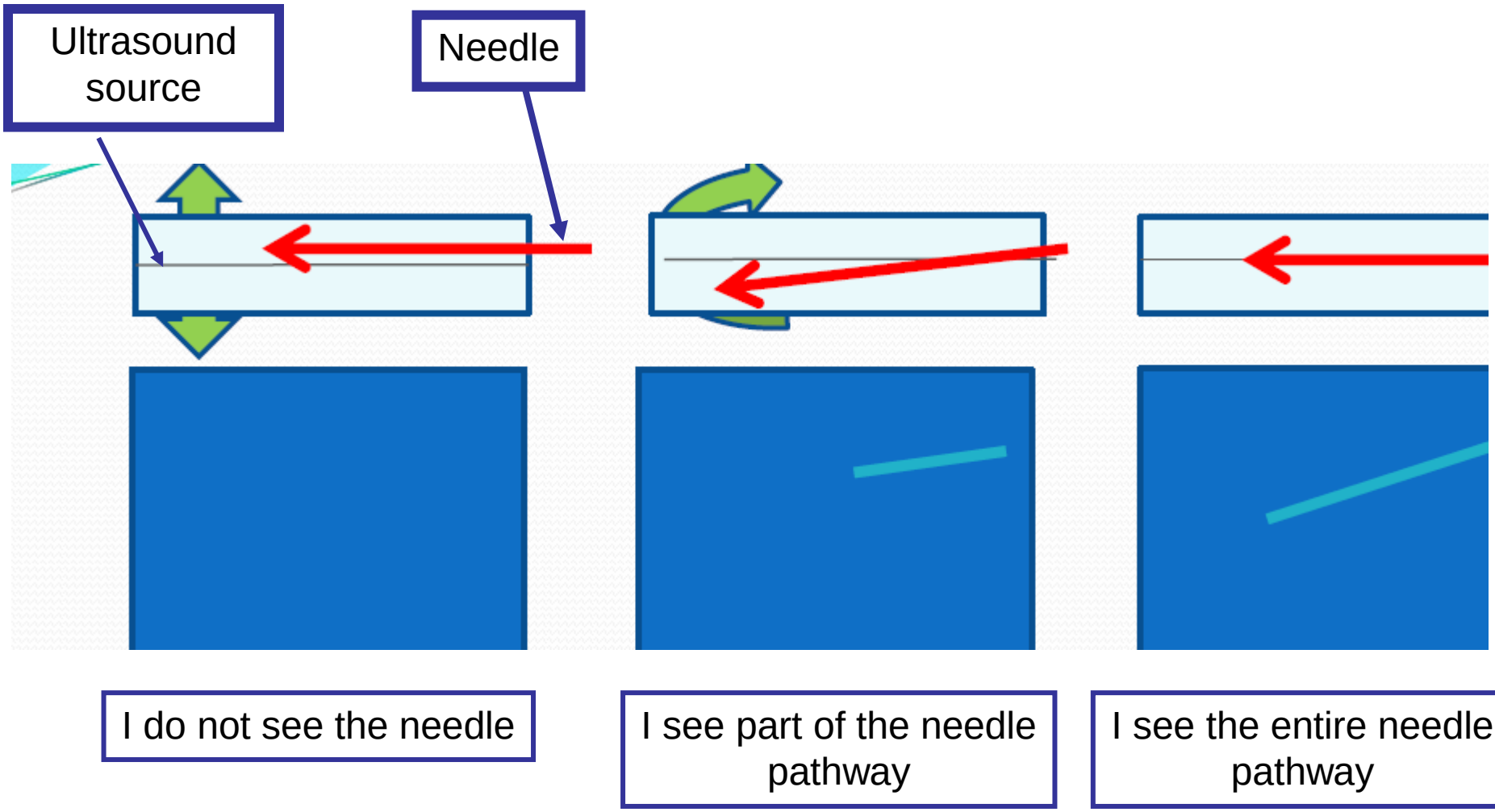
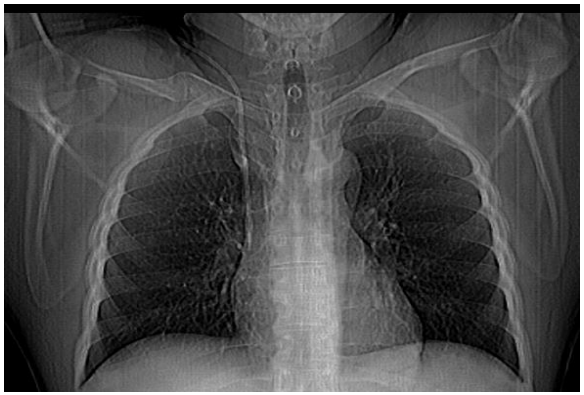





Ultrasound source
Needle
I do not see the needle
I see part of the needle pathway
I see the entire needle pathway

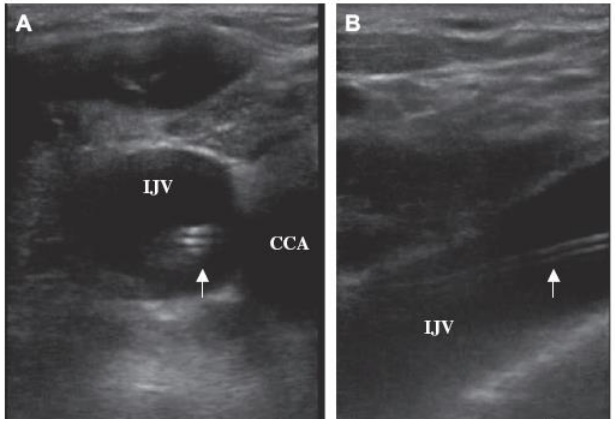


Ultrasonic Examination

An Alternative to Chest Radiography after Central Venous Catheter Insertion?

ERIC MAURY, JEAN GUGLIELMINOTTI, MARC ALZIEU, BERTRAND GUIDET, and GEORGES OFFENSTADT

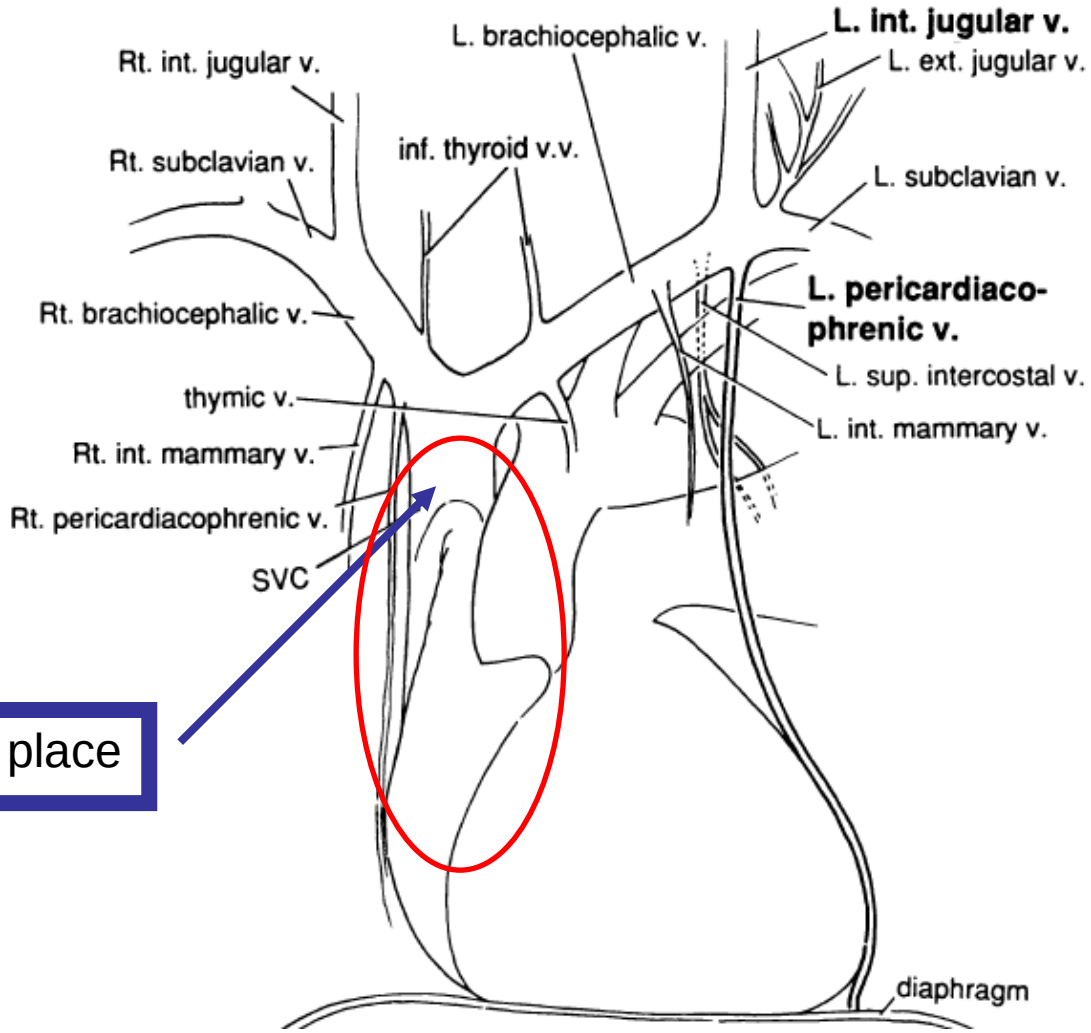
	ICU Catheters ($n = 56$)	Catheters from Other Wards ($n = 29$)
Pneumothorax	0	1
Aberrant position	3	1
Intracardiac position	3	3
Inferior vena cava placement	0	0



Sensitivity: 100%; feasibility 99%, training 2 hours,
time required for the procedure: 6.8 mn vs 80.3 mn

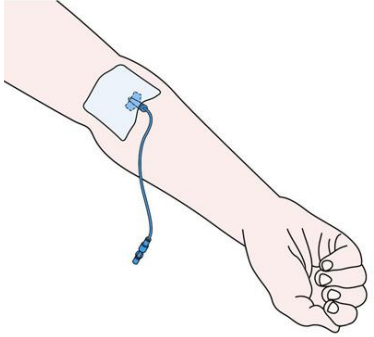
Am J Respir Crit Care Med Vol 164. pp 403–405, 2001

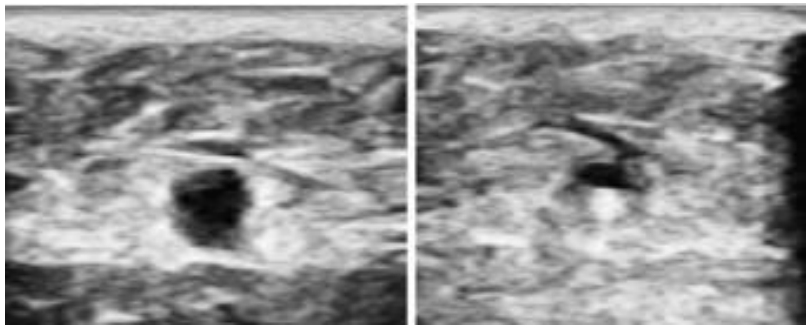
Visualisation extrémité cathéter?



The correct place

Peripheral vein





- Six months retrospective study
- 148 impossible peripheral access → 147 success US guided (71% at first attempt)

Gregg, Journal of Critical Care 2010

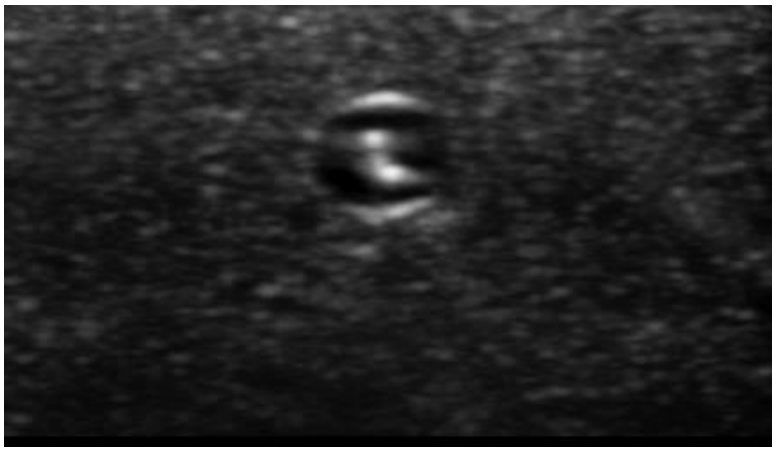
ACAD EMERG MED • December 2004, Vol. 11, No. 12 • www.aemj.org 1361

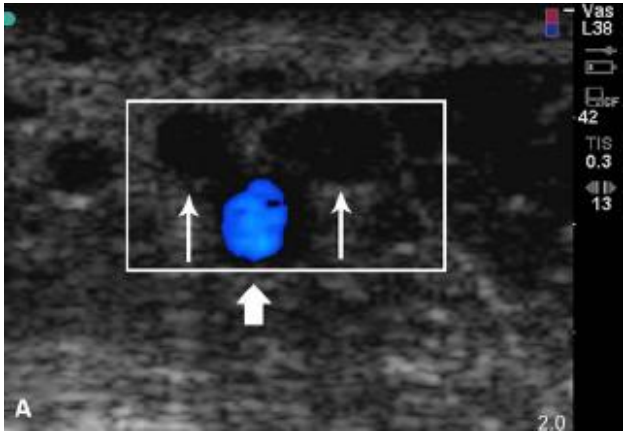
Emergency Nurses' Utilization of Ultrasound Guidance for Placement of Peripheral Intravenous Lines in Difficult-access Patients

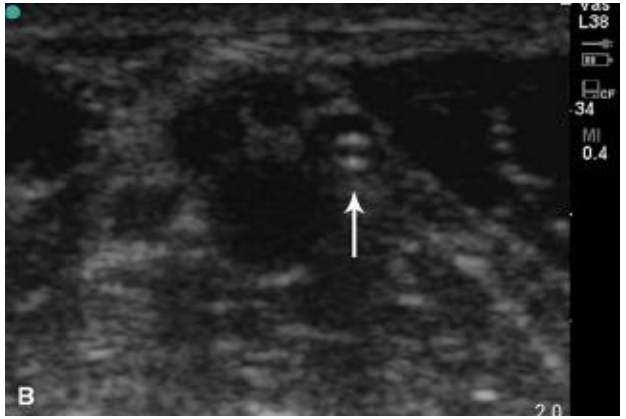
Larry Brannam, MD, RDMS, Michael Blaivas, MD, RDMS,
Matthew Lyon, MD, RDMS, Michael Flake, RN

45 minutes training
Hands on an inanimate deep peripheral arm

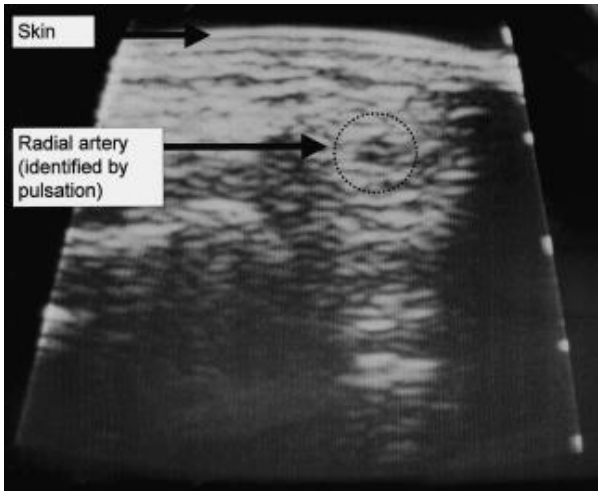
2 blind IV sticks
US guided cannulation
Succes rate 87%

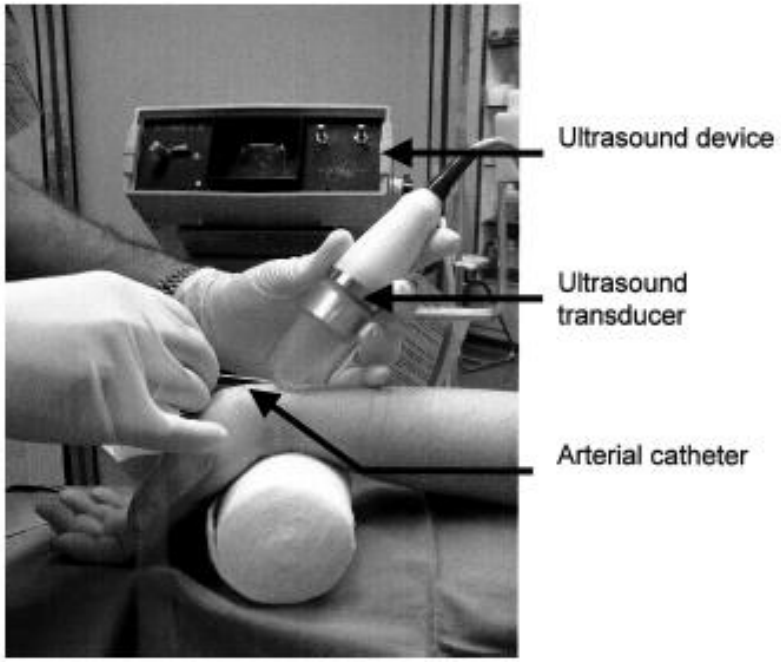






Radial artery





	Ultrasound Group	Palpation Group	*p* Value
No. of patients	34	35	
No. of patients whose arterial catheter was inserted successfully on first attempt	21 (62%)	12 (34%)	.03
Total no. of attempts	55	110	
Mean no. attempts per patient	1.6 ± 1.0	3.1 ± 2.4	.003
Mean time per patient, secs	55.5 ± 63.8	111.5 ± 121.5	.17
Mean time for any successful attempt, secs	26.1 ± 2.0	17.3 ± 1.6	.001
Mean time for successful first attempt, secs	25.4 ± 2.6	16.9 ± 2.3	.04
Mean no. cannulae used per patient	1.1 ± 0.4	1.7 ± 0.9	.001

Levin *Crit Care med* 2003

Intensive Care Med (2012) 38:1105–1117
DOI 10.1007/s00134-012-2597-x

Massimo Lamperti
Andrew R. Bodenham
Mauro Pittiruti
Michael Blaivas
John G. Augoustides

International evidence-based recommendations on ultrasound-guided vascular access

Medical literature on ultrasound vascular access was reviewed from January 1985 to October 2010. The GRADE and the GRADE-RAND methods were utilised to develop recommendations. *Results:* The recommendations following the conference suggest the advantage of 2D vascular screening prior to cannulation and that real-time ultrasound needle guidance with an in-plane/long-axis technique optimises the probability of needle placement. Ultrasound guidance can be used not only for central venous cannulation but also in peripheral and arterial cannulation. Ultrasound can be used in order to check for immediate and life-threatening complications as well as the catheter's tip position. Educational courses and training are required to achieve competence and minimal skills when cannulation is performed with ultrasound guidance. A recommendation to create an ultrasound curriculum on vascular access is proposed. This technique allows the reduction of infectious and mechanical complications. *Conclusions:* These definitions and recommendations based on a critical evidence review and expert consensus are proposed to assist clinicians in ultrasound-guided vascular access and as a reference for future clinical research.

Keywords Central venous access · Ultrasound guidance · Arterial cannulation · Vascular access · Critical care ultrasound · RAND · GRADE · Guideline · Evidence-based medicine

Echographie en reanimation

- Evaluation hémodynamique
- Aide à l'insertion des cathéters
- Exploration abdominale
- Exploration pleuro pulmonaire
- Doppler trans crânien

Echographie en reanimation

- Exploration abdominale
- Epanchement intra péritonéal
- Uropathie obstructive
- Néphropathie chronique

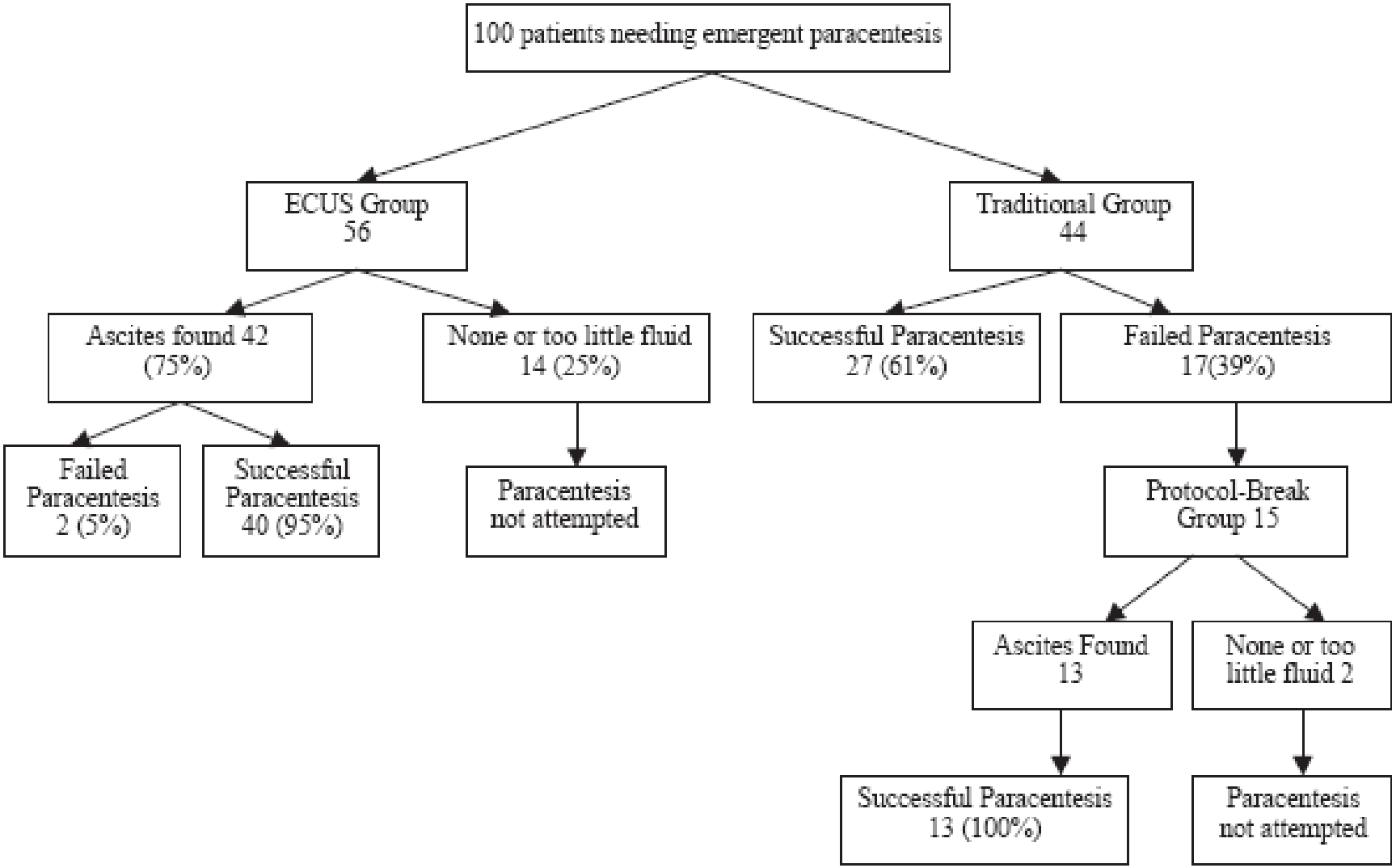

TOSHIBA
MR BENOIST:- -
TOSHIBA
O
- -
Abdomen
06.10.2006
9.29.16
T
0
2
4
6
MI:1.2
2DG
92
DR
60
12L5
T7.6
35 fps
IP3
HDD:90% Free

Safety


BOWEL W ASCITES
2007Jan02 17:05
Gen
Vas
L38
CF
59%
60
146
MI
0.9
5.9
Gen
0
Dual
Clips...
Biopsy
Page 2...

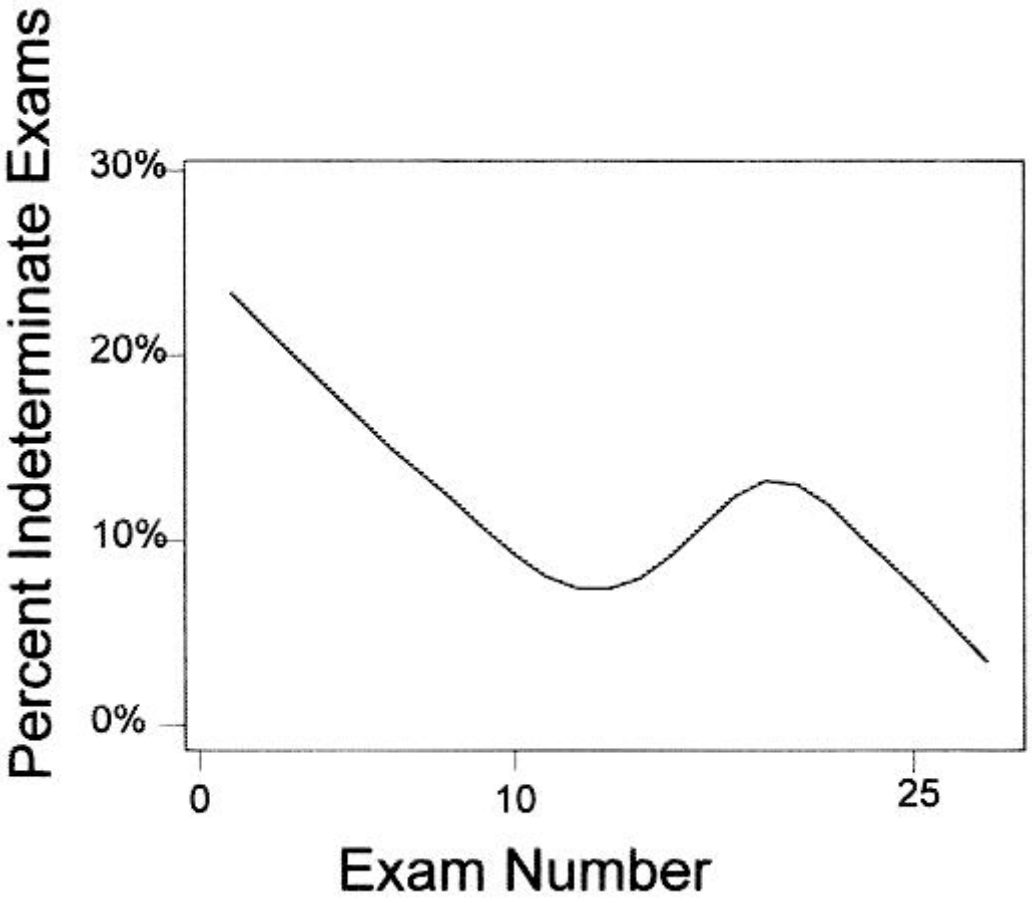
Quelques principes

- Où suis je?
- Où est le diaphragme?
- Tourner la sonde
- Utiliser doppler couleur
- Ne pas se contenter d’images fixes
- Les épanchements libres se trouvent vers les régions déclives



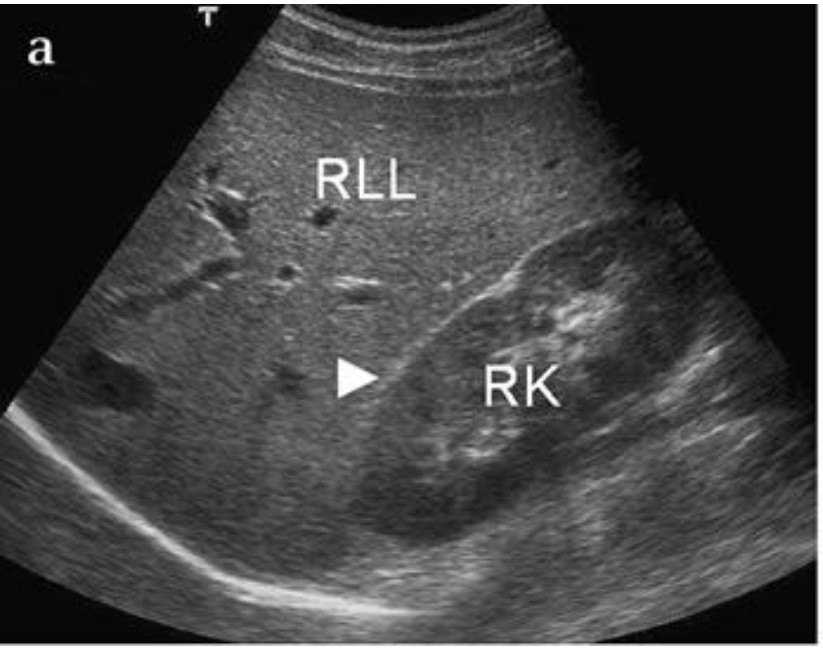
Nazeer SR AJEM 2005;23:363

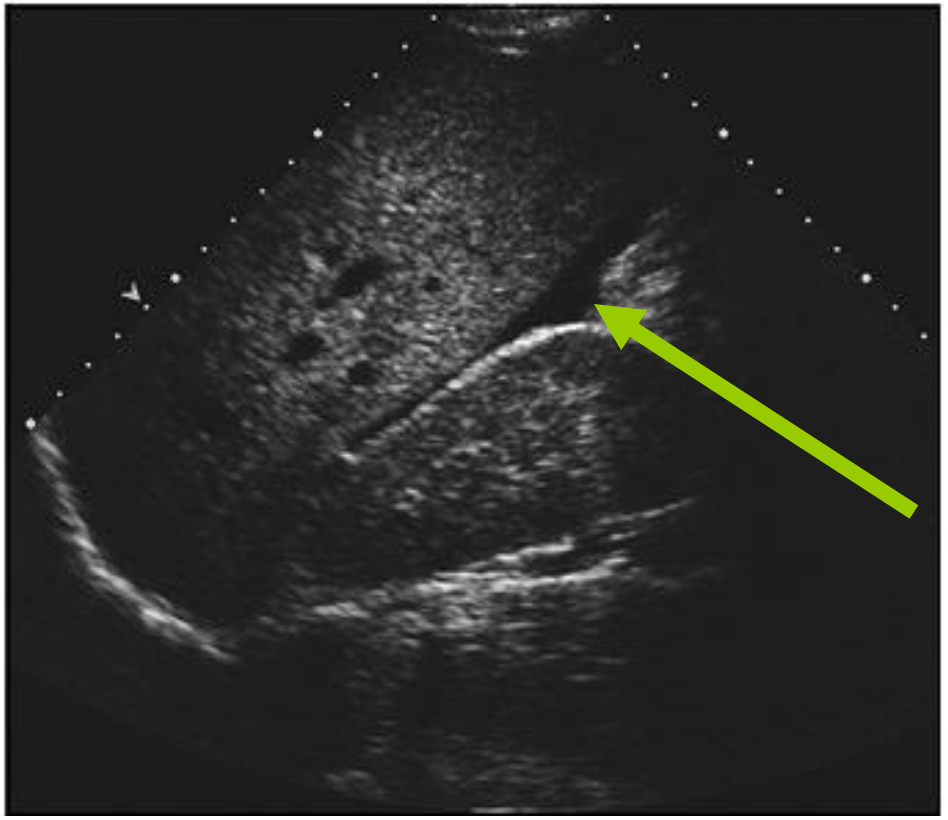
Focused Abdominal Sonogram for Trauma: The Learning Curve of Nonradiologist Clinicians in Detecting Hemoperitoneum

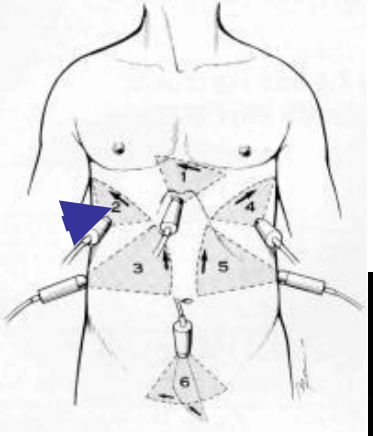


Shackford S, *J Trauma 1999*

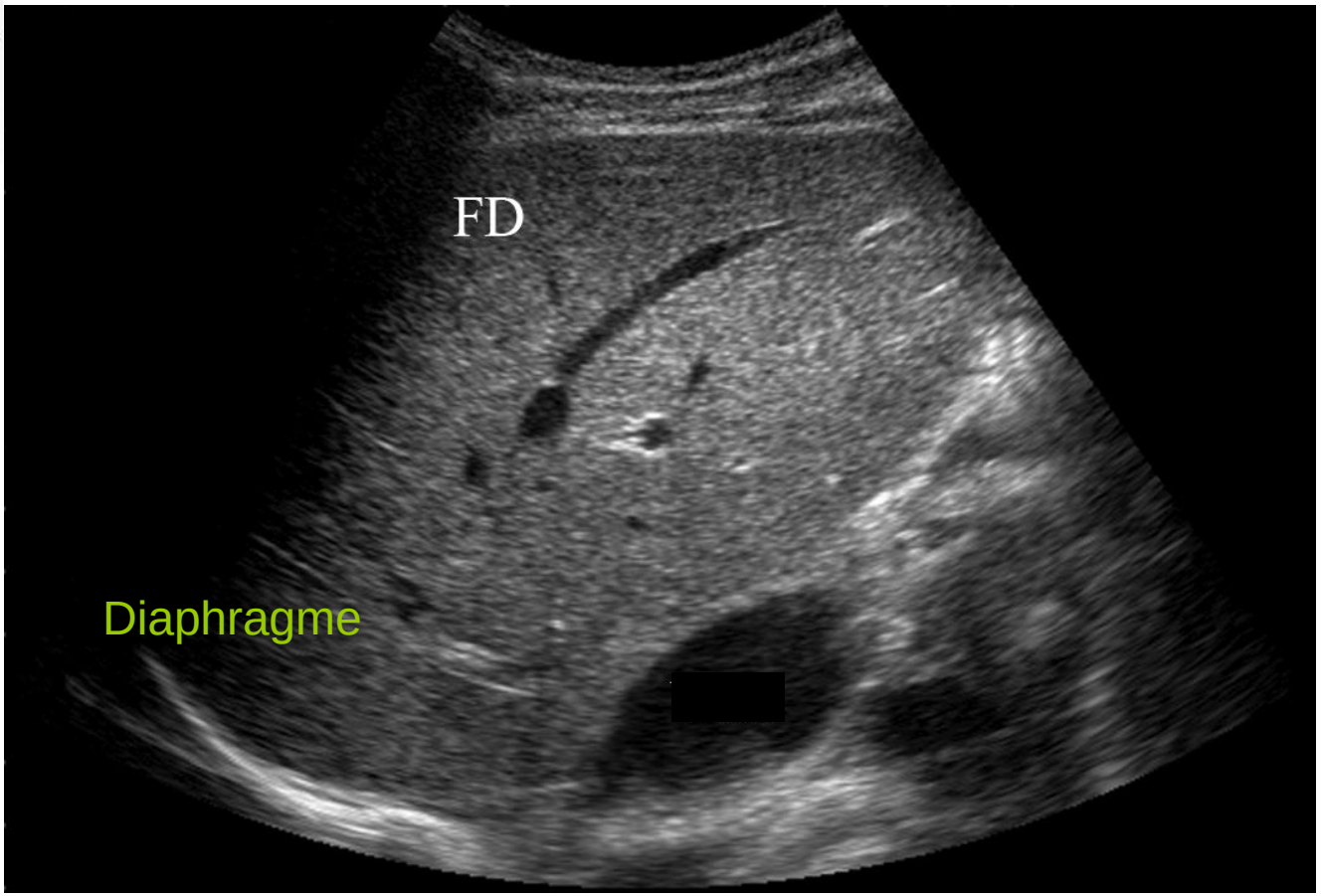
Epanchement liquidien dans le récessus de Morison





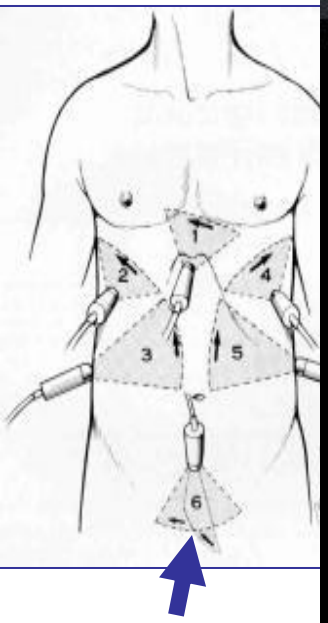


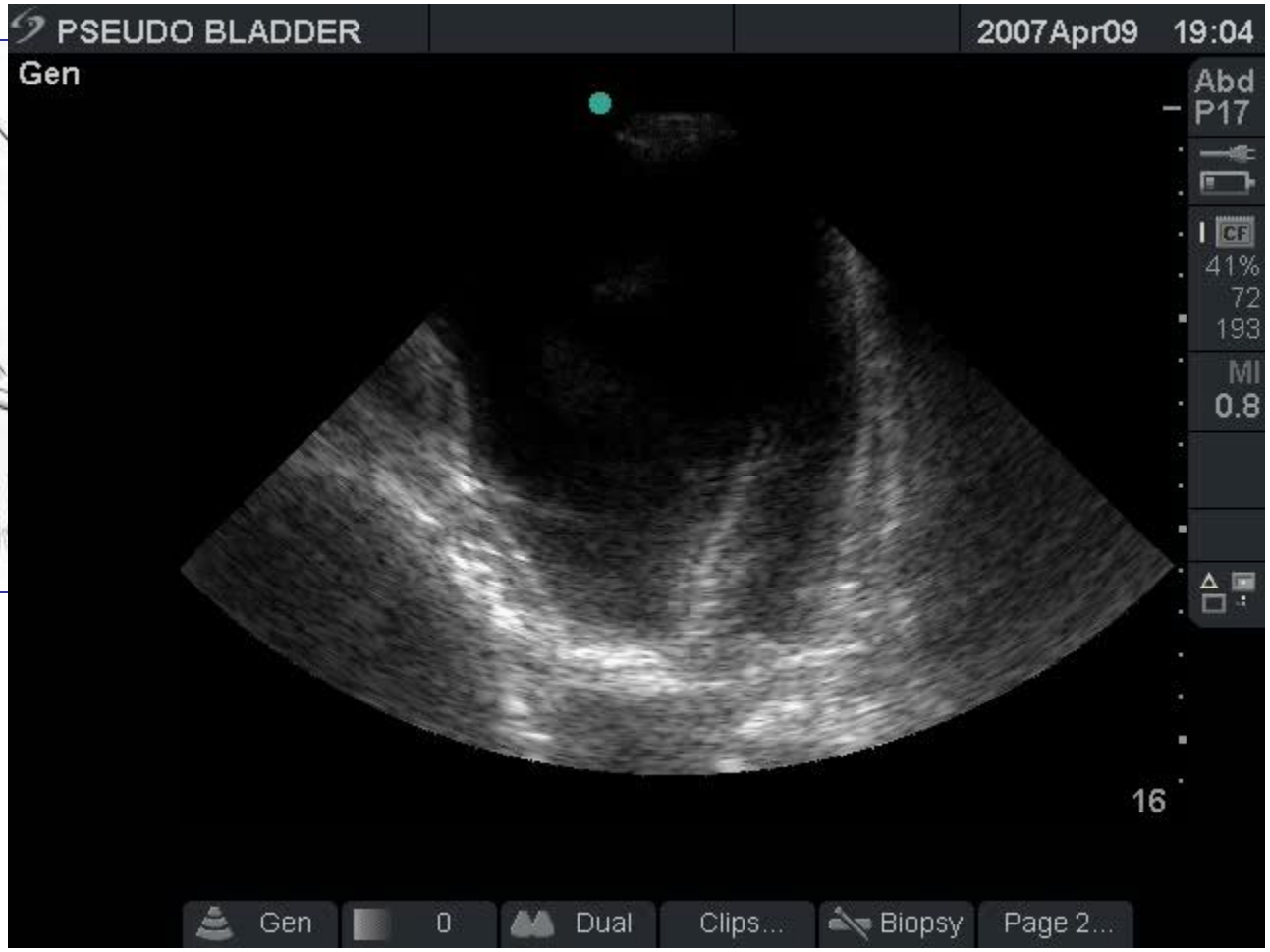
Epanchement péritonéal?



Morison entre le foie et le rein droit

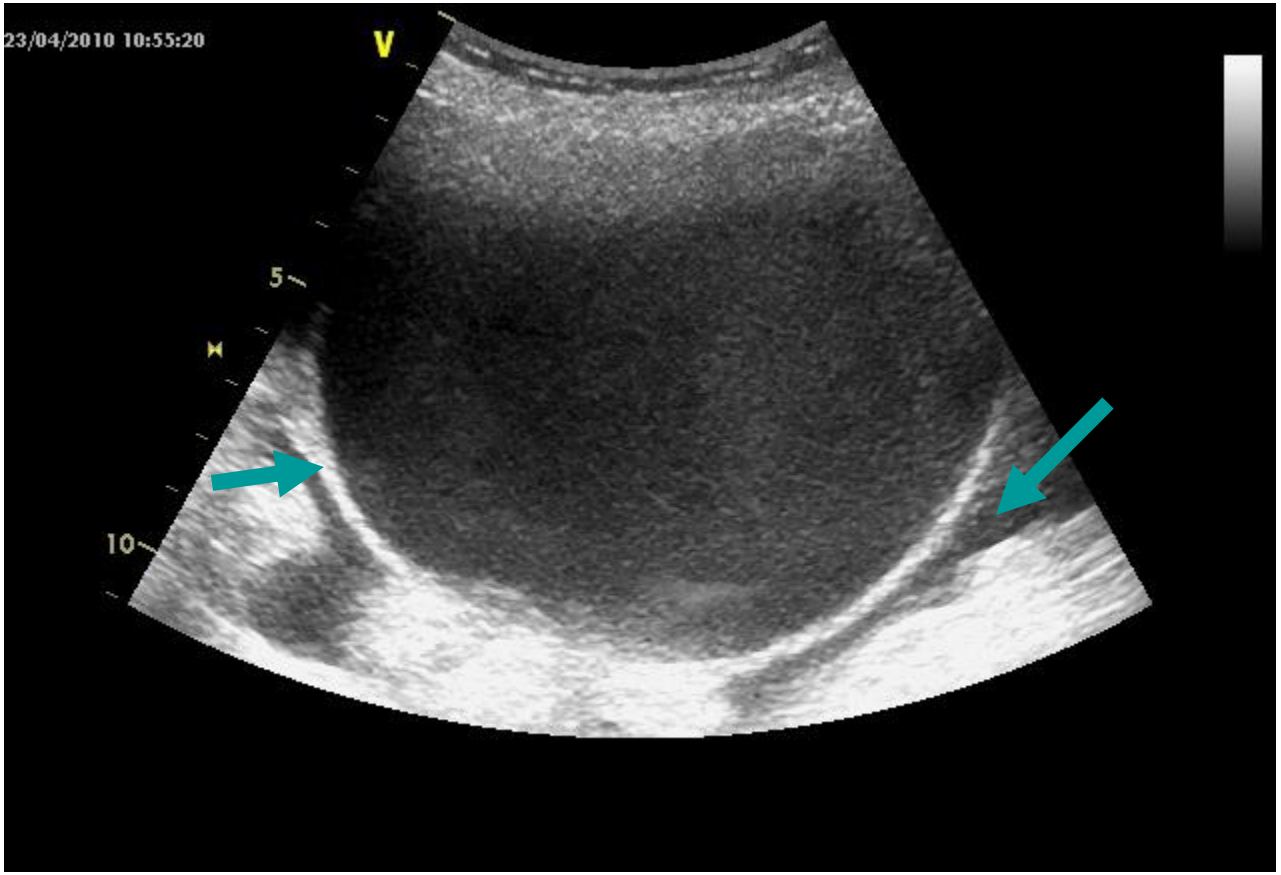
Vessie?





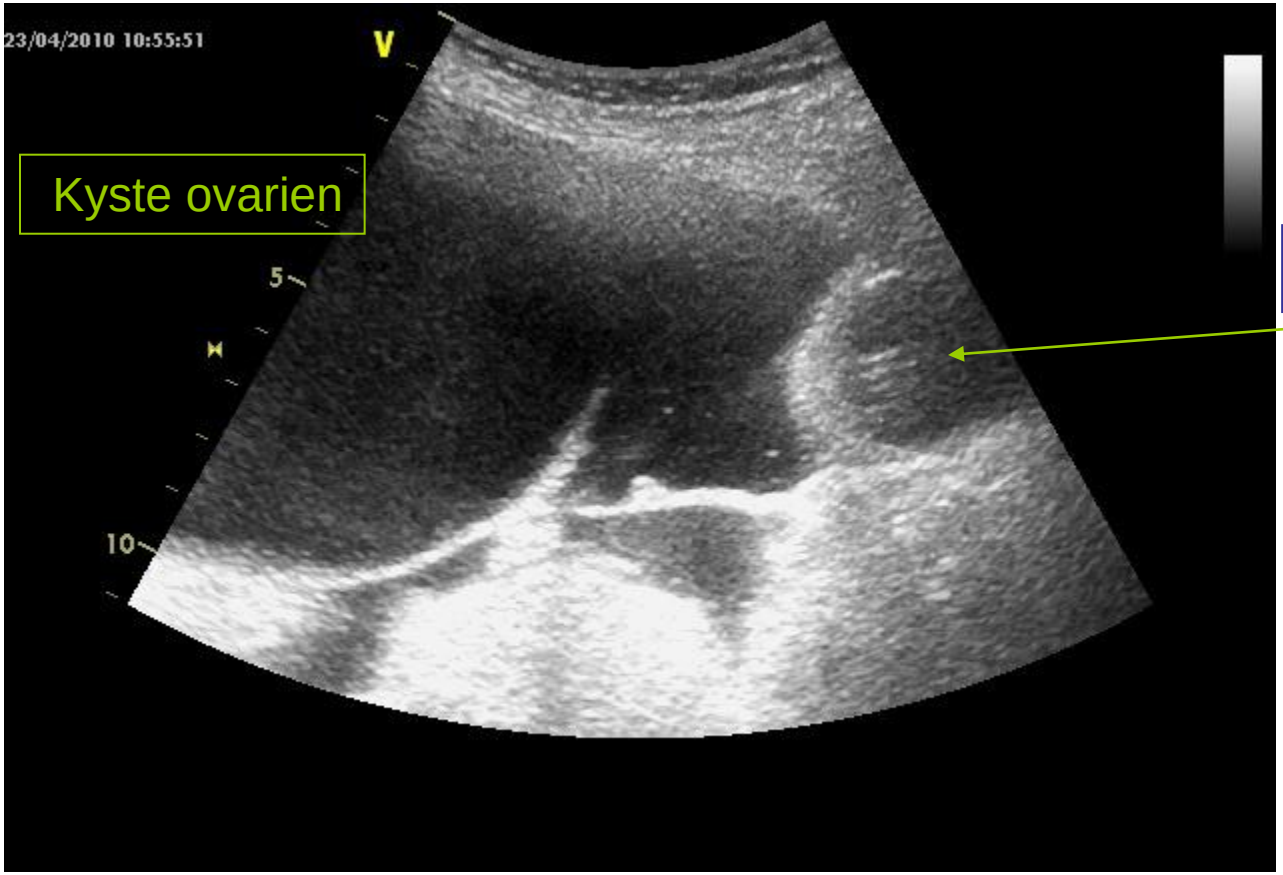
Ascite

Vessie?

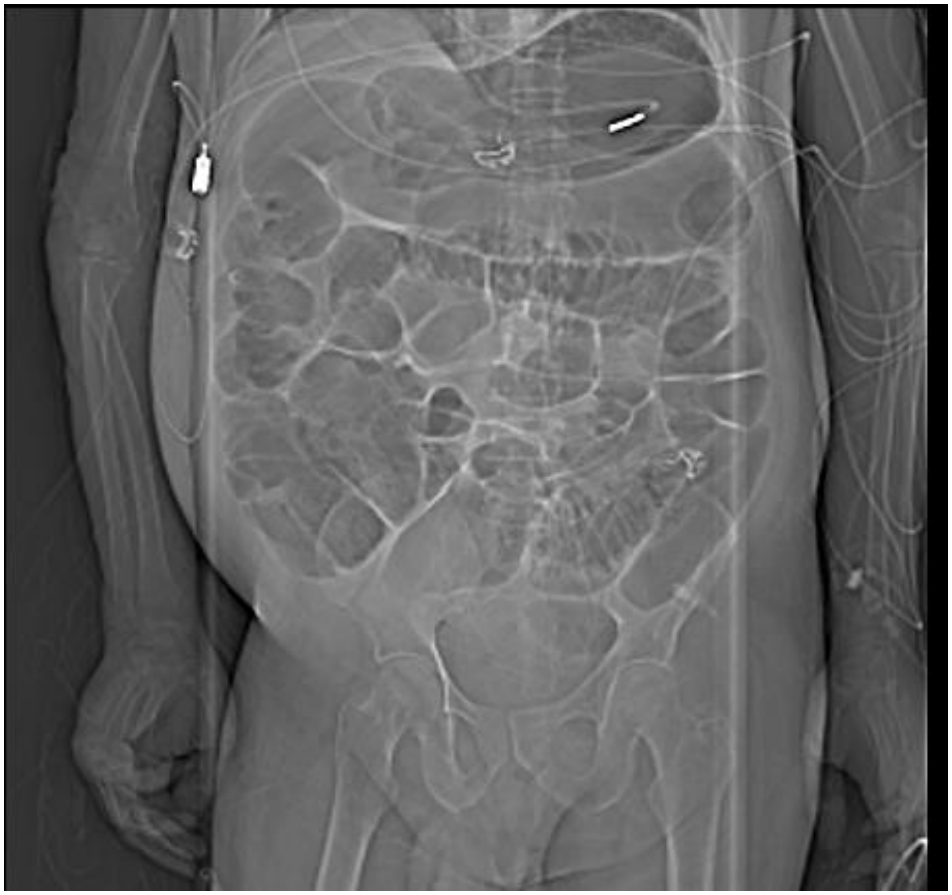


Peut-être mais il y a du liquide autour

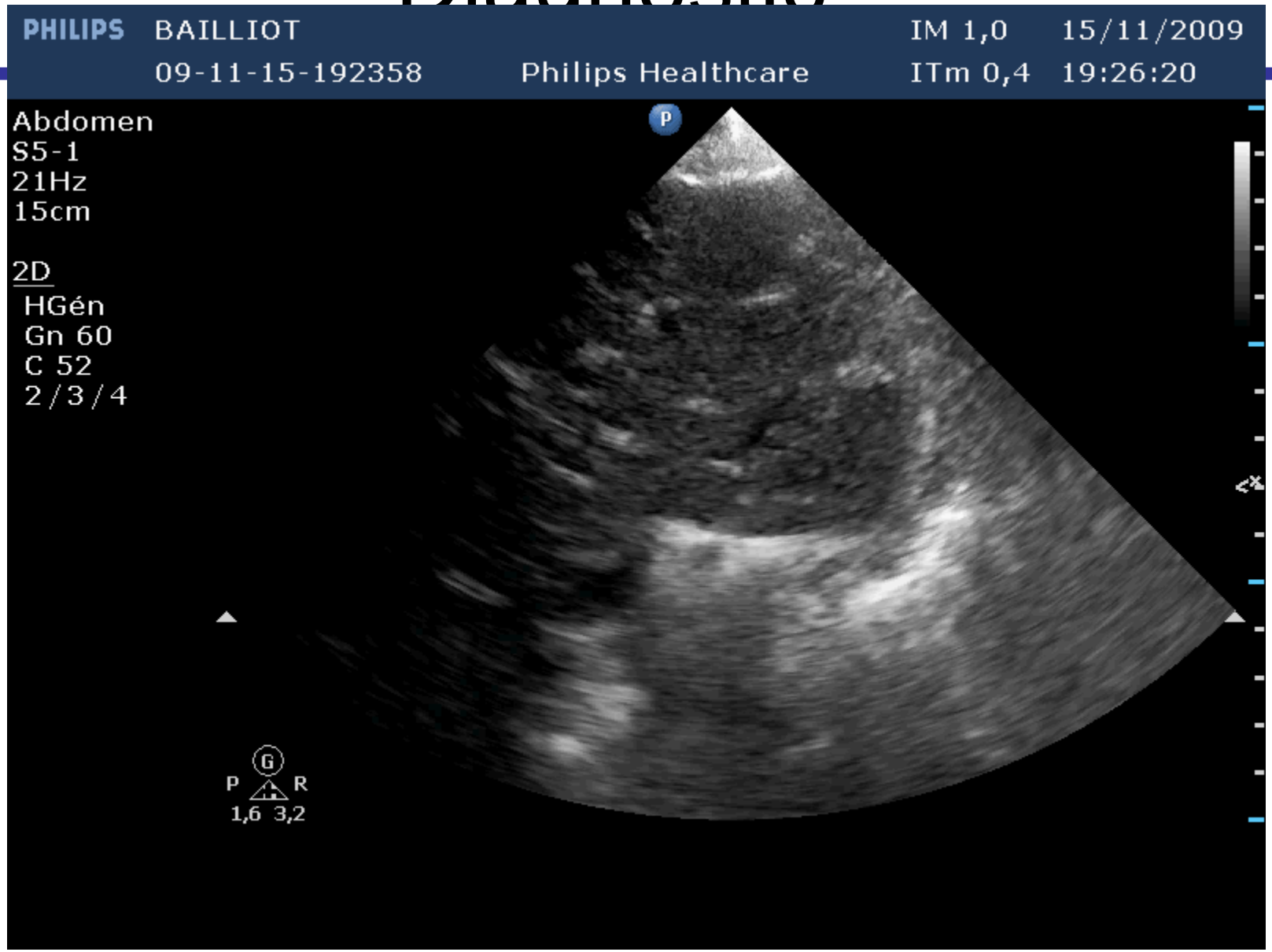
Vessie? Non kyste ovarien



Homme de 70 ans, acfa
douleur abdominale de début brutal et choc

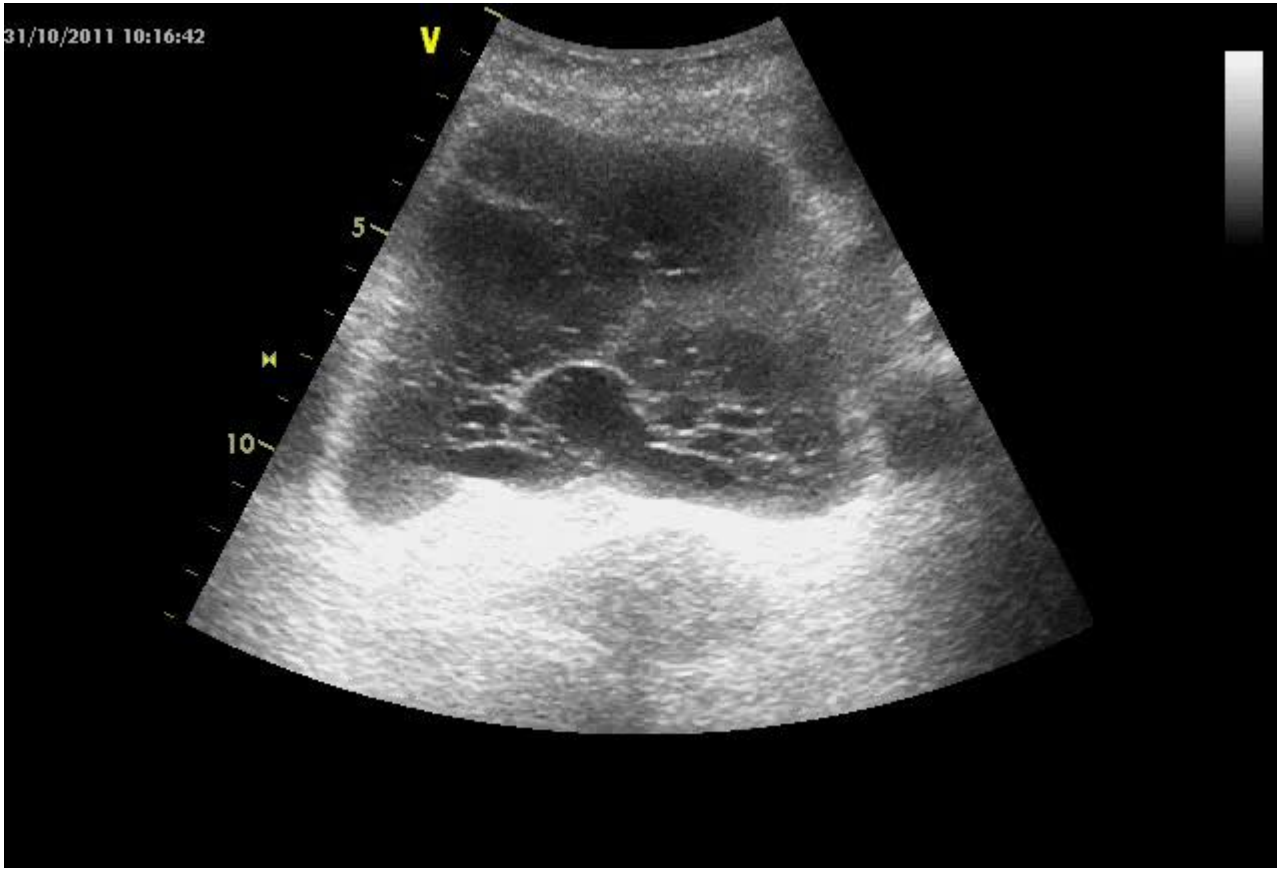


Diagnostic?

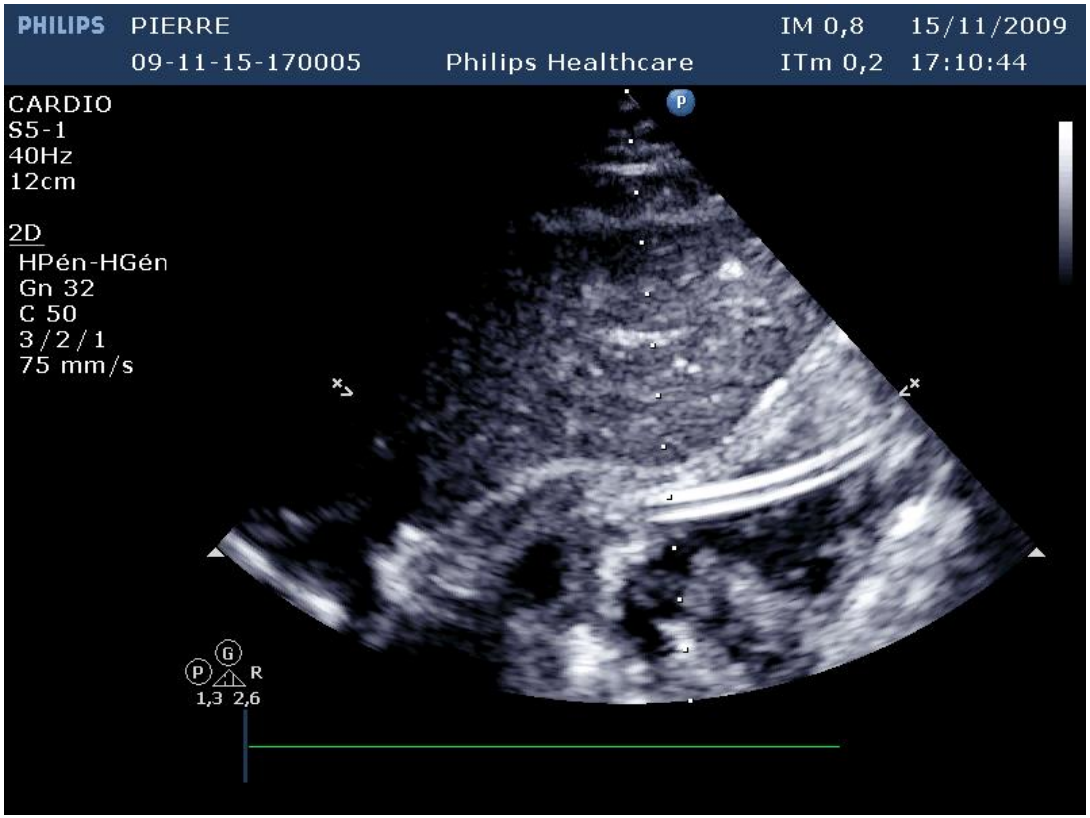

PHILIPS
BAILLIOT
09-11-15-192358
Philips Healthcare
IM 1,0
ITm 0,4
15/11/2009
19:26:20
Abdomen
S5-1
21Hz
15cm
2D
HGén
Gn 60
C 52
2 / 3 / 4
P
G
P
R
1,6 3,2

Infarctus mésentérique

Une péritonite



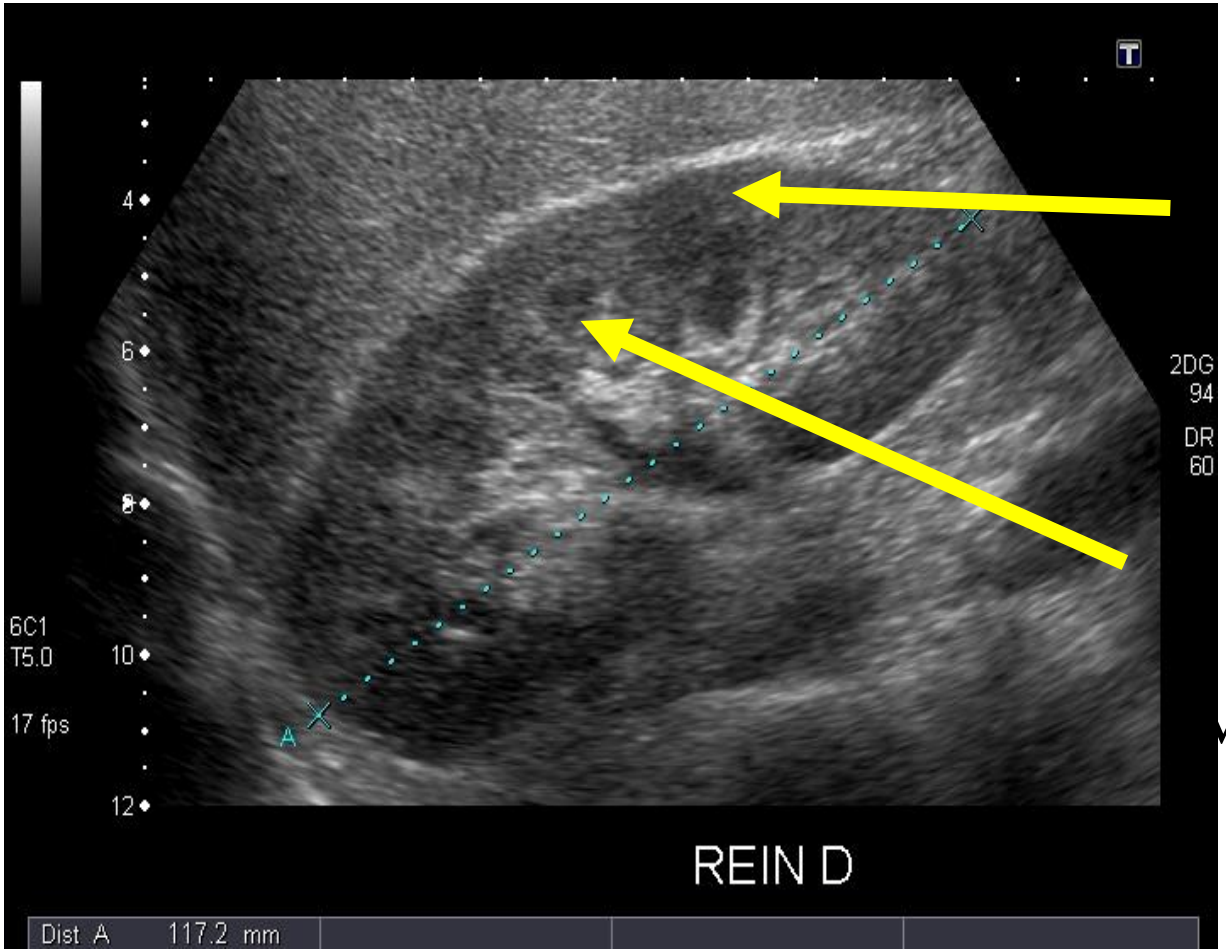
Où est la sonde nasogastrique?



STOP
Je ne suis pas radiologue

Uropathie obstructive

Normal kidney
longitudinal axis 9-12 cm



Cortical area

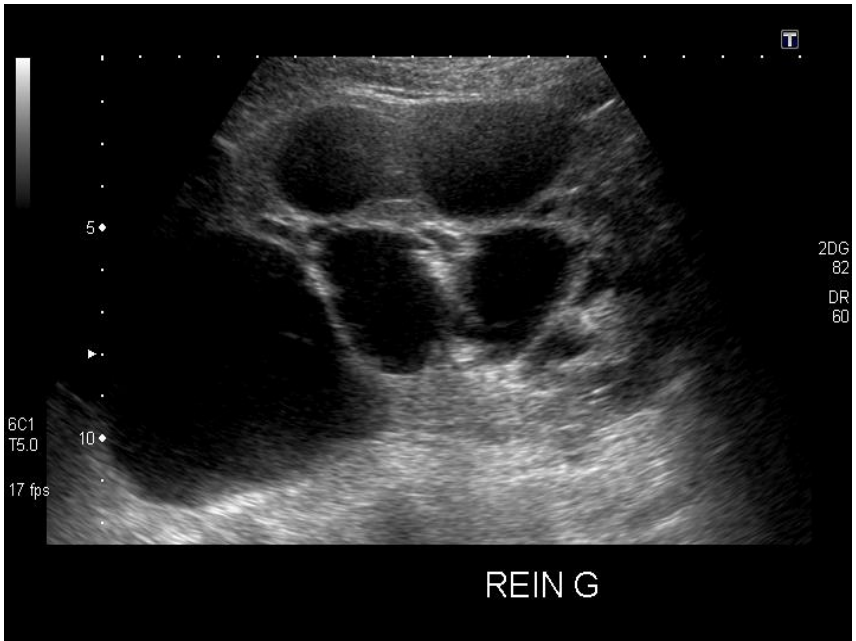
Medullar area

Images anéchogènes rondes confluentes
en boule de gui ou en oreille de Mickey non limitées au rein aboutissant à un uretère dilaté

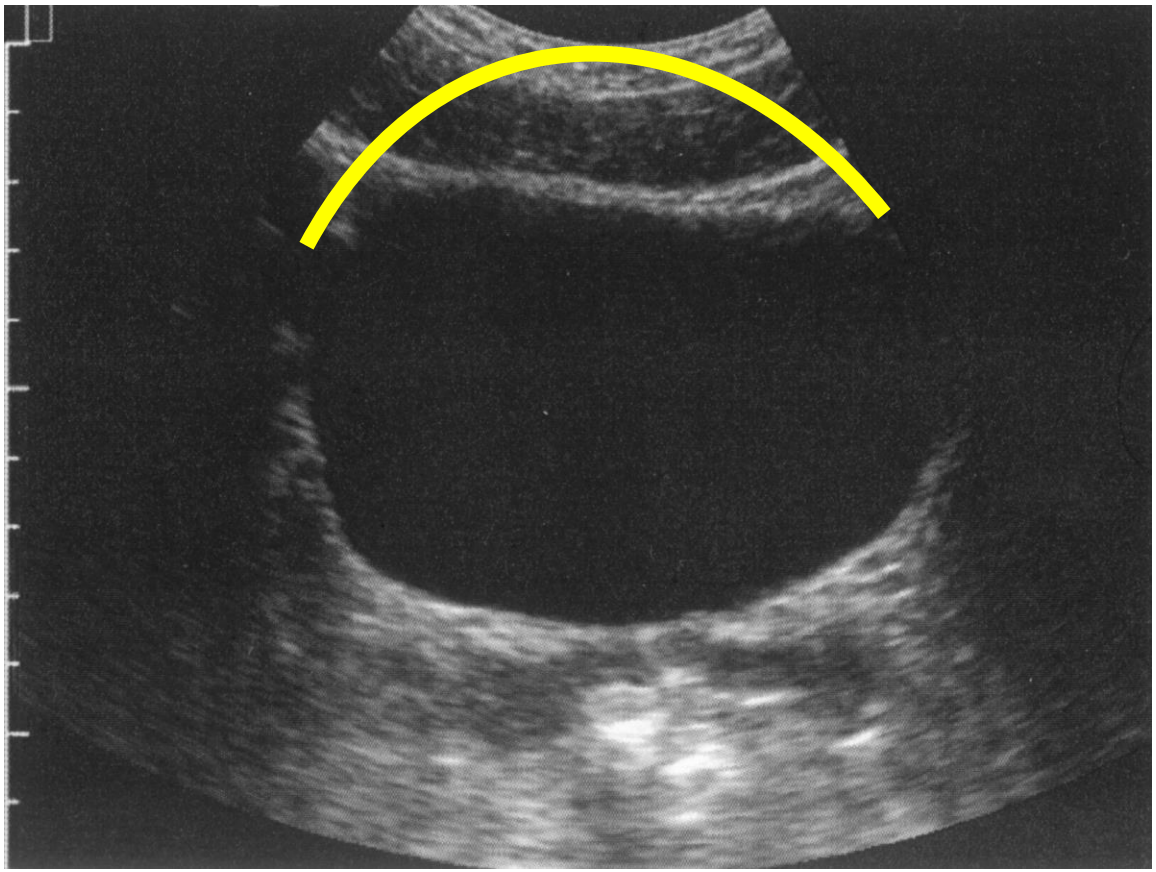
Dilatation des CPC

Quelques difficultés

- Polykystose rénale
- Kyste parapyelique
- Chercher l’uretère+++



Globe vésical
La vessie devient sphérique



Volume estimé 4/3 x3.14x R^3

Echographie en réanimation

- Evaluation hémodynamique
- Aide à l'insertion des cathéters
- Exploration abdominale
- Exploration pleuro pulmonaire

Le poumon, le poumon vous dis je

Ultrasound performs better than radiographs

Eustachio Agricola,[1] Charlotte Arbelot,[2] Michael Blaivas,[3] Belaid Bouhemad,[2] Roberto Copetti,[4] Anthony Dean,[5] Scott Dulchavsky,[6] Mahmoud Elbarbary,[7] Luna Gargani,[8] Richard Hoppmann,[9] Andrew W Kirkpatrick,[10] Daniel Lichtenstein,[11] Andrew Liteplo,[12] Gebhard Mathis,[13] Lawrence Melniker,[14] Luca Neri,[15] Vicki E Noble,[12] Tomislav Petrovic,[16] Angelika Reissig,[17] Jean Jacques Rouby,[2] Armin Seibel,[18] Gino Soldati,[19] Enrico Storti,[15] James W Tsung,[20] Gabriele Via,[21] Giovanni Volpicelli[22]

In conclusion, we agree that in supine and trauma patients ultrasound may be a valuable tool in the detection of pneumothorax. In these patients, ultrasound may have increased sensitivity compared with a CXR, although difficulty with pneumothorax quantification suggests that ultrasound is unlikely to completely replace the need for a radiograph. In the majority of cases of spontaneous or postprocedure pneumothorax, ultrasound is unlikely to provide additional benefit over the combination of CXR and clinical judgement when deciding management.

Tom Havelock,[1] Richard Teoh,[2] Diane Laws,[3] Nick Maskell,[4] Fergus Gleeson[5]

Thorax September 2011 Vol 66 No 9

REVIEW ARTICLE

Pneumothorax Following Thoracentesis

A Systematic Review and Meta-analysis

Craig E. Gordon, MD, MS; David Feller-Kopman, MD; Ethan M. Balk, MD, MPH; Gerald W. Smetana, MD

- 24 études
- 6605 thoracocenteses
- Incidence Pneumothorax : 6%; IC95%[4.6%-7.8%]
- Facteurs de risque de pneumothorax

Procedural Factors				
Ultrasonography				
Yes	16	4424	4.0 (2.9-5.6)	.001
No	13	2081	9.3 (6.6-13.0)	

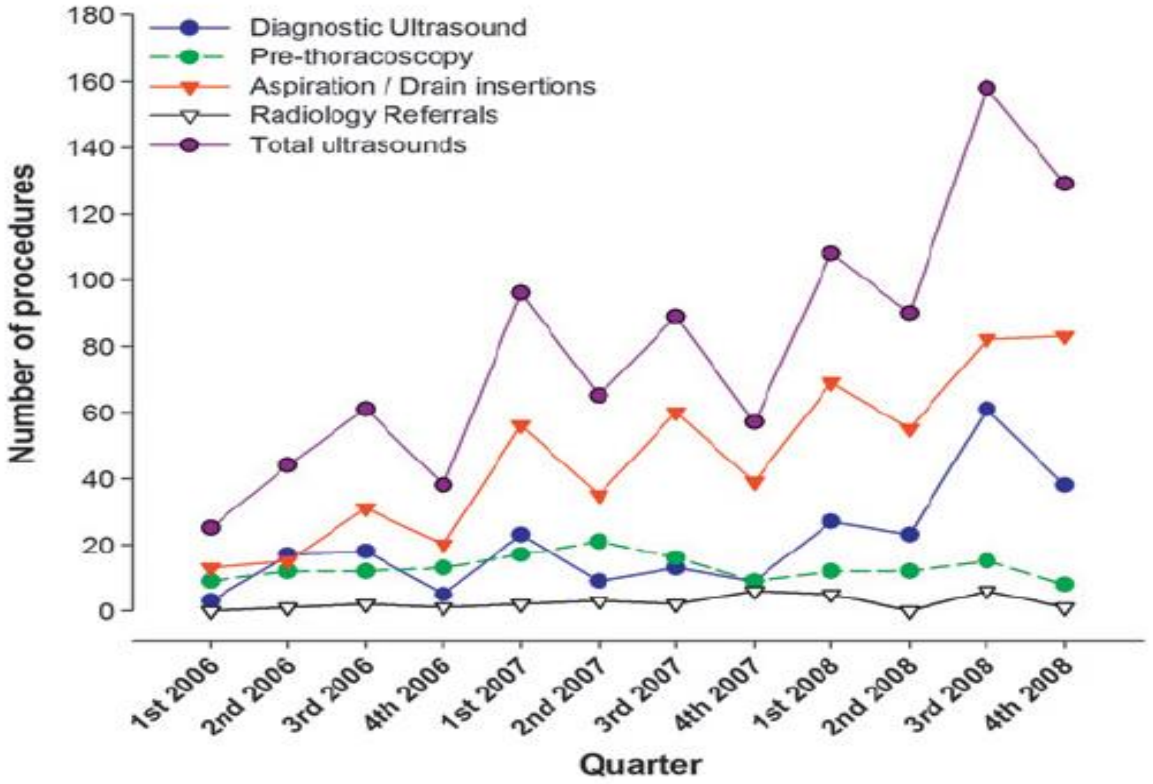
Table 3. Unadjusted Odds Ratios for Pneumothorax by Procedural or Patient Factor (Direct Comparisons)

Variable	No. of Studies[a]	No. of Patients With (Without) Variable	Odds Ratio (95% Confidence Interval) for Pneumothorax
Procedural Factors			
Ultrasonography vs no ultrasonography	6	654 (1026)	0.3 (0.2-0.7)
Experienced operator vs inexperienced	4	308 (622)	0.7 (0.2-2.3)
Therapeutic thoracentesis vs diagnostic	12	1048 (1323)	2.6 (1.8-3.8)
Larger needle or catheter vs small needle	7	700 (1178)	2.5 (1.1-6.0)
≥2 Needle passes vs 1 pass	3	145 (580)	2.5 (0.3-20.1)
Follow-up thoracentesis vs initial	3	377 (993)	1.1 (0.3-3.6)

Arch Intern Med. 2010;170(4):332-339

Diagnostic accuracy, safety and utilisation of respiratory physician-delivered thoracic ultrasound

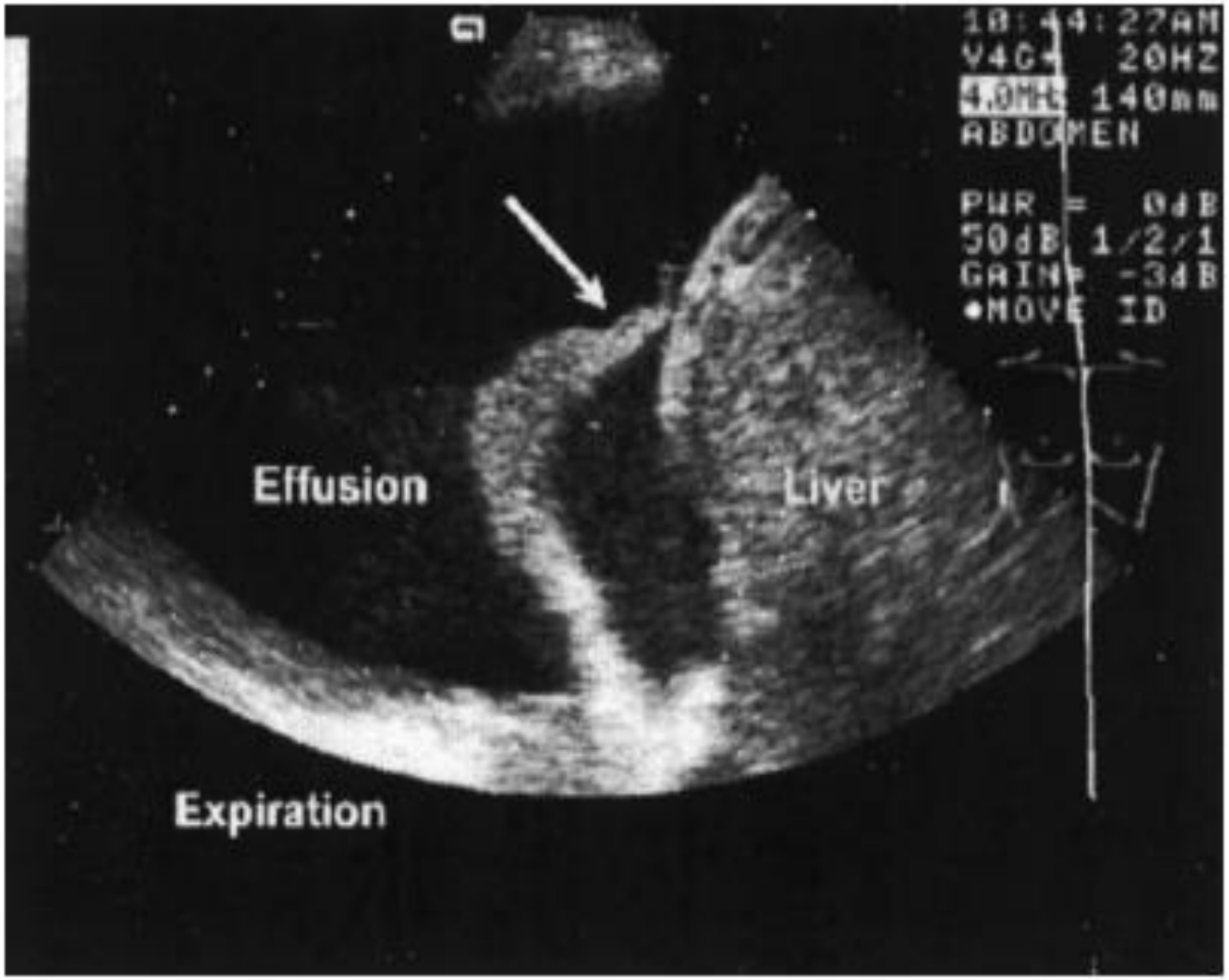
Najib M Rahman,[1] Aran Singanayagam,[1] Helen E Davies,[1] John M Wrightson,[1] Eleanor K Mishra,[1] Y C Gary Lee,[2] Rachel Benamore,[3] Robert J O Davies,[1] Fergus V Gleeson[3]



Thorax 2010;**65**:449–453. doi:10.1136/thx.2009.128496

US and Pleural effusion

Immediate and easy to perform diagnosis of pleural effusion


Effusion
Liver
Expiration

Is there a pleural effusion?

Chest Ultrasound for "Dummies"

Although it is often said that sonographic diagnosis is operator dependent, it is probably even more task specific. In other words, the basic skill required to detect a pleural effusion may be acquired in minutes and may then improve with experience. Anyone already performing thoracentesis the traditional way can get started with little instruction. Once a basic familiarity with pleural effusion ultrasonography has been obtained, the clinician can easily proceed to ultrasound-guided small-bore thoracostomy tube placement. Chest ultrasonography in the clinician's

AMERICAN COLLEGE OF CHEST PHYSICIANS®

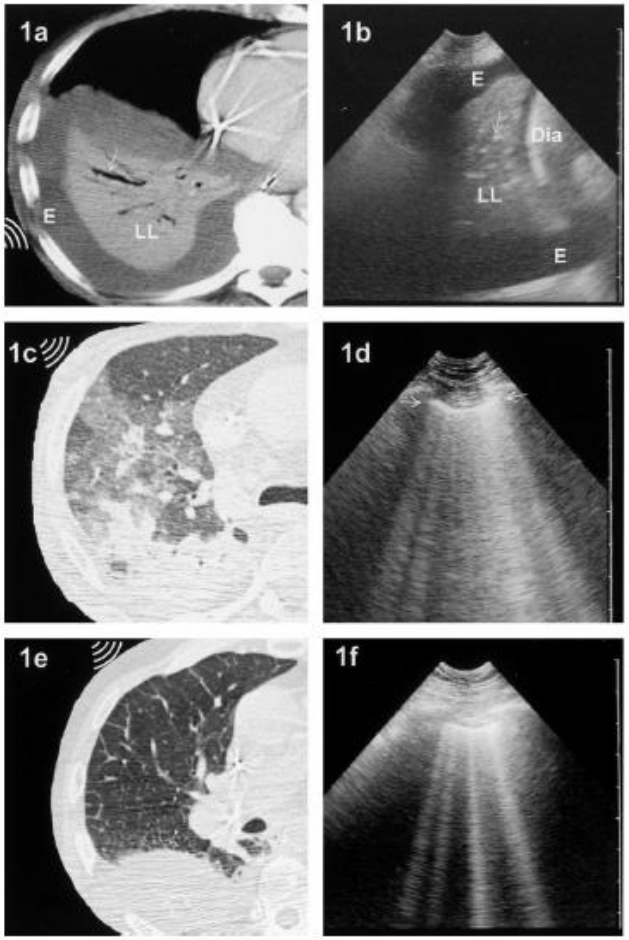
Peter Doelken, MD
Charlie Strange, MD, FCCP
Charleston, SC

CHEST / 123 / 2 / FEBRUARY, 2003

Anesthesiology 2004; 100:9–15

Comparative Diagnostic Performances of Auscultation, Chest Radiography, and Lung Ultrasonography in Acute Respiratory Distress Syndrome

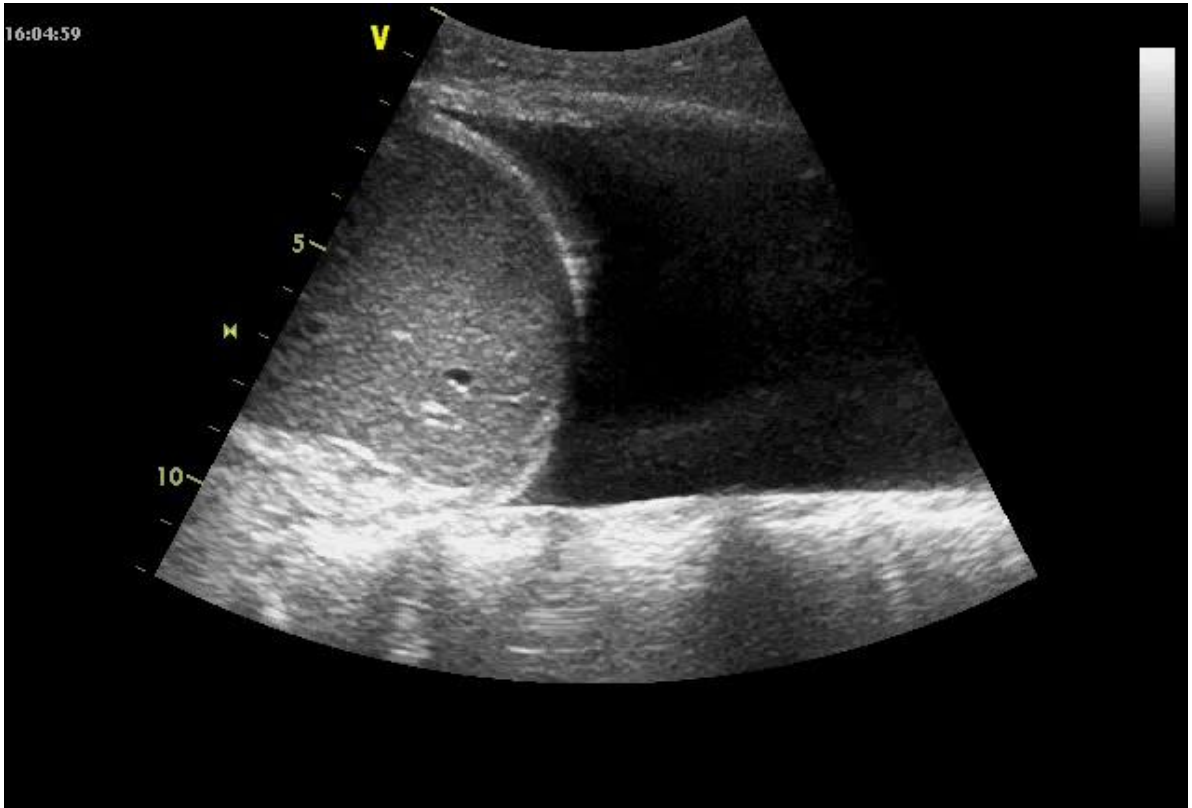
Daniel Lichtenstein, M.D., Ivan Goldstein, M.D.,† Eric Mourgeon, M.D.,† Philippe Cluzel, M.D., Ph.D.,‡ Philippe Grenier, M.D.,§ Jean-Jacques Rouby, M.D., Ph.D.‖*



	Auscultation, %	Chest Radiography, %	Lung Ultrasonography, %
Pleural effusion			
Sensitivity	42	39	92
Specificity	90	85	93
Diagnostic accuracy	61	47	93
Alveolar consolidation			
Sensitivity	8	68	93
Specificity	100	95	100
Diagnostic accuracy	36	75	97
Alveolar–interstitial syndrome			
Sensitivity	34	60	98
Specificity	90	100	88
Diagnostic accuracy	55	72	95

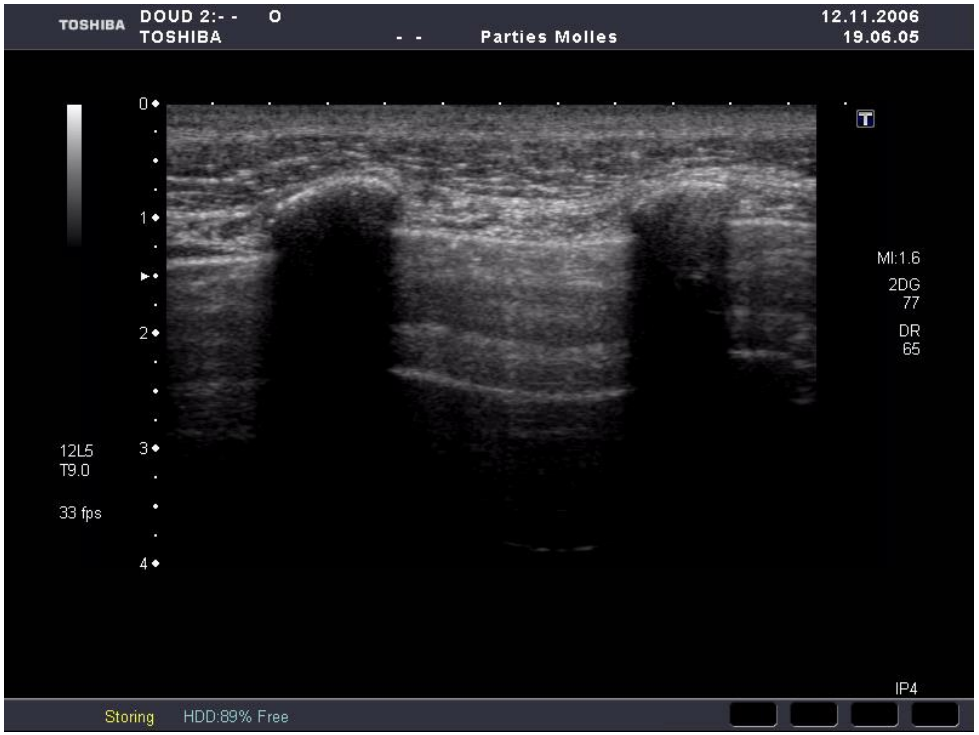
Safety procedure when

- Effusion is seen at least on 3 intercostal spaces at a depth of 15mm



Pneumothorax and ultrasonography

Semiology: lung sliding



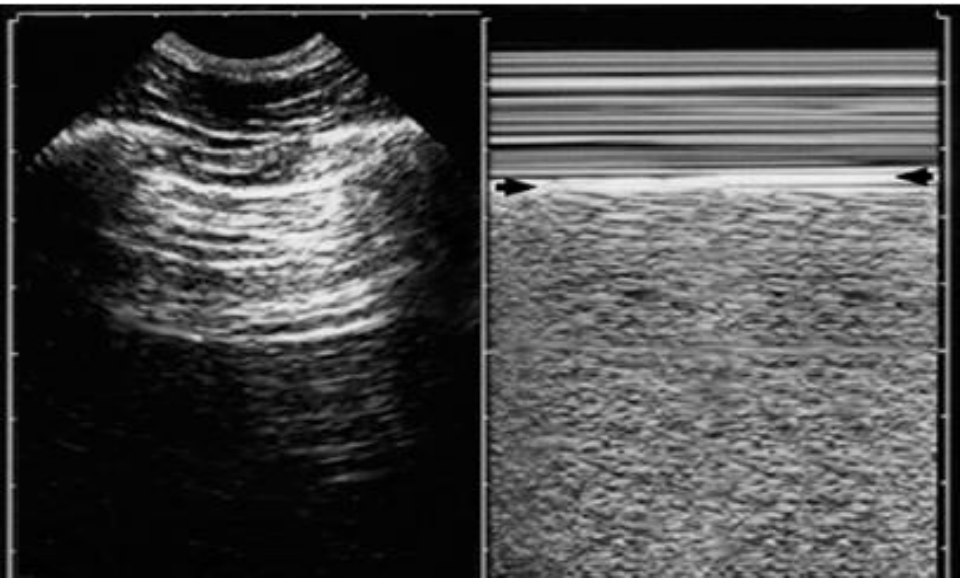
A Bedside Ultrasound Sign Ruling Out Pneumothorax in the Critically Ill*

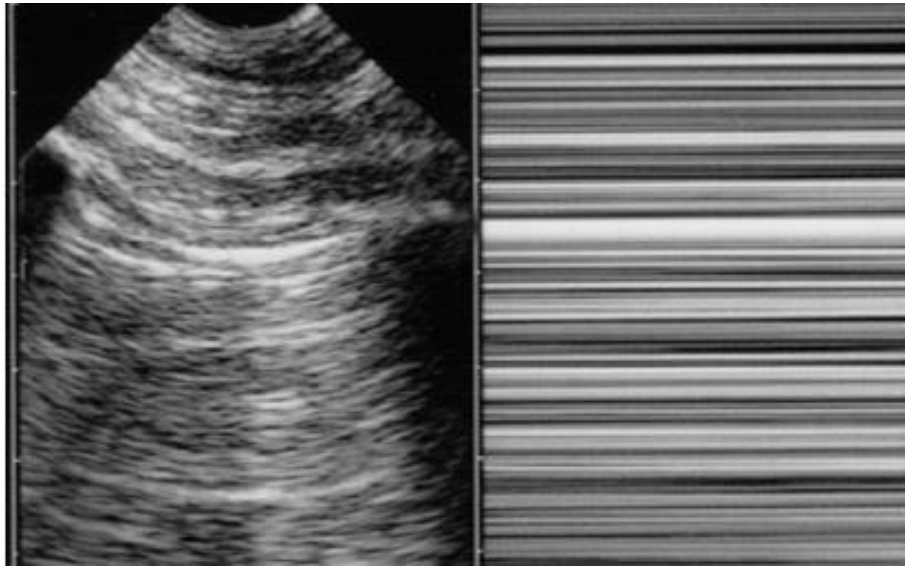
Lung Sliding

Daniel A. Lichtenstein, MD, and Yves Menu, MD

Lung sliding présent: pas de pneumothorax sous la sonde

Absence of lung sliding
M-mode

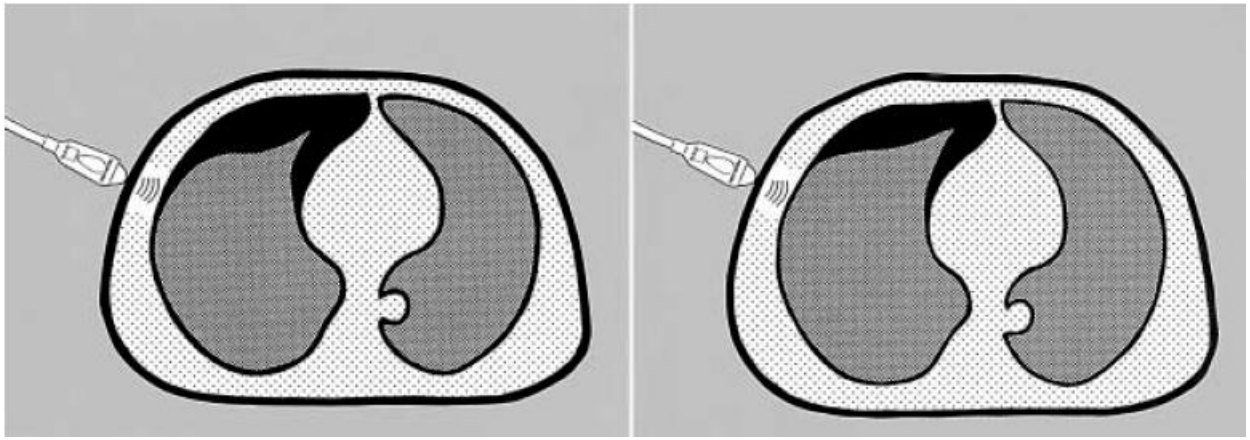




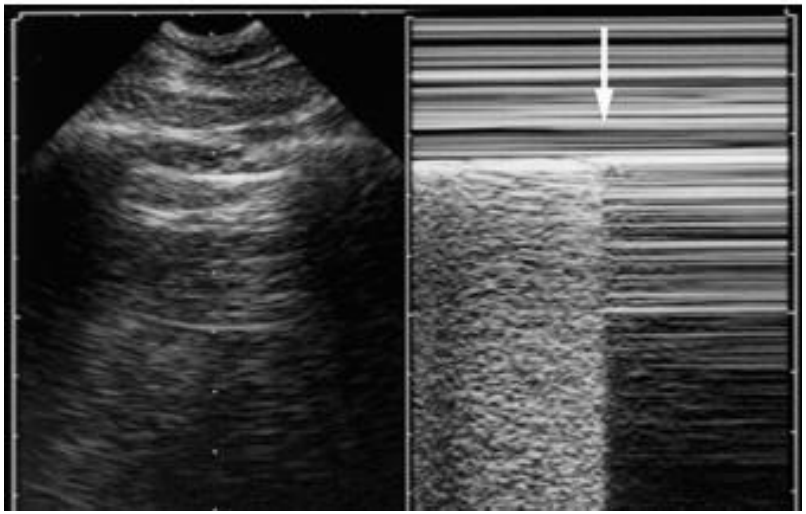
Lung sliding present
Seashore
Rules out pneumothorax

Lung sliding absent
Stratosphere sign
Pneumothorax cannot be ruled out

The lung point



- Specificity 100%



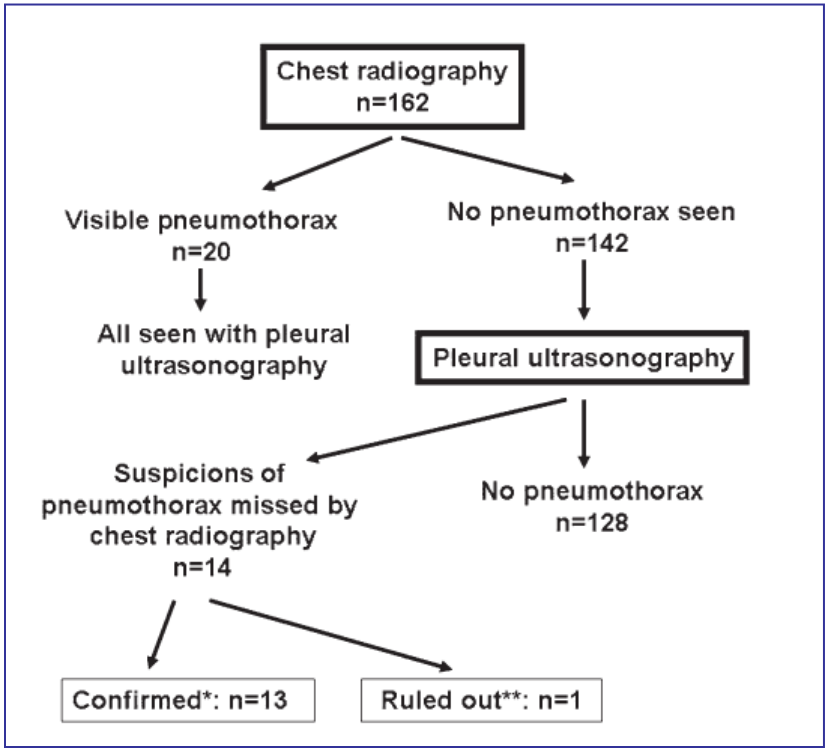
CHEST

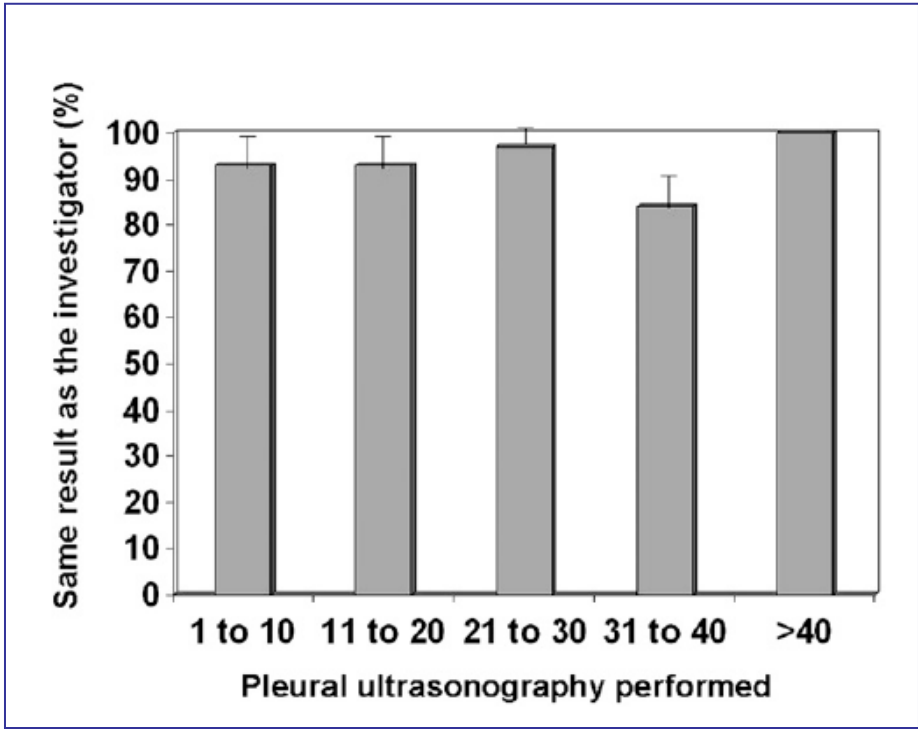
Original Research

INTERVENTIONAL PULMONOLOGY

Pleural Ultrasound Compared With Chest Radiographic Detection of Pneumothorax Resolution After Drainage

Arnaud Galbois, MD; Hafid Ait-Oufella, MD, PhD; Jean-Luc Baudel, MD; Tomek Kofman, MD; Julie Bottero, MD; Stéphanie Viennot, MD; Clémentine Rabate, MD; Salima Jabbouri, MD; Abdeslam Bouzeman, MD; Bertrand Guidet, MD; Georges Offenstadt, MD; and Eric Maury, MD, PhD





Aeroportie
Obstruction voies bilaires
Colites
Pneumoperitoine
Naso gastric tube positioning
Trans cranial Doppler
Optic nerve sheath diameter…..

Quelle formation?

- Focused examination
- A surgeon does not require the training of a hematologist to interpret a leukocyte count in the presence of a localized right lower quadrant abdominal tenderness

Intensive Care Med
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BRIEF REPORT

Ludivine Chalumeau-Lemoine
Jean-Luc Baudel
Vincent Das
Lionel Arrivé
Béatrice Noblinski
Bertrand Guidet
Georges Offenstadt
Eric Maury

Results of short-term training of naïve physicians in focused general ultrasonography in an intensive-care unit

Table 2 Clinical questions addressed by residents and senior intensivists

Clinical questions	Cases identified (*n*)	Discrepant results obtained by residents (*n*)	Discrepant results obtained by senior intensivists (*n*)	Examination sensitivity		Examination specificity		Kappa values for clinical questions addressed	
				Residents	Seniors	Residents	Seniors	Residents	Seniors
Pleural effusion ($n = 35$)	24	13	8	58.3	83.3	70	63.6	0.30 (−0.01–0.62)	0.45 (0.09–0.88)
Centesis feasibility ($n = 35$)	9	3	1	77.7	88.8	88.8	100	0.65 (0.32–0.97)	0.75 (0.47–1.02)
Intraperitoneal effusion ($n = 12$)	8	3	1	75	87.5	87.5	100	0.44 (−0.1–0.9)	0.81 (0.46–1.1)
Centesis feasibility ($n = 12$)	5	1	0	80	100	100	100	0.82 (0.49–1.15)	–
DVT ($n = 12$)	0	1	0	–	–	92	100	–	–
Bladder distention ($n = 20$)	0	0	0	–	–	100	100	–	–
Obstructive uropathy ($n = 20$)	2	2	3	90	100	90	100	0.77 (0.34–1.2)	0.48(−0.05–1.02)
Chronic renal disease ($n = 19$)	1	0	0	100	100	100	100	1 (1–1)	1 (1–1)
Acute cholecystitis ($n = 2$)	0	1	0	–	–	50	100	–	–
IHBDD ($n = 9$)	0	0	0	–	–	100	100	–	–

Sensitivity and specificity were only calculated for examinations with a definite confirmed conclusion
DVT, deep venous thrombosis; IHBDD, intrahepatic biliary duct dilation

Focused training duration: 8hours
Hands on: 6 hours

come to a firm conclusion. The time that elapsed between the fax emission and examination was 37 ± 39 min for the residents and 296 ± 487 min for the radiologists ($P = 0.004$).

CHEST Consensus Statement

American College of Chest Physicians/ La Société de Réanimation de Langue Française Statement on Competence in Critical Care Ultrasonography*

Paul H. Mayo, MD; Yannick Beaulieu, MD; Peter Doelken, MD; David Feller-Kopman, MD; Christopher Harrod, MS; Adolfo Kaplan, MD; John Oropello, MD; Antoine Vieillard-Baron, MD; Olivier Axler, MD; Daniel Lichtenstein, MD; Eric Maury, MD; Michel Slama, MD; and Philippe Vignon, MD

Objective: **To define competence in critical care ultrasonography (CCUS).**
Design: **The statement is sponsored by the Critical Care NetWork of the American College of Chest Physicians (ACCP) in partnership with La Société de Réanimation de Langue Française (SRLF). The ACCP and the SRLF selected a panel of experts to review the field of CCUS and to develop a consensus statement on competence in CCUS.**
Results: **CCUS may be divided into general CCUS (thoracic, abdominal, and vascular), and echocardiography (basic and advanced). For each component part, the panel defined the specific skills that the intensivist should have to be competent in that aspect of CCUS.**
Conclusion: **In defining a reasonable minimum standard for CCUS, the statement serves as a guide for the intensivist to follow in achieving proficiency in the field.**

(CHEST 2009; 135:1050–1060)

Key words: critical care; echocardiography; imaging; ultrasonography

Abbreviations: ACCP = American College of Chest Physicians; CCE = critical care echocardiography; CCUS = critical care ultrasonography; GCCUS = general critical care ultrasonography; IVC = inferior vena cava; LV = left ventricle, ventricular; RV = right ventricle, ventricular; SRLF = La Société de Réanimation de Langue Française; TEE = transesophageal echocardiography; TTE = transthoracic echocardiography; 2D = two-dimensional

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Ultrasound in Emergency Medicine

FOCUSED CARDIAC ULTRASOUND TRAINING: HOW MUCH IS ENOUGH?

Christopher B. Chisholm, MD, MS,*[1] William R. Dodge, MD,*[1] Ray R. Balise, PHD,† Sarah R. Williams, MD,‡
Laleh Gharahbaghian, MD,‡ and Anne-Sophie Beraud, MD, MS§

sults: Ninety percent of trainees passed the written post-test. Two views, the parasternal long and short axis, were easily obtainable, regardless of the level of training or the number of ultrasounds completed. Other views were more difficult to master, but strong trends toward increased competency were evident after 10 h of mixed didactic and scanning training and > 45 ultrasounds. Conclusions: A short, 12-h didactic training in F-TTE provided proficiency in image interpretation and in obtaining adequate images from the parasternal window. More extensive training is needed to master the apical and subcostal windows in a timely man-

Intensive Care Med
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Expert Round Table
on Ultrasound in ICU

International expert statement on training standards for critical care ultrasonography

1. Theoretical program:

Course design should include specific learning goals that are described in the ACCP/SRLF competence statement [14]. The minimum number of hours for course design required to teach GCCUS [15] and basic CCE [16, 17] is 10 h each, to be divided between lectures and didactic cases with image-based training (100% agreement).

A process of certification, accreditation, or delivery of a diploma validating the acquisition of competence is essential for recognition by colleagues/hospital administration. This may be more true in some countries than others, but the more difficult the access to ultrasound for ICU physicians, the more important the "official" recognition of competence (100% agreement).

Medicolegal perspective

considered. When the considerable benefits it confers to patients are well known, not utilizing ultrasound in the management of patients could be considered inexcusable. Examples include assistance with vascular access, cardiac assessment, and ultrasound-guided paracentesis.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Ultrasonography versus Computed Tomography for Suspected Nephrolithiasis

R. Smith-Bindman, C. Aubin, J. Bailitz, R.N. Bengiamin, C.A. Camargo, Jr., J. Corbo, A.J. Dean, R.B. Goldstein, R.T. Griffey, G.D. Jay, T.L. Kang, D.R. Kriesel, O. J. Ma, M. Mallin, W. Manson, J. Melnikow, D.L. Miglioretti, S.K. Miller, L.D. Mills, J.R. Miner, M. Moghadassi, V.E. Noble, G.M. Press, M.L. Stoller, V.E. Valencia, J. Wang, R.C. Wang, and S.R. Cummings

TDM exam de référence

Cout radiation

incidentalomes

Objectifs :dcs ratés, radiations (180j)

- Lithiase/colique néphrétique
- US par radiologue
- US par urgentiste
- CT scan

Outcome	Point-of-Care Ultrasonography (N=908)	Radiology Ultrasonography (N=893)	Computed Tomography (N=958)	P Value
Primary Outcomes				
High-risk diagnosis with complication — no. of patients (%)	6 (0.7)	3 (0.3)	2 (0.2)	0.30
Radiation exposure — mSv	10.1±14.1	9.3±13.4	17.2±13.4	<0.001
During emergency department enrollment visit	6.5±9.4	4.7±8.4	14.1±9.6	<0.001
From enrollment to 30 days	1.2±4.4	1.8±5.4	1.0±3.9	0.19
30–180 days	1.5±5.5	2.1±6.8	1.2±4.8	0.08

Emergency Department Discharge Diagnosis	Final Diagnosis
Point-of-care ultrasonography	
Nonspecific pain	Acute renal insufficiency, pyelonephritis, urosepsis
Nephrolithiasis	Small-bowel obstruction, bowel ischemia and resection
Nephrolithiasis	Acute cholecystitis
Radiology ultrasonography	
Nonspecific pain	Appendicitis
Ruptured ovarian cyst	Ovarian torsion
Nonspecific pain	Acute cholecystitis
Nonspecific pain	Diverticulitis
Computed tomography	
Urinary tract infection	Acute allergic reaction requiring hospital admission
Nonspecific pain	Acute cholecystitis
Nonspecific pain	Pulmonary embolism
Nonspecific pain	Acute cholecystitis
Nonspecific pain, ovarian cyst	Acute cholecystitis

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DOI: 10.1056/NEJMoa1404446

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Letters to the Editor

☐ CLINICAL AUSCULTATION IN NOISY ENVIRONMENTS[1,2]

Recognizing the need for a device capable of adequate preservation of signal-to-noise ratio (SNR) under condi-

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doi:10.1016/j.jemermed.2009.08.026

Selected Topics: Prehospital Care

IN-FLIGHT THORACIC ULTRASOUND DETECTION OF PNEUMOTHORAX IN COMBAT

Justin J. Madill, DO

Department of Emergency Medicine and Aviation Medicine, 2-17 Cavalry, 101st Airborne Combat Aviation Brigade, Fort Campbell, Kentucky

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Ultrasound in Emergency Medicine

PREHOSPITAL CHEST ULTRASOUND BY A DUTCH HELICOPTER EMERGENCY MEDICAL SERVICE

Rein Ketelaars, MD, Nico Hoogerwerf, MD, PHD, and Gert Jan Scheffer, MD, PHD

Change in Treatment Decision	Trauma Patient n (%)	Primary CPR n (%)	Total n (%)
Cardiac			
Initiate inotropic medication	2 (3)	-	2 (3)
Stop resuscitation	4 (7)	5 (8)	9 (15)
More intravascular fluids	2 (3)	-	2 (3)
Less intravascular fluids	4 (7)	-	4 (7)
Pulmonary			
Reposition endotracheal tube	1 (2)	-	1 (2)
Refrain from inserting a chest tube	10 (17)	-	10 (17)
Insert chest tube	3 (5)	-	3 (5)
Other			
Change destination	10 (17)	-	10 (17)
…to a hospital (instead of none)	1		1
…to a lower-level hospital	6		6
…to a Level I trauma center	3		3
Transport	4 (7)	-	4 (7)
No physician needed	3		3
Not by helicopter	1		1
Order preparations	4 (7)	-	4 (7)
Prepare operating room	2		2
Prepare blood transfusion at ED	1		1
Personal call to trauma surgeon	1		1
Total			60

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Original Research

Aeromedical Ultrasound: The Evaluation of Point-of-care Ultrasound During Helicopter Transport

Jeffrey G. Yates, MPA, PA-C [1,*], Denise Baylous, MSN, RN, CCRN, CFRN, NREMT-P [2]

Injury	Trauma Patient n (%)	Primary CPR n (%)	Total n (%)
Cardiac			
Asystole	26 (8)	22 (7)	48 (15)
Poor myocardial contractility	9 (3)	8 (2)	17 (5)
Poor ventricular filling	9 (3)	3 (1)	12 (4)
Pulmonary			
Pneumothorax	25 (9)	0 (0)	25 (9)
Hemothorax	2 (1)	0 (0)	2 (1)
Pulmonary contusion	2 (1)	0 (0)	2 (1)

Ultrasonography: All it can do for you