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Paulo Savoia

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**Affiliations:**

- 1) University of Sao Paulo School of Medicine
- 2) Hospital Israelita Albert Einstein
- 3) Fleury Group



**Shot CV:**

- Graduated in Medicine by University of Sao Paulo School of Medicine.
- Medical Residency in Radiology and Diagnostic Imaging at Clinics Hospital by University of Sao Paulo School of Medicine
- Sub-specialized in Cardiothoracic Radiology at Clinics Hospital by University of Sao Paulo School of Medicine
- Faculty Staff in Emergency Radiology - Institute of Radiology - Clinics Hospital by University of Sao Paulo School of Medicine
- PhD Student at University of Sao Paulo

A-S01

## FAST – Focused Assessment with Sonography for Trauma

*Paulo Savoia*

*Radiologist, University of Sao Paulo School of Medicine Clinics Hospital, Brazil*

Over the past 30 to 40 years, focused assessment with sonography in trauma (well known acronym word “FAST”) has been extensively used and researched in blunt and penetrating trauma in countless health institutions all around the world. Before FAST, diagnosing intraabdominal damage frequently involved invasive methods like exploratory laparotomy and diagnostic peritoneal lavage, which is practically no longer performed nowadays. With various changes in technique, protocols, and interpretation, the FAST examination has developed into a more thorough assessment of the chest, abdomen, heart, and inferior vena cava today. It is one of the Point-Of-Care Ultrasound (POCUS) methods more performed by physicians worldwide, not only by radiologists, but by most emergency attending teams. Laparotomy, laparoscopy, endoscopy, computed tomographic angiography, angiographic intervention, serial imaging, and clinical monitoring are some of the trauma management techniques that have also undergone changes over time. The FAST examination's development to its present position in 2022 will be covered in this presentation, which will also assess its changing role in the decision making process of the acute care of trauma patients, accuracy, technique, interpretation, limitations, newer protocols and correlation with computed tomography, when available. FAST protocol is also included in the latest editions of Advanced Trauma Life Support (ATLS) systematized care to access circulation / shock issues in traumatized patients, which will also be addressed. Additionally, it will be discussed the usefulness of FAST in particular patient groups, such as children and expectant trauma patients, as well as the possibility for further study and applications. Practical tips regarding where, how and with what equipment the FAST protocol should be performed will be considered and the also the experience of the FAST protocol within the biggest Hospital Complex in South America will be shared. As a conclusion, FAST is an extremely important decision making process is the acute care of trauma patients.

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**Toru Kameda, MD, PhD****Affiliation (from April 2022)**

Chief, Department of Ultrasound Medicine, Saiseikai Utsunomiya Hospital

Visiting lecturer, Department of Clinical Laboratory Medicine, Jichi Medical University, JAPAN

**Education**

School of Medicine, Hokkaido University, 1996

Residency (Emergency and Critical Care Medicine), Sapporo City General Hospital, 1998

Residency (Anesthesiology and Intensive Care Medicine), National Children's Hospital, 2000

Residency (Ultrasound Medicine), Saiseikai Utsunomiya Hospital, 2004

**Certification**

Senior fellow of the Japan Society of Ultrasonics in Medicine

Certified emergency physician (Japanese Medical Specialty Board)

Certified intensivist (The Japanese Society of Intensive Care Medicine)

**Society**

Chair, Emergency and Point-of-Care Ultrasound Committee, Japanese Association for Acute Medicine Board of directors, Japan Society of Point-of-Care Ultrasound (JPOCUS)

**Publications**

1. Kameda T, Kamiyama N, Taniguchi N. The Mechanisms Underlying Vertical Artifacts in Lung Ultrasound and their proper utilization for the evaluation of cardiogenic pulmonary edema. *Diagnostics (Basel)*. 2022;12:252.
2. Kameda T, Taniguchi N, Konno K, Koibuchi H, Omoto K, Itoh K. Ultrasonography in undergraduate medical education: a comprehensive review and the education program implemented at Jichi Medical University. *J Med Ultrason(2001)*.2022.
3. Kameda T, Kamiyama N, Taniguchi N. Simple Experimental Models for Elucidating the Mechanism Underlying Vertical Artifacts in Lung Ultrasound: Tools for Revisiting B-lines. *Ultrasound Med Biol*. 2021;47:3543-3555.
4. Kameda T, Mizuma Y, Taniguchi H, Fujita M, Taniguchi N. Point-of-care lung ultrasound for the assessment of pneumonia: a narrative review in the COVID-19 era. *J Med Ultrason (2001)*.2021; 48:31-43.PMID:33438132.
5. Kameda T, Kimura A. Basic point-of-care ultrasound framework based on the airway, breathing, and circulation approach for the initial management of shock and dyspnea. *Acute Med Surg*. 2020; 7: e481.
6. Kameda T, Kamiyama N, Kobayashi H, Kanayama Y, Taniguchi N. Ultrasonic B-line-like artifacts generated with simple experimental models provide clues to solve key issues in B-Lines. *UltrasoundMedBiol*.2019;45:1617-1626.
7. Kameda T, Uebayashi K, Wagai K, Kawai F, Taniguchi N. Assessment of the renal collecting system using a pocket-sized ultrasound device. *J Med Ultrason (2001)*. 2018;45:577-581.
8. Kameda T, Taniguchi N. Overview of point-of-care abdominal ultrasound in emergency and

- critical care. *J Intensive Care*. 2016;4:53.
9. Kameda T, Kawai F, Taniguchi N, Kobori Y. Usefulness of transabdominal ultrasonography in excluding adnexal disease. *J Med Ultrason* (2001). 2016;43:63-70.
  10. Kameda T, Kawai F, Taniguchi N, Omoto K, Kobori Y, Arakawa K. Evaluation of whether the ultrasonographic sign is specific for the diagnosis of an appendiceal mucocele. *J Med Ultrason*. (2001). 2014;41:439-43. PMID: 27278024
  11. Kameda T, Murata Y, Fujita M, Isaka A. Transabdominal ultrasound-guided urethral catheterization with transrectal pressure. *J Emerg Med*. 2014; 46: 215-9. PMID:24199721.
  12. Kameda T, Kawai F, Taniguchi N, Mori I, Ono M, Tsukahara N, Kobori Y, Yoshida H, Wagai K, Numao A. Ultrasonography for ureteral stone detection in patients with or without caliceal dilatation. *J Med Ultrason* (2001). 2010; 37: 9-14. PMID: 27277604.

A-S02

## Lung Point-of-care Ultrasound - Time to Revisit B-lines

*Toru Kameda, MD, PhD*

*Department of Ultrasound Medicine, Saiseikai Utsunomiya Hospital,  
Department of Clinical Laboratory Medicine, Jichi Medical University, JAPAN*

In lung point-of-care ultrasound (POCUS), the presence of diffuse multiple B-lines indicates sonographic interstitial syndrome, common causes of which include cardiogenic pulmonary edema, interstitial pneumonia, and pulmonary fibrosis. The recent advances in lung POCUS for the assessment of sonographic interstitial syndrome are outstanding. However, there is no global consensus with regard to the optimal settings of ultrasound machines even though their contribution to the configuration of B-lines is clinically evident. The configuration is detrimentally affected by the use of spatial compound imaging and the placement of the focal point at a deep level (Diagnostics 2022;12:252). On top of that, the mechanism of vertical artifacts including B-lines and comet tail artifacts in lung POCUS has not yet been fully elucidated. The theory of acoustic trap is useful when considering the generation of these vertical artifacts. Using simple experimental models, we evaluated the generation, configuration and echo intensity of vertical artifacts by varying the point or plane of contact and height of objects (made using gel balls) that correspond to sources of vertical artifacts in the subpleural space. The size of the point or plane of contact and height of the source were observed to be key factors in the generation, length and echo intensity of the artifacts (Ultrasound Med Biol 2019;45:1617-26, Ultrasound Med Biol 2021;47:3543-55). Furthermore, we evaluated the relationship of the attenuation inside the sources of vertical artifacts to the echo intensity and attenuation of vertical artifacts. For a given size of hemispherical objects, the intensity and attenuation of the artifacts in the objects made of agar containing graphite (attenuation coefficient, 0.5 dB/cm · MHz) were significantly lower and larger, respectively, than those in the objects made of pure agar. In the hemispherical objects containing graphite, the intensity decreased when the frequency was changed from 5 to 9 MHz (J Med Ultrason. 2022. doi: 10.1007/s10396-022-01244-0). The series of the experiments using simple models support the theory of acoustic traps, and indicate that clarification of the relationship between the length and intensity of vertical artifacts and physical composition of sources may be useful for differentiating cardiogenic pulmonary edema from lung diseases. It is time to revisit B-lines in terms of the optimal settings of ultrasound machines and elucidation of the mechanism.

A-S03

## Daniel Lichtenstein

Daniel Lichtenstein is a medical intensivist working at Ambroise-Paré Hospital ICU (Paris-West, France) since 1989. He created critical ultrasound since 1985, then a personalized on-site training centre (CEURF) since 1989, in François Jardin's I.C.U.

Critical ultrasound was defined as a discipline associating an ultrasound diagnosis with an immediate therapeutic action, as well as parallel uses such as venous cannulation and thoracocentesis (*Intensive Care Med* 1991;19:353-355).

Main publications: a textbook (six editions from 1992 to 2016, at Springer) and a few dozen of publications in international literature, mostly focused on lung ultrasound. Main articles: BLUE-protocol (lung & venous ultrasound in acute respiratory failure). FALLS-protocol (lung ultrasound for diagnosis and management of acute circulatory failure). The SESAME-protocol (whole body ultrasound in cardiac arrest) is the opportunity to define the universal probe philosophy and to advise simple equipments, the main condition for being able to face such an event, with the peculiarity that every routine approach (diagnostic and therapeutic) are done following the SESAME-protocol without any adaptation, just by working less fast. Lung ultrasound in the critically ill neonate can be done like in the adult, without any adaptation too.

Daniel Lichtenstein is President of CEURF, visiting Professor since 2007. He animated more than 600 lectures in more than 40 countries.

CEURF pinpoints on a holistic use of critical ultrasound, favoring simple equipment (without Doppler), the use of one universal probe for the whole body, emphasis on lung ultrasound and adapted venous ultrasound, allowing among many advantages to simplify echocardiography.



### Extract of bibliographic references (only corresponding author)

#### Some among publications in international journals with peer review

Lichtenstein D & Axler O (1993). Intensive use of general ultrasound in the intensive care unit, a prospective study of 150 consecutive patients. **Intensive Care Med** 19:353-355

Lichtenstein D & Menu Y (1995). A bedside ultrasound sign ruling out pneumothorax in the critically ill: lung sliding. **Chest** 108:1345-1348

Lichtenstein D, Mezière G, Biderman P, Gepner A & Barré O (1997). The comet-tail artifact, an ultrasound sign of alveolar-interstitial syndrome. **Am J Respir Crit Care Med** 156:1640-1646

Lichtenstein D, Biderman P, Mezière G & Gepner A (1998). The sinusogram, a real-time ultrasound sign of maxillary sinusitis. **Intensive Care Med** 24:1057-1061

Lichtenstein D & Courret JP (1998). Feasibility of ultrasound in the helicopter. **Intensive Care Med** 24:1119

Lichtenstein D & Mezière G (1998). A lung ultrasound sign allowing bedside distinction between pulmonary edema and COPD: the comet-tail artifact. **Intensive Care Med** 24:1331-1334

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Lichtenstein D, Hulot JS, Rabiller A, Tostivint I & Mezière G (1999). Feasibility and safety of ultrasound-aided thoracentesis in mechanically ventilated patients. **Intensive Care Med** 25:955-958

- Lichtenstein D, Mezière G, Biderman P & Gepner A (2000). The lung point: an ultrasound sign specific to pneumothorax. **Intensive Care Med** 26:1434-1440
- Lichtenstein D, Saïfi R, Augarde R, Prin S, Schmitt JM, Page B, Pipien I & Jardin F (2001) The internal jugular veins are asymmetric, usefulness of ultrasound before catheterization. **Intensive Care Med** 27:301-305
- Lichtenstein D, Lascols N, Prin S and Mezière G (2003). The lung pulse: an early ultrasound sign of complete atelectasis. **Intensive Care Med** 29:2187-2192
- Lichtenstein D, Lascols N, Mezière G & Gepner A (2004). Ultrasound diagnosis of alveolar consolidation in the critically ill. **Intensive Care Med** 30:276-281
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- Lichtenstein D, Mezière G, Lascols N, Biderman P, Courret JP, Gepner A, Goldstein I and Tenoudji-Cohen M (2005). Ultrasound diagnosis of occult pneumothorax. **Crit Care Med** 33:1231-1238
- Lichtenstein D & Peyrouset O (2006). Lung ultrasound superior to CT? The example of a CT-occult necrotizing pneumonia. **Intensive Care Medicine** 32:334-335
- Lichtenstein D & Mezière G (2008). Relevance of lung ultrasound in the diagnosis of acute respiratory failure. The BLUE-protocol. **Chest** 134:117-125
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- Lichtenstein D, Mezière G, Lagoueyte JF, Biderman P, Goldstein I & Gepner A (2009). A-lines and B-lines: Lung ultrasound as a bedside tool for predicting pulmonary artery occlusion pressure in the critically ill. **Chest** 136: 1014-1020
- Lichtenstein D (2009) Ultrasound examination of the lungs in the intensive care unit. **Pediatr Crit Care Med** 10: 693-698
- Lichtenstein D, Mezière G (2011) - The BLUE-points: three standardized points used in the BLUE-protocol for ultrasound assessment of the lung in acute respiratory failure. **Crit Ultrasound J** 3:109-110
- Lichtenstein D (2012) Fluid Administration Limited by Lung Sonography: the place of lung ultrasound in assessment of acute circulatory failure (the FALLS-protocol). **Expert Rev Respir Med** 6(2):155-162

**Some from Editorials, Reviews, State-of-the-art**

- (1997) L'échographie pulmonaire: une méthode d'avenir en médecine d'urgence et de réanimation? **Revue de Pneumologie Clinique** 53:63-68
- (2001) Lung ultrasound in the intensive care unit. **Research Signpost Recent Res Devel Resp Critical Care Med** 1:83-93
- (2004) Lung ultrasound in the critically ill. **2004 Yearbook of Intensive Care and Emergency Medicine** pp. 625-644 (Springer-Verlag)
- (2007) Lung ultrasound in the ICU. **Jurnalul Roman de Anestezie Terapie Intensiva** Vol. 14 N.1:3-5
- (2007) Ultrasound in the Management of Thoracic Disease. **Critical Care Medicine** 35 [Suppl]: S250-S261
- (2007) Point of Care Ultrasound: Infection Control on the ICU. **Critical Care Medicine** 35 [Suppl]: S262-S267
- (2007) L'échographie "corps entier", une approche visuelle du patient en état critique. **Bulletin**

- officiel de l'Académie Nationale de Médecine, Paris, Tome 191, mars N 3, 495-517 (2009)  
Lung ultrasound in the critically ill. **J Med Ultrasound** 2009; 17(3):125-142
- (2009) Lung ultrasound in acute respiratory failure - an introduction to the BLUE-protocol.  
**Minerva Anestesiologica**. 75(5):313-317
- (2010) Should lung ultrasound be more widely used in the assessment of acute respiratory disease -  
Editorial - **Expert Rev Resp Med** 4(5):533-538
- (2012) Lichtenstein D & Mauriat P. Lung ultrasound in the critically ill neonate. **Current Pediatric  
Reviews** Vol. 8, No. 3, 217-223
- (2013) FALLS-protocol: lung ultrasound in hemodynamic assessment of shock. **Heart, Lung and  
Vessels** 5(3): 142-147
- (2014) Lung ultrasound in the critically ill. **Annals of Intensive Care** 4:1;1-12
- (2014) Lung ultrasound in the critically ill. **Current Opinion in Critical Care** 2014;20:315-322
- (2014) Lichtenstein D, van Hooland S, Elbers P, Malbrain ML. Ten good reasons to practice  
ultrasound in critical care. **Anaesthesiol Intensive Ther** 46(5):323-35. doi: 10. 5603/AIT.  
2014.0056
- (2015) BLUE-protocol and FALLS-protocol, two applications of lung ultrasound in the critically ill  
(Recent advances in chest medicine). **CHEST** 147:1659-1670
- (2015) Lichtenstein D, Malbrain ML. Critical care ultrasound in cardiac arrest. Technological  
requirements for performing the SESAME-protocol - a holistic approach. **Anaesthesiol  
Intensive Ther** 47(5):471-481. doi: 10.5603/AIT.a2015.0072. Epub 2015 Nov 18. PMID:  
26578398
- (2017) Lung Ultrasound (in the Critically Ill) Superior to CT: the Example of Lung Sliding.  
**Korean J Crit Care Med** 32(1): 1-8. Doi.org/10.4266/kjccm.2016.00955
- (2017) Novel approaches in ultrasonography of the lung and pleural space: where are we now?  
**Breathe** 13:100-111 - DOI: 10.1183/20734735.004717.
- (2017) Lung Ultrasound in the Critically Ill (LUCI): a translational discipline. **Anaesthesiol  
Intensive Ther**. 2017 vol. 49, n°5, 430-436 - ISSN 0209-1712 - DOI: 10.5603/AIT.a2017.0063

#### Textbooks(monographies)

- (1992). L'échographie générale en réanimation (1ère édition). **Springer-Verlag France**
- (2002). L'échographie générale en réanimation (2ème édition). **Springer-Verlag France**
- (2005). General ultrasound in the critically ill (3rd Edition). **Springer-Verlag International**  
(Korean translation (2008) **Koonja Editor**)
- (2010). Whole-body ultrasound in the critically ill (4th Edition). **Springer-Verlag International**  
Korean translation (2013) **Koonja Editor**  
Chinese (mandarin) translation  
(2015) **People's Military Medical Press**
- (2011) L'Echographie Corps Entier chez le Patient Critique (5th Edition)  
**Springer-Verlag France**
- (2016) Lung Ultrasound in the Critically Ill, the BLUE-protocol -  
**Springer-Verlag International**  
Chinese (mandarine) translation (2018) **People Health press (national press)**

#### Some among publications in french Journals with peer review

- Lichtenstein D (1994). Diagnostic échographique de l'œdème pulmonaire (Lettre à la rédaction).  
**Revue d'Imagerie Médicale** 6:561-562
- Lichtenstein D & François Jardin (1994). Appréciation non invasive de la pression veineuse



centrale par la mesure échographique du calibre de la veine cave inférieure en réanimation.  
**Réanimation Urgences** 3 (2), 79-82

**Didactic material available on Internet**

The videos of the main profiles of the BLUE-protocol on the website of CEURF ([www.CEURF.net](http://www.CEURF.net))

The video of a standard lung ultrasound, solicited by the ERS (European Respiratory Society) in 2012, accessible on [http:// www. ers-education.org/ ers Made/ procedures/ Lung Ultrasound/ LungUltrasound.html](http://www.ers-education.org/ers_Made/procedures/Lung_Ultrasound/LungUltrasound.html) (please do not copy/paste until having withdrawn the spaces)

Zoom On: Lichtenstein D, Critical Ultrasound Pioneer.

Command from Health Management for the congress ISICEM 2016.  
(<https://healthmanagement.org/c/icu/post/zoom-on-daniel-lichtenstein-critical-ultrasound-pioneer> )

**Some among oral communications, posters of various congresses, which should be converted into original publications in the times to come**

D. Lichtenstein. Relevance of ultrasound in predicting the ease of central venous lines insertion. **J.E.U.R.** 1994 vol 7 n°1, p.46

D. Lichtenstein, A. Gepner, T. Jullien, B. Mercier, G. Mezière & B. Valtier. L'échographie peut-elle prédire la faisabilité d'un cathétérisme veineux central ? **Ann FrAnesth Réanim** 1994; 13 (suppl) : R.168

D. Lichtenstein, R. Saïfi, G. Mezière & I. Pipien. Cathétérisme écho-guidé de la veine sous-clavière en réanimation. **Réan Urg** 2000; 9 Suppl 2: 184s

D. Lichtenstein, L. Holzapfel & J. Frija. Projection cutanée des pneumothorax et impact sur leur diagnostic échographique. **Réan Urg** 2000; 9 Suppl 2: 138s

D. Lichtenstein, C. Mirolo & G. Mezière. Un signe échographique d'infarctus mésentérique: l'abolition du péristaltisme digestif. **Réanimation**2001;10 Suppl 1:203s

D. Lichtenstein, G. Mezière & J.P. Courret. L'abolition du glissement péritonéal: un signe échographique de pneumopéritoine. **Réanimation** 2002;11 Suppl 3:165s

D. Lichtenstein, N. Bendersky, G. Mezière & I. Goldstein. Diagnostic de l'hypertension intra-crânienne par la mesure échographique du nerf optique. **Réanimation** 2002;11 Suppl 3:170s

D. Lichtenstein & G. Mezière. Ultrasound diagnosis of an acute dyspnea. **Critical Care** 2003 vol 7 suppl 2:S93

A-S03

## Holistic Whole Body Ultrasound during Cardiac Arrest: The SESAME-protocol

*Daniel Lichtenstein*

*Medical ICU, Hospital Ambroise Pare, Paris, France*

The term SESAME is the abbreviation of a long acronym (sequential emergency sonography assessing mechanism or origin of severe shock of indistinct cause) historically devoted in shock then used without adaptation to cardiac arrest for etiologic diagnosis.

Done after ruling out shockable causes, this very fast protocol lasts less than one minute. The tool that we have defined for holistic critical ultrasound in the ICU in 1991 is providentially the optimal choice for this critical application. Holistic ultrasound is defined as a discipline where each element interacts with the others; the understanding of each of them allows to understand the whole. This is the opportunity for technical considerations. A simple gray-scale real-time equipment is used for all steps, the very principle of visual medicine. The concept of holistic ultrasound is 100% on focus: the best image is obtained with the simplest equipment devoid of traditional facilities (image filtering, harmonics, time lag, Doppler...). The term “holistic” implies:

A narrow machine, as those built since 1992 (not necessarily a laptop).

A fast start-on time (7 seconds in our 1992 machine).

A simple keyboard favoring only three useful buttons.

A universal microconvex probe able to analyze five sequential steps (reversible causes).

- 1) Pneumothorax. Nobody should die from undiagnosed pneumothorax, this diagnosis is therefore prioritized. This implies that a ventilation is required (any means, even mouth-to-mouth).
- 2) Then deep venous thrombosis, by directly following the BLUE-protocol (only one strategical area investigated).
- 3) Then abdominal (or pleural) massive bleeding.
- 4) Then pericardial tamponade (fully splitted from the heart).
- 5) The fifth step (direct analysis of the heart), often of poor prognosis, focuses first and mainly at the right ventricle volume (favoring pulmonary embolism when no DVT is detected).

SESAME-protocol can be used without change, just more quietly, for countless less urgent settings.

One reference (a textbook) : Lung ultrasound in the critically ill - the BLUE-)rotocol (Springer-Verlag, 2016) :

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## Odd Helge Gilja



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**Sivil status:** Married to May Elisabeth Pedersen (in 1993).  
 Children: Hanne Gilja (b. 1994)  
 Erik Gilja (b. 1996)  
 Martin Gilja (b. 1999)  
 Anders Gilja (b. 2001)

**ORCID:0000-0002-0436-0383****Bibliometry as per 4/1 -2022:****TOTAL PUBLICATIONS AND BIBLIOMETRICS**

**475** Publications totally during my career (abstracts excluded)  
**287** Scientific publications in international peer-reviewed journals (Web of Science), of which **113** from 2016-2021.  
**112** Books / Book chapters / Conference proceedings  
**75** Popular science / Multimedia publications  
**1** Dissertation

	Google Scholar:		Web of Science:	
Citation index	All	Since 2017	Papers: 287	Sum of the Times Cited: 9402
Citations	14400	8178	H-index: 45	Citations excl self-citations: 8453
H-index	57	41	Average citations per paper: 32,76	
i10-index	185	124		

**Research Gate: RG Index 47,52      426 Research items      84.026 reads**  
**H-index: 52**

**Education**

Master (Cand. med.) at University of Bergen 1988. Authorisation as M.D. in 1990.  
 Post-graduate Program in Pedagogical Development 1996-97 at University of Bergen (UiB). PhD (Dr. Med.) at University of Bergen 1997.  
 Specialist in Internal Medicine 2001. Specialist in Gastroenterology 2002.

### **Work Experience**

Intern (House Officer) at SSSF in Førde. 1989.

Assistant Public Health Physician in Stryn commune. 1990.

Drafted Military Physician in Panserbataljonen, Div. 6, Setermoen. 1990/91.

Resident at Dept of Medicine, Haukeland University Hospital (HUH). 1991/92 and 1997-2001.

Research Fellow at Christian Michelsen Research (CMR) A/S (NTNF). 1993.

Research Fellow at Dept. of Medicine A, University of Bergen. 1993-1997. Director of Gilja Medisin & Multimedia since 1997.

Web-Consultant in Nett Doktor. no AS. 1999-2000.

Consultant at Dept. of Medicine, Section of Gastroenterology, Haukeland University Hospital, 2001-2003.

Associate Professor at Institute of Medicine, University of Bergen, 2001-2002.

Professor at Institute of Medicine, University of Bergen from 2002-.

Executive Coordinator for MD's post-graduate education in Helseregion Vest, Norwegian Medical Association, 25% position, 2002-2014.

Senior Consultant, National Centre for Ultrasound in Gastroenterology, Haukeland University Hospital, 2003-2012.

Senior Consultant, Dept of Medicine, Section of Gastroenterology, Haukeland University Hospital, 2003-.

Director of Med Viz, an R&D cluster in medical imaging and visualisation at HUH, UiB and CMR, 2007-2016.

Director, National Centre for Ultrasound in Gastroenterology, Haukeland University Hospital, 2012-.

Professor I, Dept. of Clinical Medicine, University of Bergen. 2021-.

### **Administrative and Leadership experience**

1. Member of board of IT-strategy at Faculty of Medicine, UiB. 1995-1996.

2. Member of The Research Committee at Faculty of Medicine, UiB. 1997.

3. Board member and web-master of Scandinavian Association for Gastrointestinal Motility. 1995-2001.

4. Executive secretary for the establishment of National Centre for Ultrasound in Gastroenterology. 1998-2001.

5. Board Member of Norwegian Society for Diagnostic Ultrasound in Medicine. 1999-2001.

6. Vice-president for the European congress Euroson 2003 in Copenhagen.

7. President of Norwegian Society for Diagnostic Ultrasound in Medicine. 2001-7.

8. National elected representative in Board of Directors in EFSUMB (European Federation of Societies in Ultrasound in Medicine and Biology). 2001-2011.

9. Chairman of the ICT-Committee at Institute of Medicine, UiB. 2004-8.

10. Chairman of the ICT Cooperative Committee between UiB, Faculty of Medicine and HUH. 2005-9.

11. Board member of EFSUMB's Education and Professional Standards Committee. 2005-7.12.  
Deputy member of the Regional Ethic Committee in Helse Vest, 2005-9.

13. Board member of Fond I Steering Committee in The Norwegian Medical Association. 2005-10.

14. Board member of The Research Committee at Institute of Medicine, UiB. 2006-9

15. Chairman of EFSUMB's Education and Professional Standards Committee. 2007-11.16.

16. Board member of The Steering Committee at Institute of Medicine, UiB. 2009-

17. Member of National Strategy Group for Medical Imaging, 2009-11.
18. Board member in the National consortium Nor Bio Imaging 2010-.
19. Member of Helse-Bergen's Strategy Policy Group 2011.
20. Member of EFSUMB's Publication Committee. 2011 - 2013.
21. Honorary Secretary of EFSUMB's Executive Bureau. 2011-2013.
22. Member of Helse-Bergen's Research & Development Strategy Group 2012.
23. Chairman Section of Gastroenterology and Nutrition, Faculty of Medicine, UiB, 2013-.
24. Vice-Chair (R&D), Department of Clinical Medicine, Faculty of Medicine, UiB, 2013-2020.
25. Member of World Federation of Ultrasound in Medicine and Biology's Sponsorship Committee/Collaboration Committee, 2013-2021.
26. President Elect in European Federation of Societies in Ultrasound in Medicine and Biology, 2013,-.
27. Board member of EFSUMB's Education and Professional Standards Committee. 2013-15.
28. Member of leader group in NORMIT (Norwegian centre for Minimally invasive Image guided Therapy and medical technologies). 2014-.
29. President of EFSUMB (European Federation of Societies in Ultrasound in Medicine and Biology) 2015-17.
30. President of Euroson Congress, October 2016, Leipzig, Germany (>2000 participants).
31. 31. Past-President EFSUMB (European Federation of Societies in Ultrasound in Medicine and Biology) 2017-2019.
32. Member of World Federation of Ultrasound in Medicine and Biology's Congress Committee, 2017-2021.
33. President of Euroson Congress, Ljubljana, Slovenia, September 2017.
34. Member of World Federation of Ultrasound in Medicine and Biology's Communication Committee 2017-2021.
35. Board member of Fond I Steering Committee in The Norwegian Medical Association. 2017-.
36. Councillor of World Federation of Ultrasound in Medicine and Biology's 2017-2019.
37. Chairman of Education Committee in World Federation of Ultrasound in Medicine and Biology, 2017-2021.
38. President of Euroson Congress, Bergen 2020.
39. Vice-Chair (Innovation), Department of Clinical Medicine, Faculty of Medicine, UiB, 2013-2020.
40. Co-opted Councillor of World Federation of Ultrasound in Medicine and Biology's 2019-2021.
41. Leader of Centres of Education Task Force Group in WFUMB in Education Committee in World Federation of Ultrasound in Medicine and Biology, 2021-.
42. Member of Education Committee in World Federation of Ultrasound in Medicine and Biology, 2021-.

A-S04

## POCUS of the GI Tract

*Odd Helge Gilja, MD, PhD*

*Professor, National Centre for Ultrasound in Gastroenterology, Haukeland University Hospital,  
and Dept of Clinical Medicine, University of Bergen, Norway*

Gastrointestinal ultrasound (GIUS) offers a great possibility to examine non-invasively and in a physiological manner the bowels including extra-intestinal features such as the splanchnic vessels, mesentery, oment and lymph nodes. For properly trained users, GIUS have good accuracy and repeatability, not only in a primary work-up of patients, but also in the follow up of chronic diseases, and in Point-of-care settings.

The world's first ever guidelines on gastrointestinal ultrasound (GIUS) was published in 2016 on methodology (1). The following years several other topics on GIUS were published: US in IBD (2), US in appendicitis and diverticulitis (3), endoanal, endorectal and perineal US (4), Coeliac and rare diseases (5), GI emergencies (6), and functional ultrasound (7).

In POCUS of the bowels the most important parameters to examine are bowel wall thickness, wall blood flow by color Doppler, lumen dilatation, peristaltic activity, presence of free fluid and free air. Fat wrapping and fatty creeping is also important to look for if Crohn's disease is suspected. The presence of classical Crohn-complications such as fistulae, strictures, and abscesses can also be examined for during a POCUS examination of the intestines.

### **References:**

1. Nylund K, Maconi G, Hollerweger A, Ripolles T, Pallotta N, Higginson A, Serra C, Dietrich CF, Sporea I, Saftoiu A, Dirks K, Hausken T, Calabrese E, Romanini L, Maaser C, Nuernberg D, Gilja OH. EFSUMB Recommendations and Guidelines for Gastrointestinal Ultrasound - Part 1: Examination Techniques and Normal Findings (Long version). *Ultraschall Med.* 2017 Jun;38(3):273-284. PMID: 27604052.
2. Maconi G, Nylund K, Ripolles T, Calabrese E, Dirks K, Dietrich CF, Hollerweger A, Sporea I, Saftoiu A, Maaser C, Hausken T, Higginson AP, Nürnberg D, Pallotta N, Romanini L, Serra C, Gilja OH. EFSUMB Recommendations and Clinical Guidelines for Intestinal Ultrasound (GIUS) in Inflammatory Bowel Diseases. *Ultraschall Med.* 2018 Jun;39(3):304-317. PMID: 29566419.
3. Dirks K, Calabrese E, Dietrich CF, Gilja OH, Hausken T, Higginson A, Hollerweger A, Maconi G, Maaser C, Nuernberg D, Nylund K, Pallotta N, Ripolles T, Romanini L, Saftoiu A, Serra C, Wüstner M, Sporea I. EFSUMB Position Paper: Recommendations for Gastrointestinal Ultrasound (GIUS) in Acute Appendicitis and Diverticulitis. *Ultraschall Med.* 2019 Jan 7. doi:

- 10.1055/a-0824-6952. PubMed PMID: 30616263.
4. Nuernberg D, Saftoiu A, Barreiros AP, Burmester E, Cartana T, Clevert DA, Dietrich CF, Lorentzen T, Maconi G, Mihmanli I, Nolsoe CP, Pfeffer F, Rafaelsen SR, Sparchez Z, Vilmann P, Waage JER, Gilja OH. EFSUMB Recommendations for Gastrointestinal Ultrasound Part 3: Endorectal, Endoanal and Perineal Ultrasound. *Ultrasound Int Open* 2019; 4: 1-18.
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  6. Hollerweger A, Maconi G, Ripolles T, Nylund K, Higginson A, Serra C, Dietrich CF, Dirks K, Gilja OH. Gastrointestinal Ultrasound (GIUS) in Intestinal Emergencies - An EFSUMB Position Paper. *Ultraschall Med*. 2020 Dec;41(6):646-657. English. doi: 10.1055/a-1147-1295. Epub 2020 Apr 20. PMID: 32311749.
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A-S05

## Adrian Michael Goudie



### PERSONAL DETAILS

Name	Adrian Michael Goudie
Address	13a Melville Beach Rd Applecross, Perth West Australia 6154
Work Telephone	61-8-61522222
Mobile Telephone	0400317274
Email	adrian.goudie@health.wa.gov.au

### PRIMARY EDUCATION

1976-1976	Embleton Primary School, Perth, Western Australia
1977-1979	Guildford Grammar School, Perth, Western Australia

### SECONDARY EDUCATION

1980-1984	Guildford Grammar School, Perth, Western Australia
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### TERTIARY ENTRANCE EXAM PRIZES

General Exhibition  
Subject Exhibition – Mathematics II & III  
Subject Exhibition – Physics

### TERTIARY EDUCATION

1985-1987	Bachelor of Medicine and Bachelor of Surgery (Years 1-3) University of Western Australia
Prizes	Emele Bradshaw Vance Prize in Physiology Boots Proprietary Ltd Prize in Physiology

1988	Bachelor of Medical Science University of Western Australia Department of Pathology
	THESIS “Tumour necrosis factor - beta as a mediator of autoimmune susceptibility”
Result	B.Med.Sci (Pathology) Honours 2A

1989-1991	Bachelor of Medicine and Bachelor of Surgery (Years 4-6)
Prizes	Royal Perth Hospital Clinical Association Prize in Surgery

### QUALIFICATIONS



Bachelor of Medical Science (Honours) (UWA)	1990
Bachelor of Medicine and Bachelor of Surgery (UWA)	1992
Fellowship, Australasian College for Emergency Medicine	1999
Diploma of Medical Toxicology (University of Cardiff)	2002
Diploma of Diagnostic Ultrasound (Australasian Society for Ultrasound in Medicine)	2005
Master of Business Administration (Curtin University)	2008

**OTHER CERTIFICATIONS AND COURSES**

Paediatric Advanced Life Support Course (Cambridge)	1996
Clinical Toxinology Short Course (University of Adelaide)	1997
Radiation Safety Course in Radiation Protection in the Use of Fluoroscopic Equipment (RPH)	1998
Advanced Paediatric Life Support (London)	2001
Principles of Obstetric and Gynaecological Ultrasound (Thomas Jefferson University)	2003
Regional and Peripheral Nerve Block Course (CTEC)	2003
Major Incident Medical Management & Support - Commander	2008

**EMPLOYMENT**

2015-Current	<p>Consultant, Emergency Department Fiona Stanley Hospital Clinical Senior Lecturer, University of Western Australia. <i>Duties include lead for the Emergency Department Ultrasound Programme, in addition to those of a clinical consultant and teaching (undergraduate, junior medical staff and fellowship programmes).</i></p>
2006-2015	<p>Consultant, Emergency Department Fremantle Hospital Clinical Senior Lecturer, University of Western Australia. <i>Duties include the creation and supervision of the Emergency Department Ultrasound Programme, in addition to those of a clinical consultant and teaching (undergraduate, junior medical staff and fellowship programmes).</i> 2009 Awarded John Rowe Award (Consultant Teacher of the Year) 2007, Nominee, John Rowe Award (Consultant Teacher of the Year)</p>
2003-2006	<p>Consultant, Emergency Departments Royal Perth Hospital and Swan District Hospital Conjoint appointment (May 2003 – October 2006) Clinical Senior Lecturer, University of Western Australia. Director, Emergency Department, SDH (Oct 2003 – Jan 2006) <i>Administrative duties for SDH as Departmental Director including liaising with medical administration and other departments, quality assurance and improvement, departmental policies and procedures and medical staff recruitment, in addition to clinical consultant and teaching duties. Duties at RPH were those of a clinical consultant; undergraduate, junior medical and fellowship teaching programmes.</i></p>
2001-2003	<p>Locum Consultant, Emergency Department St Thomas' Hospital, London UK (Aug 2001 – April 2003)</p>

- Duties were those of a clinical consultant (adult and paediatric emergency); undergraduate, SHO and registrar teaching programmes; quality assurance programmes and administrative duties (including the implementation of the NHS modernization programme at one of the “first wave” hospitals).*
- 2000-2001 Consultant, Emergency Departments  
Royal Perth Hospital and Swan District Hospital  
Conjoint appointment  
Director of Emergency Medicine Training, Swan District Hospital  
*Duties were those of a clinical consultant, undergraduate and fellowship teaching programmes, quality assurance programmes and administrative duties.*
- 1999 Locum Consultant, Emergency Department,  
Royal Perth Hospital (Oct – Dec)  
Senior Registrar, Emergency Department,  
Royal Perth Hospital (Jul - Oct)  
Sessional Consultant, Emergency Department  
St John of God Hospital, Murdoch (Jun – Dec)  
Locum Consultant, Emergency Department,  
Swan District Hospital (Jun - Jul)  
Visiting Trauma Registrar, Groote Schuur Hospital,  
Cape Town, South Africa (Feb - May)  
*Duties included initial stabilisation and treatment of all trauma presentations, management of high care unit and observation ward.*
- 1998 Emergency Registrar, Royal Perth Hospital (Apr - Jan)  
Radiology Secondment, Royal Perth Hospital (Jan - Mar)
- 1997 Emergency Registrar, Fremantle Hospital (Jul - Jan)  
Intensive Care Registrar, Royal Perth Hospital (Jan - Jun)
- 1996 Anaesthetic SHO, Ipswich Hospital, UK (Jul - Jan)  
*Duties including administering anaesthetics, teaching lists, on call duties, intensive care unit cover and resuscitation and trauma team participation.*  
Paediatric Resident, Princess Margaret Hospital (Jan - Jun)  
*Emergency and Neonatal Medicine attachments*
- 1995 Emergency Registrar, Royal Perth Hospital
- 1994 Medical Registrar, Sir Charles Gairdner Hospital (Jul - Jan)  
*General Medicine attachment*  
Emergency Registrar, Royal Perth Hospital (Jan - Jun)
- 1993 Resident, Royal Perth Hospital  
*Emergency, Nephrology, Intensive Care, and Leave Relief*
- 1992 Intern, Royal Perth Hospital  
*Emergency, General Medicine, Surgery, Haematology*

#### **PROFESSIONAL ORGANISATIONS & ACTIVITIES**

Australasian College for Emergency Medicine

Fellow 1999 – Current

Ultrasound Committee Member 2007-2019

Ultrasound Committee Chair 2009-2015

Standards Committee Member 2009-2015  
Australasian Society for Ultrasound in Medicine  
Member 2005-Current  
Certificate Clinician Performed Ultrasound Board  
2009-2019 (Chair 2015-2019)  
Councillor 2010-2016  
Diploma Diagnostic Ultrasound Board  
2011-2019 (Chair 2015-2019)  
Examiner, Diploma Diagnostic Ultrasound 2011-Current  
President 2012-2013  
World Federation for Ultrasound in Medicine and Biology.  
Councillor 2013-2019  
Education Committee 2013-2015  
Finance Committee 2015-2017  
Vice President 2 2015-2017  
Secretary 2017-2019  
World Interactive Network Focussed on Critical Ultrasound  
Organising Committee WINFOCUS2009 Conference

**PUBLICATIONS AND RESEARCH 28+**

A-S05

## Right Iliac Fossa Pain-When It's Not Appendicitis

*Adrian Michael Goudie*

*BMedSci (Hons) MBBS FACEM Dip Med Tox DDU MBA*

*Emergency Department, Fiona Stanley Hospital, Clinical Senior Lecturer, University of Western Australia.*

Right iliac fossa pain is a common presentation to the emergency department, usually accompanied by the question “could it be appendicitis”? Although appendicitis is a common cause, there are many other possibilities which should be considered. This presentation will provide descriptions and a visual tour of many of the alternate pathologies, including right sided diverticulitis, colitis, mesenteric adenitis, ovarian, renal, biliary and even musculoskeletal pathology.

A-S06

## Cheong-Il SHIN

**Present Title & Affiliation:**

Clinical associate professor  
Department of Radiology  
Seoul National University Hospital



**Birth Date & Place:** March 10, 1977, Korea

**Citizenship:** Republic of Korea

**Office Address & Telephone:**

Department of Radiology  
Seoul National University Hospital  
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Tel.: 822-2072-2584 Fax: 822-743-6385  
e-mail: cheongil.tree@gmail.com

**Licensures:**

National Medical License, Korea (#77098)–March 2002

### EDUCATION

**Undergraduate:**

College of Liberal Arts and Science  
Seoul National University  
(March 1996-February 1998)

**Graduate:**

College of Medicine - M.D.  
Seoul National University  
(March 1998 - February 2002)  
Graduate School - M.S.  
Seoul National University  
(March 2005 - February 2007)  
Graduate School - Ph.D.  
Seoul National University  
(September 2008–August 2016)

**Postgraduate:**

Internship  
Seoul National University Hospital, Seoul  
(March 2002 - February 2003)  
Radiology Residency  
Seoul National University Hospital, Seoul  
(March 2004 - February 2008)  
Radiology Fellowship  
Seoul National University Hospital, Seoul

(March 2008 –February 2010)

**Specialty Boards:** Korean Board of Radiology (#2421) (February 2008)

**ACADEMIC & PROFESSIONAL APPOINTMENTS**

Clinical associate professor of Radiology,  
Seoul National University Hospital  
(Since March 2019)

**MEMBERSHIP**

**International**

Radiological Society of North America (Since 2007)  
American Society of Emergency Radiology (Since 2008)

**National**

The Korean Radiological Society (Since 2008)  
Korean Society of Ultrasound in Medicine (Since 2008)  
Korean Society of Abdominal Radiology(Since 2012)  
Korean Society of Emergency Radiology (Since 2012)

**AWARDS**

**National**

Silver Medal Award for outstanding scientific exhibition,  
Korean Society of Radiology (October 2006)

**SCIENTIFIC PAPER PUBLICATION**

**International: peer-reviewed articles (in SCI(e) journals)**

**1<sup>st</sup> author**

1. Shin CI, Lee JM, Kim SH, Choi JY, Lee JY, Han JK, Jo SY, Choi BI. Recurrence patterns of combined hepatocellular-cholangiocarcinoma on enhanced computed tomography. J Comput Assist Tomogr. 2007;31(1):109-15
2. Shin CI, Kim HC, Song YS, Cho HR, Lee KB, Lee W, et al. Rat model of hindlimb ischemia induced via embolization with polyvinyl alcohol and N-butyl cyanoacrylate. Korean J Radiol. 2013;14(6):923-30.
3. Shin CI, Kim SH, Lee ES, Lee DH, Hwang EJ, Chung SY, et al. Ultra-low peak voltage CT colonography: effect of iterative reconstruction algorithms on performance of radiologists who use anthropomorphic colonic phantoms. Radiology. 2014;273(3):759-71.
4. Shin CI, Kim SH, Im JP, Kim SG, Yu MH, Lee ES, et al. One-mSv CT colonography: Effect of different iterative reconstruction algorithms on radiologists' performance. European journal of radiology. 2016;85(3):641-8.
5. Shin CI, Kim SH. Normal and Abnormal Postoperative Imaging Findings after Gastric Oncologic and Bariatric Surgery. Korean J Radiol. 2020;21(7):793-811.

**Coauthor: 34**

**National: peer-reviewed articles (in SCI(e) journals)**

**1<sup>st</sup> author**

1. Shin CI, Lee W, Woo JS, Park E-A, Kim P-k, Song HB, et al. In vitro MRI and Characterization of Rat Mesenchymal Stem Cells Transduced with Ferritin as MR Reporter Gene. Journal of the Korean Society of Magnetic Resonance in Medicine. 2012;16(1).
2. Shin CI, Se Hyung Kim, Jung Hyo Rhim, Nam-Joon Yi, Kyung-Suk Suh, Jeong Min Lee, et al. Feasibility of Commercially Available, Fully Automated Hepatic CT Volumetry for Assessing Both Total and Territorial Liver Volumes in Liver Transplantation. J Korean Soc Radiol. 2013;68(2):125-36.

A-S06

## POCUS for RUQ Pain

*Cheong-Il SHIN, M.D., Ph.D.*

*Department of Radiology, Seoul National University Hospital, Republic of Korea*

For evaluating patients presenting with acute right upper quadrant (RUQ) pain, ultrasound is commonly the first-line imaging diagnostic modality. Point of Care Ultrasound (POCUS) can offer the provider a window into what is going on with patients and help them simplify clinical decision-making. In this talk, I will review the causes of RUQ pain identifiable at the ultrasound with an organ-based approach, offering tips for practicing POCUS.



A-S07

**Yung-Liang Wan, MD**

Professor of Radiology  
 Department of Medical Imaging and Intervention  
 Linkou Chang Gung Memorial Hospital (CGMH)  
 Chang Gung University (CGU)  
[ylw0518@cgmh.org.tw](mailto:ylw0518@cgmh.org.tw)

**Education Background:**

College of Medicine, National Taiwan University (1973 to 1980).

**Post-graduate training and qualification:**

A Research Fellow of Diagnostic Ultrasonography in 1985 at Dept. of Diagnostic Radiology, Mount Sinai Hospital and Mount Sinai School of Medicine, City University of New York, U.S.A. Passed the qualification examination of the American Registry of Diagnostic Medical Sonographers (ARDMS) on Oct. 21, 1989. Passed the physics part at percentile 93, and the clinical part at percentile 97.

**Professional and Academic Career**

1. A Chairman of the Department of Medical Imaging and Intervention, Linkou CGMH for 18 years (1993 to 2011).
2. Director, Department and Post-Graduate Institute of Medical Imaging and Radiological Sciences, College of Medicine, Chang Gung University, for 23 years (1995 to 2019).
3. Member of WFUMB COE Task Force (2021 to 2023)
4. President of AFSUMB (2020 to 2022)
5. Councilor (2007-2010), Treasurer (2014 to 2016), Secretary (2016 to 2018), and President-elect (2018 to 2020) of the AFSUMB
6. President of Taiwan Society of Ultrasound in Medicine (CTSUM) (2002 to 2004)
7. Standing Board Supervisor of Taiwan Radiological Society (2022 to 2025)
8. Honorary Consultant to Taiwan Radiological Society (2019 to 2022)
9. Standing Board Director of Taiwan Radiological Society (2013 to 2019)
10. Founding president and president of Taiwan Society of Medical Imaging and Radiological Sciences (2013 to 2016)
11. 366 publications in peer-reviewed journals (72% cited by SCI).
12. Editor of one book, contributor of 6 book chapters.
13. Delivered 75 domestic lectures and 103 international speeches.
14. Current Associate Editor of J Thoracic Imaging, USA (IF = 5)
15. Editor-in-chief of J Radiological Sciences
16. Editorial Board Member of CV Imaging Asia.
17. Reviewer of 22 peer-reviewed journals
18. President/Organizer of 12 international congresses
19. Winner of 22 honors/awards, including a member of 2019 RSNA-AOSR International Visiting Professor program, Congress Ambassador of Taipei City Government (2019 to 2023), enlisted as a global lifetime top 2% scientist published by Stanford University in Plos Biology on Oct. 20, 20221, doi: 10.17632/btchxktzyw. Lifetime achievement award bestowed by the Taiwan Society of Ultrasound in Medicine (2021), Honorary Member of Japan Society of Ultrasonics in Medicine (2022)

A-S07

## POCUS for Flank Pain

*Yung-Liang Wan, MD*

*Department of Medical Imaging and Intervention, Linkou Chang Gung Memorial Hospital,  
College of Medicine, Chang Gung University, Tao-Yuan City, Taiwan*

Flank pain, especially renal colic, is one of the most common manifestations of patients admitted to the emergency department. It is a pain typically located below the rib and above the ileum, at the posterior- or mid-axillary line. Clinically, the pain most commonly results from the stimulation of nerve endings upon distended ureter or renal capsule. The character of flank pain may help determine the etiologies or causes, which include local or referred pain, acute or chronic or recurrent pain, degree of severity, and duration. Associated symptoms and laboratory data are also critical for making an accurate diagnosis.

In cases of flank pain due to urinary disorders that radiate to the ipsilateral testicle, it is usually caused by obstruction of the proximal urinary tract due to the common innervation of the testicle and the renal pelvis (T11–12). This pain usually originates in the posterior part of the flank and radiates to the testicle of the male or the labia of the female. The pain becomes lower and more anterior in the flank when the obstruction occurs in the middle third of the ureter. The degree of severity of the pain is related to the acuteness rather than the degree of obstruction. Flank pain caused by renal inflammation generally is not as sudden in onset or as severe as pain caused by acute ureteral obstruction. Flank pain caused by chronic ureteral obstruction is generally much less severe.

Both urinary and extra-urinary diseases can be the cause of flank pain. A patient with lesions in the retroperitoneum, gall bladder disease, acute appendicitis, acute pancreatitis, diverticulitis, tubo-ovarian disease, and chest disease may present with flank pain.

Flank pain can be caused by acute renal inflammation (acute pyelonephritis, acute emphysematous pyelonephritis), acute distension of renal capsule (perirenal urinoma, renal or peri-renal abscess), acute ureteral obstruction (urolithiasis, blood clot, acute, and papillary necrosis), chronic ureteral obstruction (ureteral stricture due to previous surgery, retroperitoneal fibrosis, radiation therapy), renal neoplasms (renal cell carcinoma, urothelial carcinoma), acute renal infarction, disease related to retroperitoneum (acute pancreatitis, appendicitis, colonic diverticulitis, neoplasm of vertical colon, mycotic or ruptured aortic aneurysm, retroperitoneal tumors such as benign or malignant tumors of mesenchymal origin), and congenital anomalies (obstruction of the uretero-pelvic junction)

CT is one of the common imaging modalities to assess a patient with flank pain. In comparison with ultrasound, it has the strength of higher accuracy, global depiction, less operator-dependency with objectiveness, better delineation of soft tissue strands or fascial change, and higher specificity in delineating abnormal gas, stone, or urolithiasis. However, ultrasound has the advantages of non-irradiation, cost-effectiveness, multiplanar and repeated scanning, and availability of color flow information and hand-held devices to assess the point of discomfort at the bedside. In this lecture, the role of POCUS for flank pain will be presented and discussed.