

UCL International
Hepatology
ULTRASOUND COURSE

20TH-21ST SEPTEMBER
LONDON
ROYAL FREE HOSPITAL



BILIARY PATHOLOGY

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EFSUMB Ultrasound Learning Centre

WFUMB Center of Education

www.ulctimisoara.ro



ULTRASOUND
LEARNING CENTER
TIMIȘOARA



- Gallbladder and biliary system diseases are frequent pathologies in clinical practice and their burden is increasing worldwide
- Ultrasound is the preferred first line imaging technique in related clinical situations and in screening of asymptomatic cases.
- It is a safe, inexpensive, non-invasive, bed side tool that can provide shortcut to positive diagnosis and explores alternative pathologies
- Very frequently the gallbladder diseases are asymptomatic
- Incidental findings of the biliary system are detected in 6.2% of patients

GALLBLADDER STONES

- Is the most frequent disease of the biliary system
- It is estimated that **10% of the adult population have gallbladder stones**, and that 1/3 of the population over 70 years of age will have gallbladder stones.
- On the other hand 35% of the patients with gallstones will become in time symptomatic and will require surgery.
- Transabdominal ultrasound examination is the most commonly used screening modality for this disease.
- The accuracy of ultrasonography for the diagnosis of gallstones is **up to 96%**.

1. Freitas ML et al – World J Gastroenterol 2006

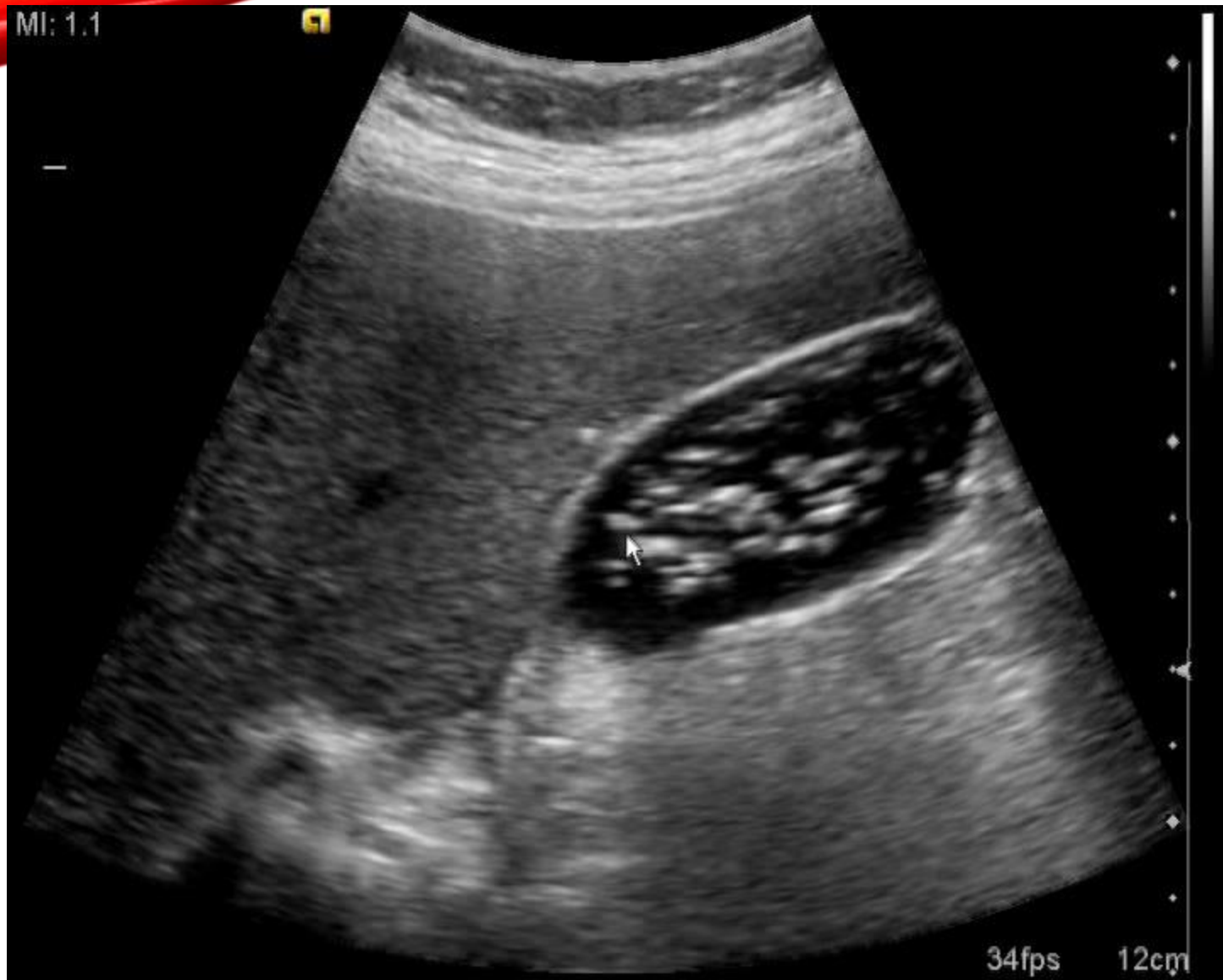
2. Schirmer BD et al- J Long Term Eff Med Implants 2005

3. Alina Popescu, Suzane Elhakim, Antonio C Matteoni - GALLBLADDER AND BILE DUCT SYSTEM – SONOPATHOLOGY, in WFUMB Course Book

4. Zeman R. Cholelithiasis and cholecystitis. In Gastrointestinal Radiology 1994

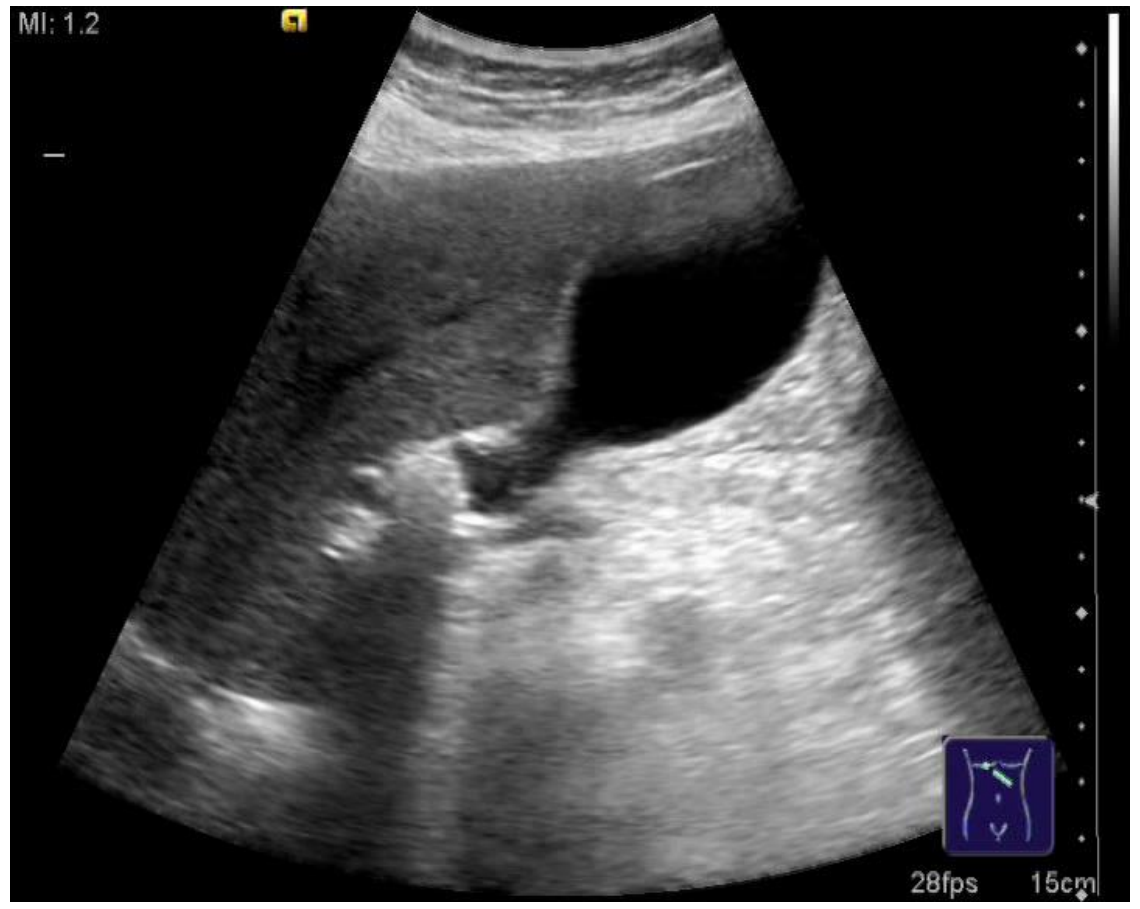
GALLBLADDER STONES





GALLBLADDER STONES

- Difficult to see when are small
- Gallstones size and number can not be estimated accurately by means of ultrasound.
- Gallbladder filled with stones and no bile left - **shell aspect** can be easily mistaken with air in the digestive tube, if the examiner is not enough experienced.
- *The presence of one gallstone impacted in the gallbladder infundibulum creates a hydrops and the diagnosis of gallstones is missed!*
- There are also limitations of this method generated by the lack of acoustic window in some patients and also by the obesity.





12:43:29 PM 6/3/2013

MI: 1.2



SIEMENS

4C1 / Abdomen

General

2D _____ 100%

THI / H4.00 MHz

0 dB / DR 70

ASC 3 / DTCE M

Map D / ST 2

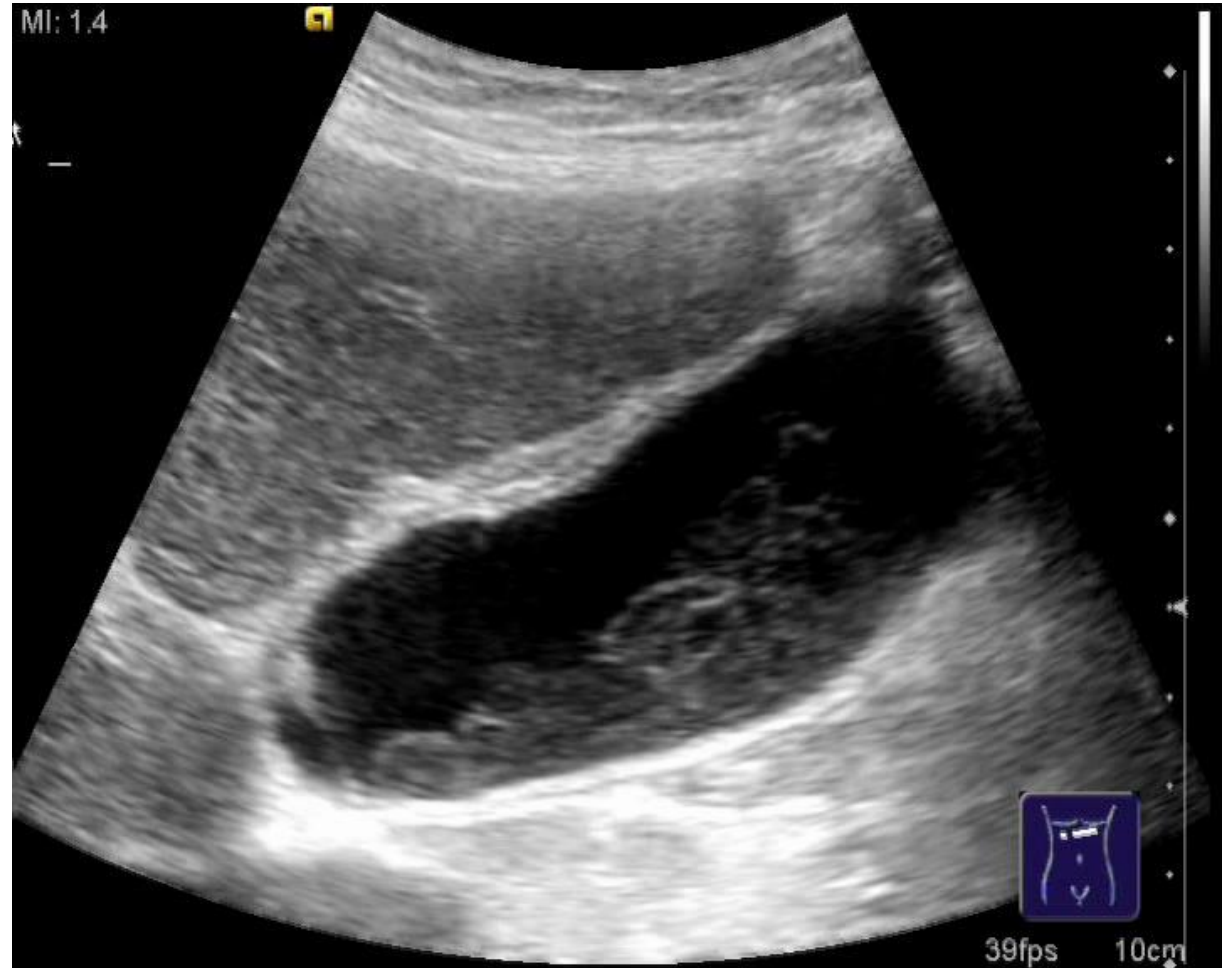
18fps

18cm



BILIARY SLUDGE

- homogenous echogenic material in the gallbladder lumen, with no posterior acoustic shadowing

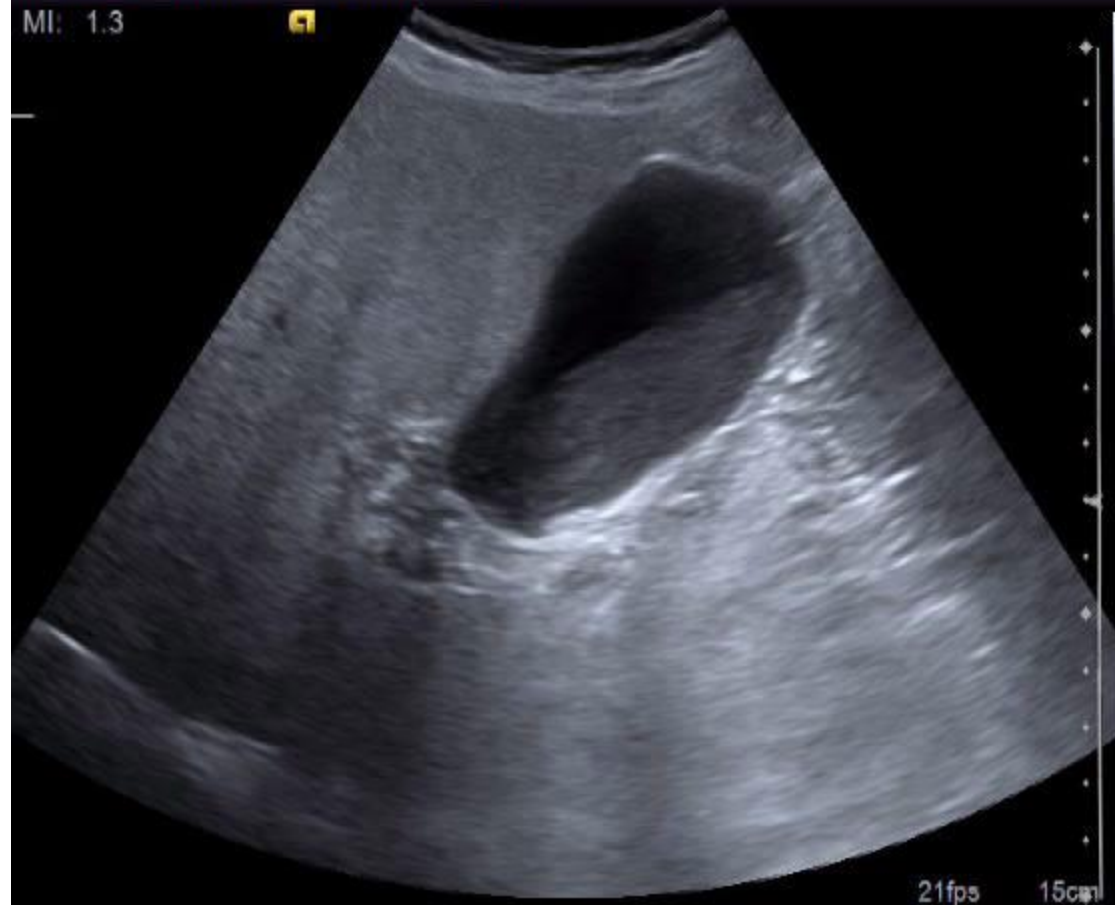


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MI: 1.3



SIEMENS

4C1 / Abdomen

General

2D 100%

THI / H4.00 MHz

7 dB / DR 70

ASC 3 / DTCE M

Map D / ST 2

21fps

15cm

ACUTE CHOLECYSTITIS

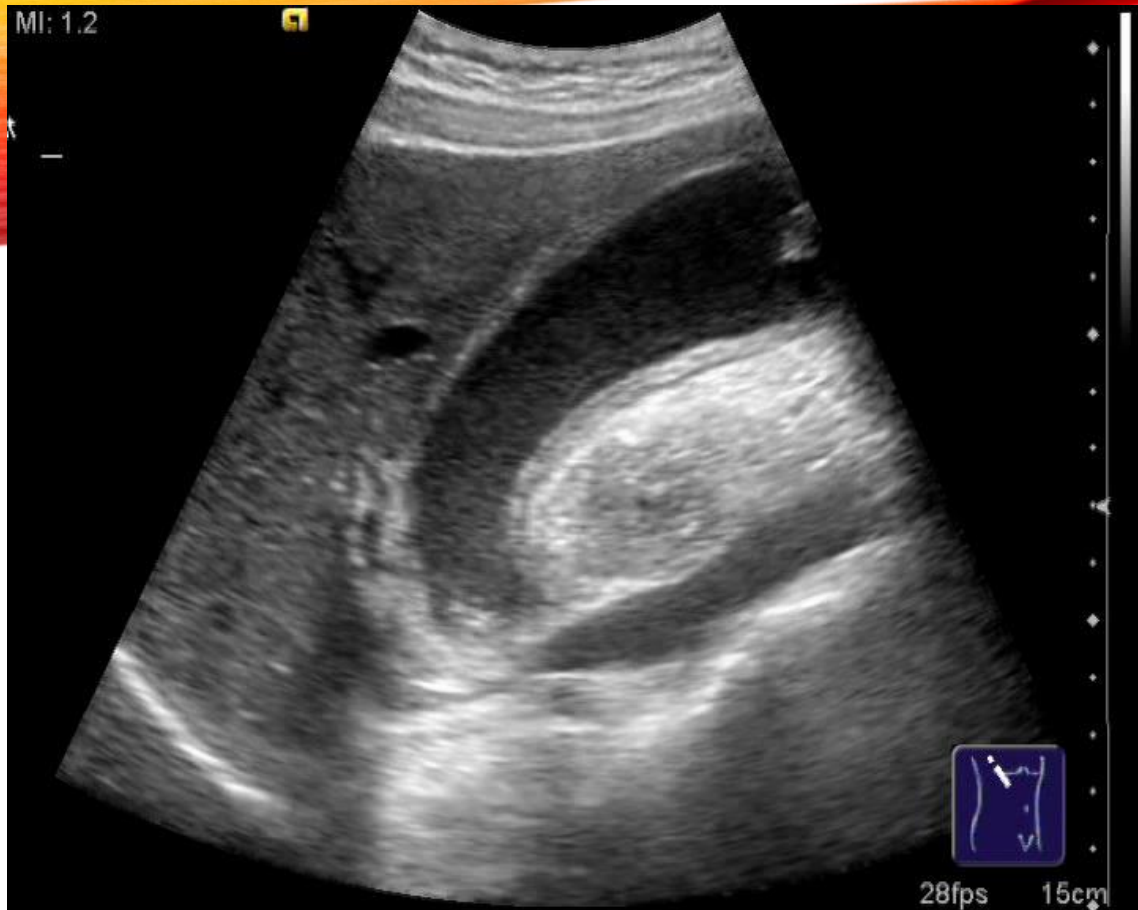
- Occurs in aprox. **1/3** of the patients with gallstones (1).
- **95% of the cases are due to calculous obstruction** of the gallbladder neck or cystic duct
- The presence of the **gallstones** at ultrasound in combination with **sonographic Murphy sign** has a positive predictive value of **92%** (2)

1. Laing FC – in Diagnostic Ultrasound 1998

2. Ralls PW et al- Radiology 1985

3. Alina Popescu, Suzane Elhakim, Antonio C Matteoni - GALLBLADDER AND BILE DUCT SYSTEM – SONOPATHOLOGY, in WFUMB Course Book

MI: 1.2



28fps 15cm



ECO COLECISTITA ACUTA

10:07:45 AM 5/22/2013

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MI: 1.1



SIEMENS

4C1 / *Abdomen

General

2D 100%

THI / H4.00 MHz

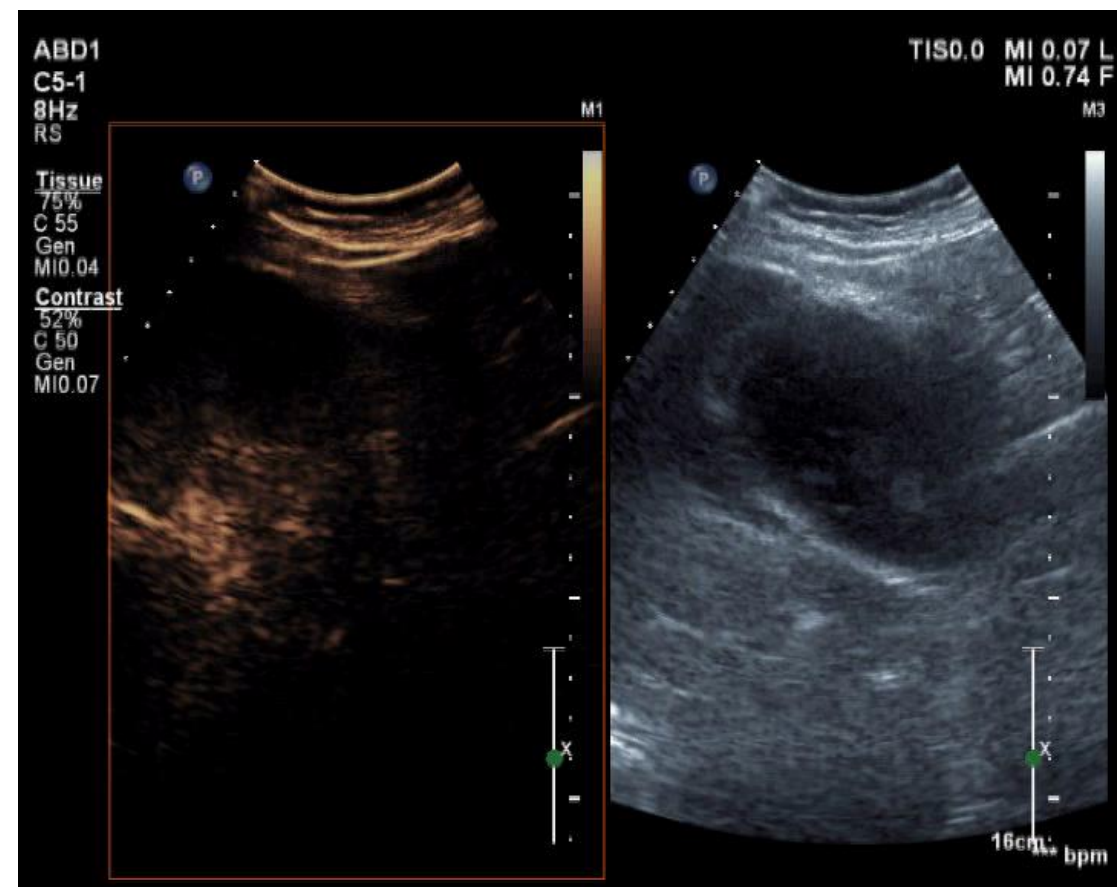
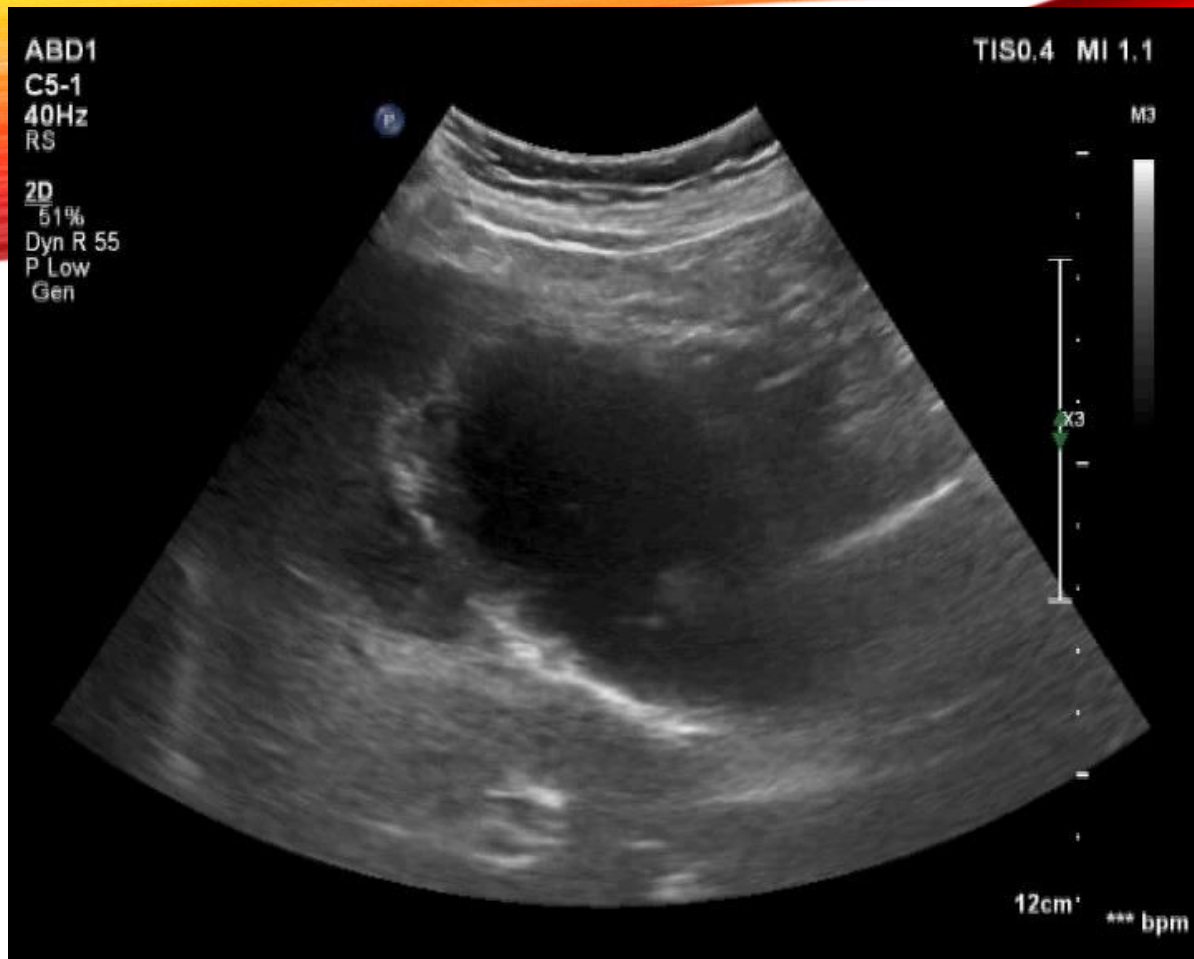
-4 dB / DR 70

ASC 3 / DTCE M

Map D / ST 2

24fps 13cm





GALLBLADDER POLYPS

- Gallbladder polyps are benign tumors, completely asymptomatic, incidentally found on ultrasound.
- The most frequent types are the adenomas and the cholesterol polyps (contain cholesterol deposits).
- Gallbladder polyps have a wide estimated prevalence in adults of 0.3–12.3%.
- Differential diagnosis polyp ≠ gallbladder stone or ball like sludge

Riddell ZC, et al. Gallbladder polyps and adenomyomatosis. Br J Radiol. 2023 Feb;96(1142):20220115.

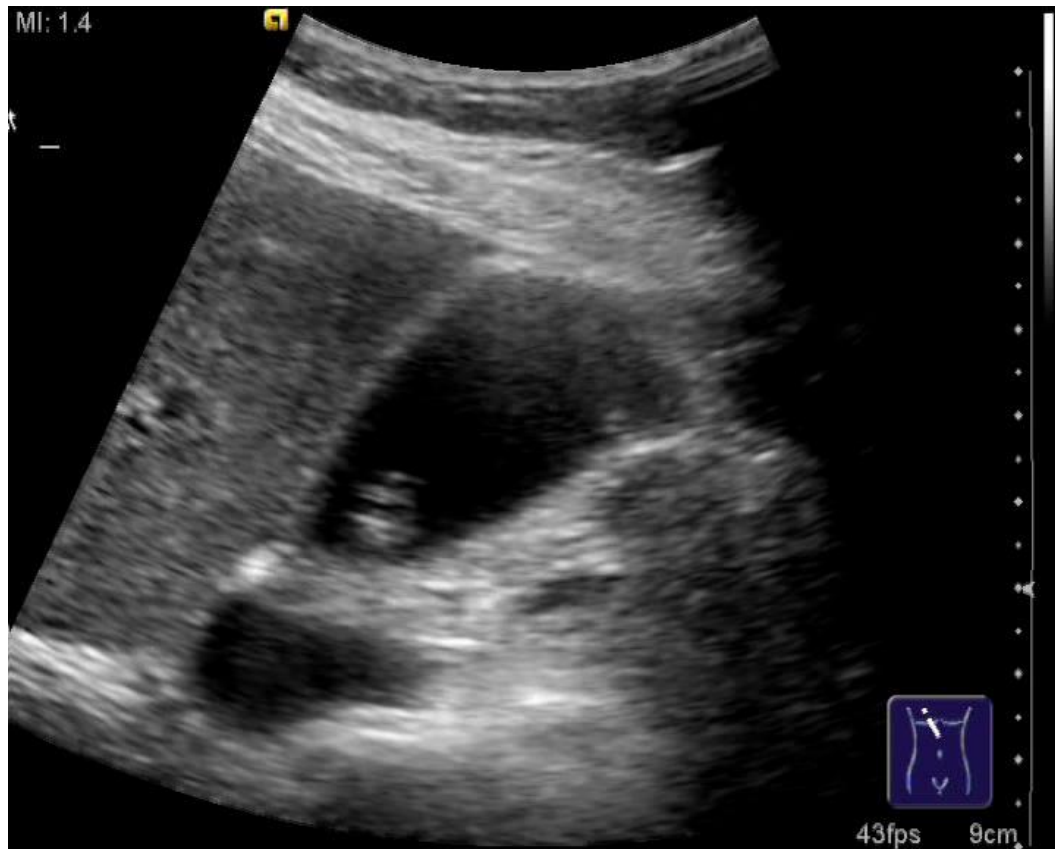
Wennmacker SZ, et al. Transabdominal ultrasound and endoscopic ultrasound for diagnosis of gallbladder polyps. Cochrane Database Syst Rev. 2018 Aug 15;8(8):CD012233.

Alina Popescu, Suzane Elhakim, Antonio C Matteoni - GALLBLADDER AND BILE DUCT SYSTEM – SONOPATHOLOGY, in WFUMB Course Book

GALLBLADDER POLYPS

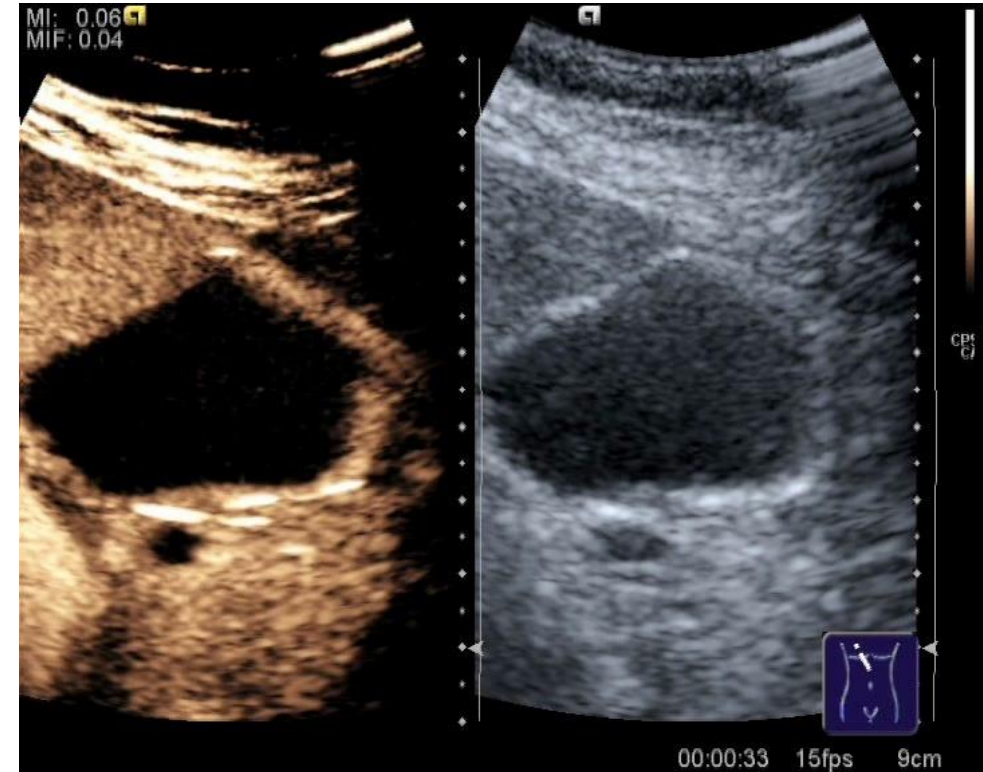
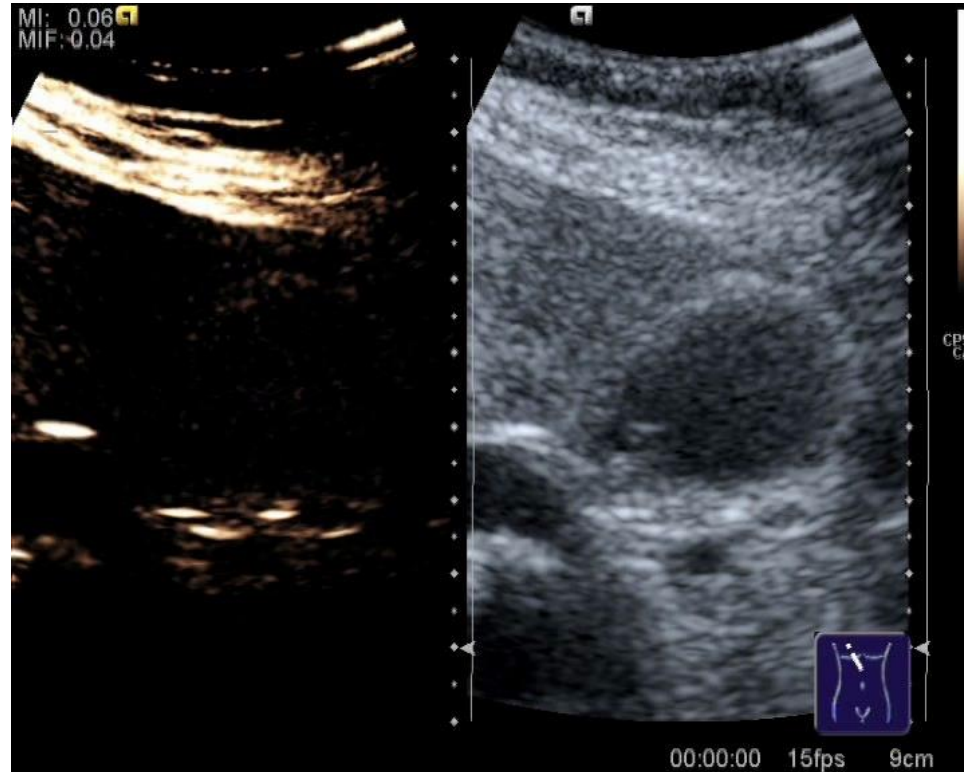


GALLBLADDER POLYPS



RECOMMENDATION 64

CEUS is able to differentiate between a perfused gallbladder lesion and motionless biliary sludge (LoE 4, GoR C). Strong consensus (20/0/0, 100%)



GALLBLADDER CARCINOMA

- Rare but highly fatal malignancy, associated in almost 100 % of the cases with cholecystolithiasis
- Arising in the majority of cases from underlying chronic cholecystitis
- More frequent in patients older than 60 years.
- The risk of developing gallbladder cancer in a patient with gallbladder stones is 0.3 % over 30 years, and with much higher cancer risk in stones larger than 3 cm.

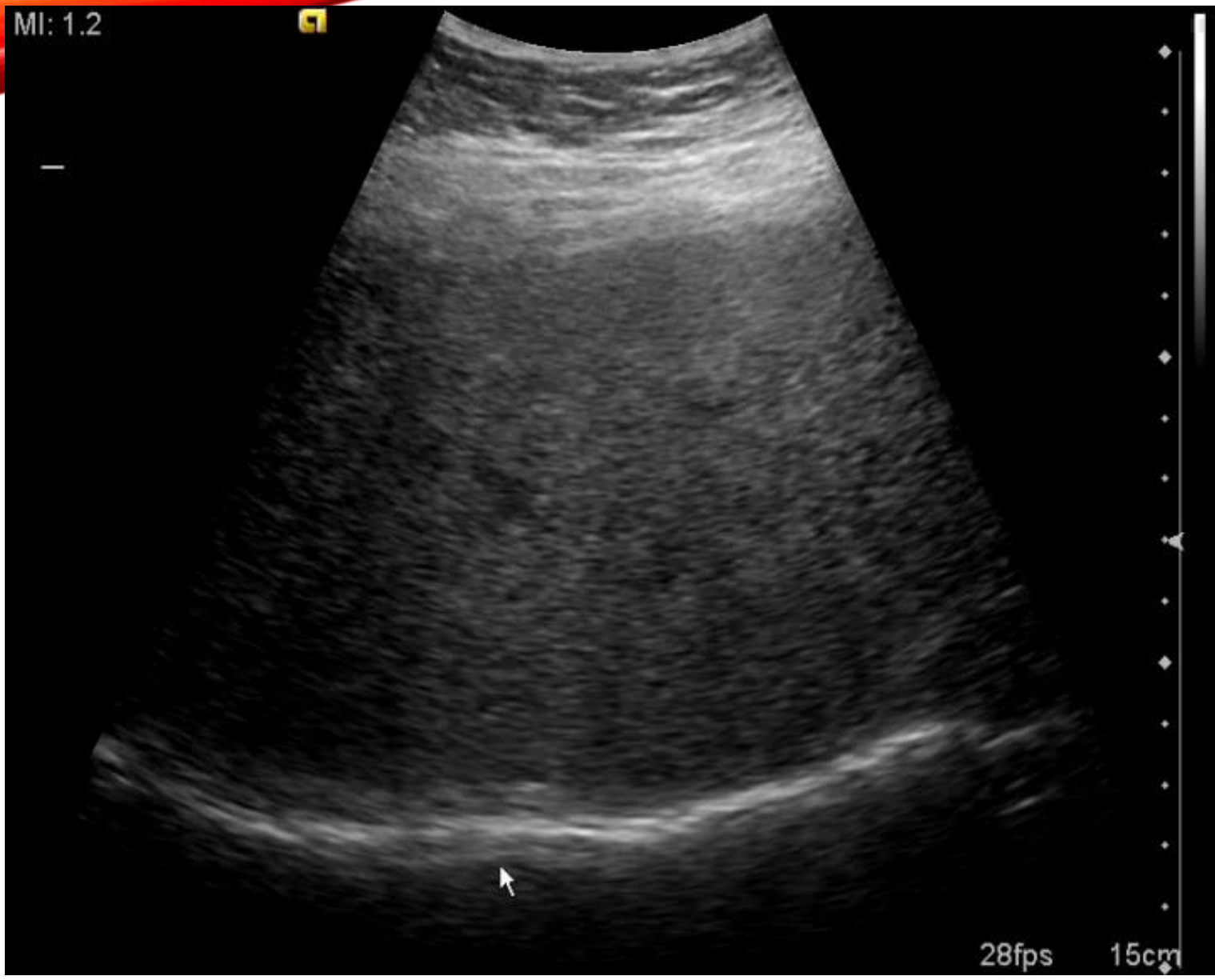
WGO Practice Guideline: Asymptomatic Gallstone Disease

Alina Popescu, Suzane Elhakim, Antonio C Matteoni - GALLBLADDER AND BILE DUCT SYSTEM – SONOPATHOLOGY, in WFUMB Course Book

Most important risk factors are

- gallbladder calculi (particularly ≥ 30 mm and > 20 years),
- a body mass index > 30 kg/m²,
- gallbladder polyps (especially ≥ 10 mm, solitary, broad based and associated with calculi),
- primary sclerosing cholangitis (PSC).

MI: 1.2



28fps

15cm



In patients with equivocal or suspicious results of US, contrast enhanced CT and (diffusion-weighted) MRI are recommended for evaluation and staging

30/07/19 08:59AM ADM 427/2019 T VB, 300719-111559AM

Se: 1
Lossy compression (JPEG)

LOGIQ
E9



C1-6 Abdomen MI 1.4 27/2019 T VB
300719-111559AM
Gastroenterology Department
20190730.111610

WL: 128 WW: 256 [D]

30/07/19 09:10AM ADM 427/2019 T VB, 300719-111559AM

Se: 1
Lossy compression (JPEG)



T1: 0:01

WL: 128 WW: 256 [D]

C1-6 Abdomen MI 0.12 27/2019 T VB
300719-111559AM
Gastroenterology Department
20190730.111610

LOGIQ
E9



7/30/2019 11:16:10 AM

BILIARY OBSTRUCTION

- Ultrasound should be the first diagnostic imaging modality chosen for detecting biliary obstruction, due to its high accuracy
 - in detecting the presence of the obstruction
 - for establishing the level and etiology of the obstruction.
- In a jaundiced patient, ultrasound is able in almost all cases to differentiate obstructive from hepatic parenchymal causes
- The ultrasound diagnosis of obstructive jaundice is based on the visualization of the dilated bile ducts, with a **sensitivity of 87% and specificity 99%** (1) [in some studies sensitivity 91% (2)].
- MRCP, EUS, ERCP (therapeutic).

1. Cooperberg PL et al – Radiology 1980

2. Liu TH et al – Ann Surg 2001

3. Alina Popescu, Suzane Elhakim, Antonio C Matteoni - GALLBLADDER AND BILE DUCT SYSTEM – SONOPATHOLOGY, in WFUMB Course Book

ECO ICTER OBSTR1

11:34:05 AM 8/13/2012

12 08 13-11-31-30-DST-1 3.12.2 110

ME 1.2



SIEMENS

4C1 / Abdomen
General
2D 100%
Tf1 7H4.00 MHz
0 dB / DR 70
ASC 3 / DTCE M
Map D / ST 2

24fps 13cm



21/09/2011 11:00AM ADM ECO, 210920-112211AM

Se: 1

Lossy compression (JPEG)

325/2020 CEUS OBSTR 2B META HEP

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Gastroenterology Department

20200921.112217

LOGIQ
E9



5
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15

WL: 128 WW: 256 [D]

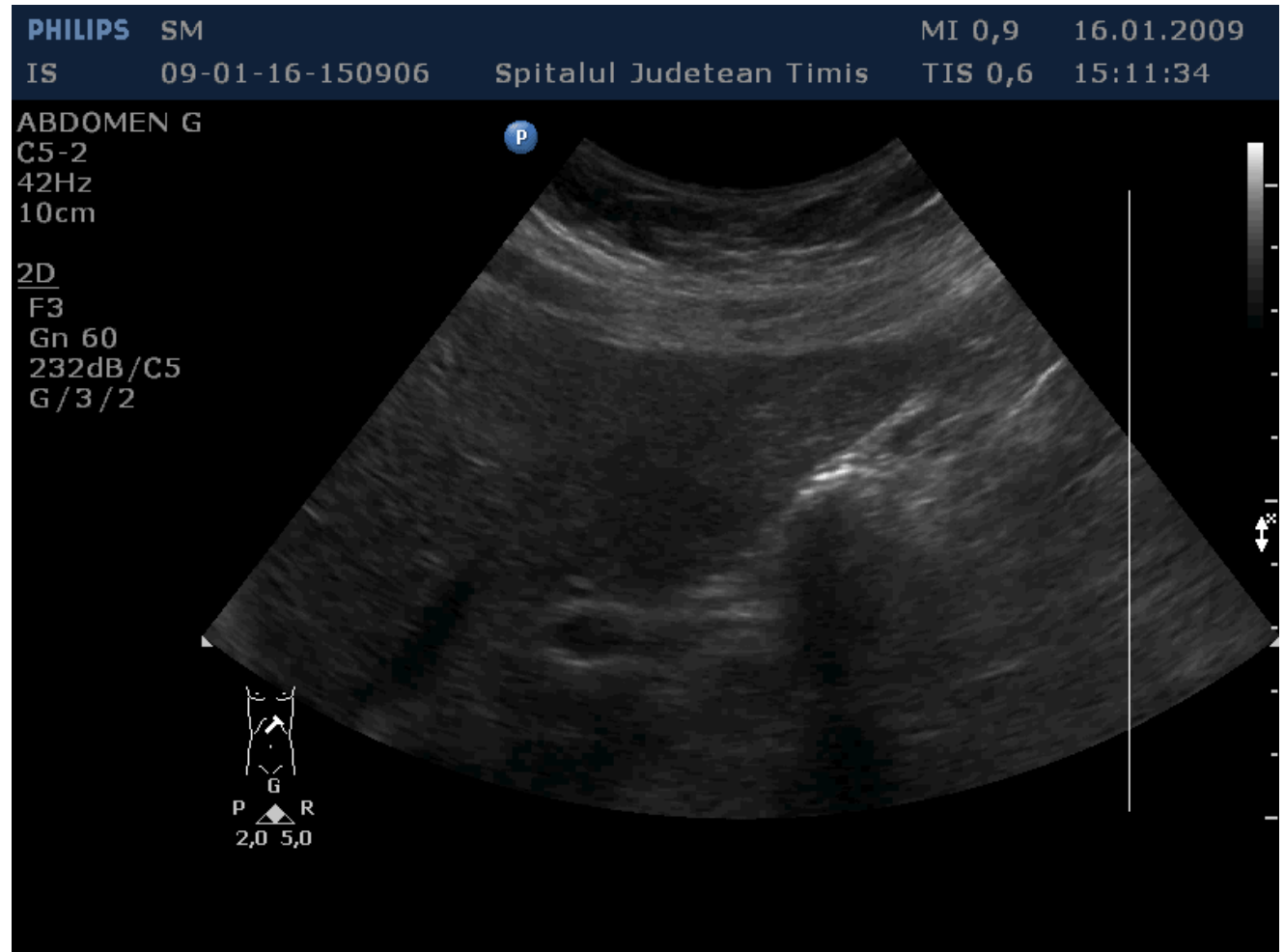
21.09.2020 11:22:17

- The localization of the **level** of the obstruction is possible in **90%** of the cases and the **evaluation** of its character in **70%** of the cases (1).



CHOLEDOCHOLITHIASIS

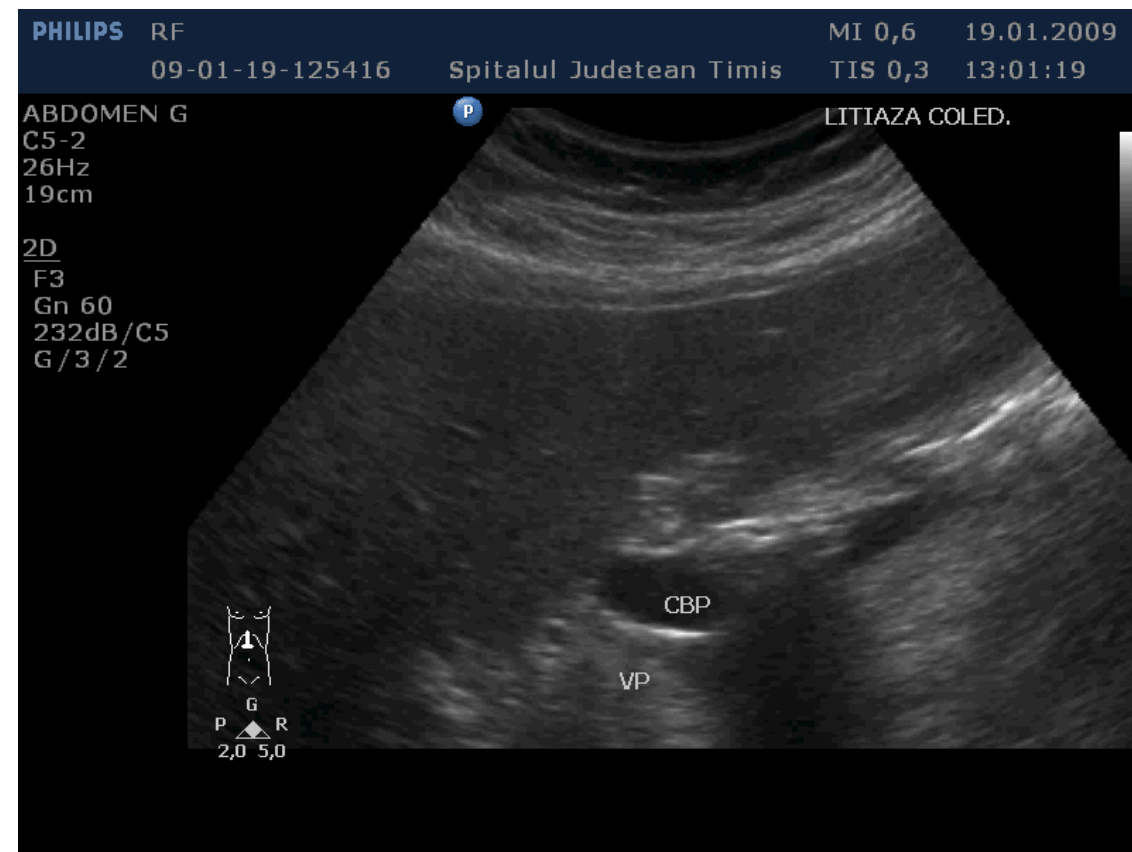
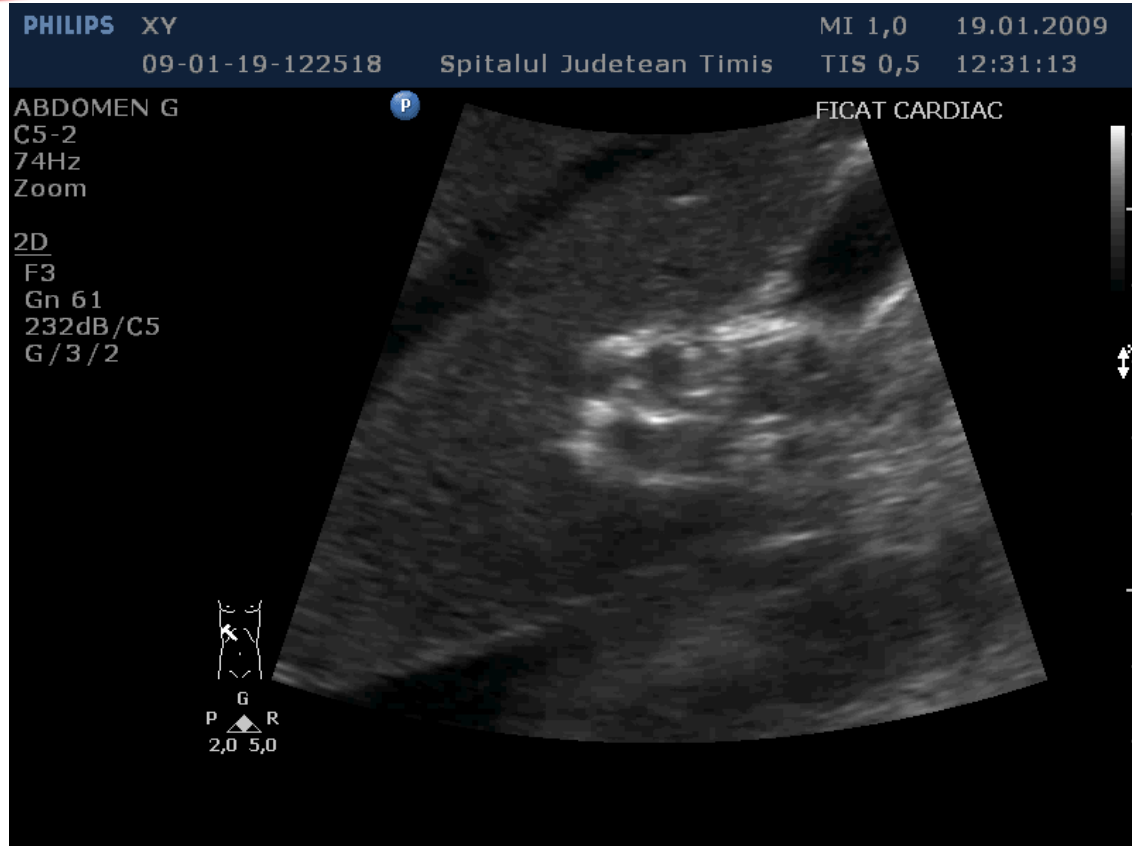
- Develops in about **10-20%** of the patients with gallbladder stones(1).
- About **3-10%** of the patients undergoing cholecystectomy will have common bile duct stones (1).



CHOLEDOCHOLITHIASIS

- US has a sensitivity of 70-75% for detection of common bile duct stones (1)
- Difficulties when the stones are located in the distal, intrapancreatic part of the common bile duct (the most frequent location)
- CT is an alternative diagnostic method with a sensitivity of 80% and 100% specificity (2)
- But MRCP is superior with a sensitivity of 81-100% and 92-100% specificity (3).
- EUS - sensitivity of 88-97% and 96-100% specificity (4, 5).
- ERCP - therapy

1. Hanbidge AE et al – Radiology 2004
2. Jimenez CI et al – Eur Radiol 2001
3. Hallal AH – J Am Coll Surg 2005
4. Freitas ML – World J Gastroenterol 2006
5. Nuernberg D – Med Klin 2007



ECO LIT COLED

11:12:18 AM 4/10/2012

ECO

ME: 1.2



SIEMENS

4C1 / Abdomen

General

2D 100%

THI 7 / H4.00 MHz

-4 dB / DR 70

ASC 3 / DTCE M

Map D / ST 2

200px

1.2cm



16/09/24 17:00:54 ADM FLOREAN ANGELICA, DR. POPESCU ALINA 160924-160953 Abdomen MI 1.3 TIs 0.6



HILAR CHOLANGIOCELLULAR CARCINOMA (KLATSKIN TUMOR)

- Klatskin tumor is the most frequent cause of high-level biliary obstruction.
- The ultrasound examination will commonly reveal dilated bile ducts proximal to a stricture and may not reveal the underlying tumor.
- The main biliary duct is usually also not visible due to its invasion by the tumor or because it is not dilated.
- Contrast enhanced ultrasound can sometimes improve the delineation of the tumor.
- Hilar location of cholangiocellular carcinoma is the most common type.

412/2011 CEUS HCC?

11:06:30 AM 7/6/2011

412/2011 CEUS HCC?

MI: 1.2



SIEMENS

4C1 / Abdomen

General

2D 100%

THI / H4.00 MHz

6 dB / DR 70

ASC 3 / DTCE M

Map D / ST 2

23fps

14cm



TAKE HOME MESSAGES!

- Gallbladder and biliary system diseases are frequent pathologies in clinical practice
- Ultrasound is the preferred first line imaging technique in symptomatic but also asymptomatic cases.
- It is the gold standard method for gallbladder stones diagnosis and their complications.
- Ultrasound is the first line imaging modality chosen for detecting biliary obstruction and the level of the obstruction



Ultrasound

The Ultrasound hands-on programme is run in cooperation with [EFSUMB](#) and [BICUS](#).

Ultrasonography for gastroenterologists!

The Ultrasound Hands-on Programme promotes the role of a major diagnostic and interventional tool in gastroenterology: Clinical ultrasonography in the hands of the gastroenterologist.

It offers basic and postgraduate courses on ultrasonography, individual hands-on training and special lectures in abdominal ultrasonography at no extra costs. The programme is designed for both young and senior gastroenterologists with or without experience in ultrasonography.

No online pre-registration is required.

Limited spots are available, and participation is based on a first-come, first-served basis on-site and does not involve any extra costs in addition to your registration for UEG Week and/or PGT.

[Programme](#)



UEG Week 2024: In Vienna & Online

October 12 – 15, 2024

