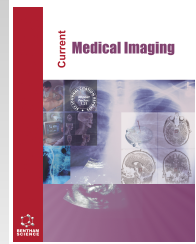




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CASE REPORT

Discrepancies between Screening Sonography and Ultrasound in Emergency Department – A Case Report

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Abstract:

Introduction:

This case report presents a discrepancy in sonographic findings between a screening sonography performed by a Sonographer in the Basic Emergency Service (BES) and a subsequent ultrasound performed by a Radiologist physician in a Referral Hospital (RH). The aim of this report is to discuss the possible reasons for the discrepancy and its implications for patient care.

Case Presentation:

A patient with a history of epigastric pain and vomiting underwent screening sonography in a BES, which suggested Intrahepatic Biliary Dilatation Duct (IHBD) and main pancreatic duct dilatation. The patient was subsequently referred to the RH for further evaluation. However, the Radiologist in the RH did not confirm any of the initial suspicions from BES through a normal ultrasound procedure. The discrepancy raises questions regarding the quality of the screening ultrasound, misinterpretation of the BES images, or the potential for ambiguity in the point of care ultrasound (POCUS) exam.

Conclusion:

The differences in sonographic findings between BES and RH, in this case, suggest that the improvement of the patient's clinical condition and therapeutic interventions may have contributed to the discrepancy. Further investigation and standardization of POCUS training and interpretation may improve diagnostic accuracy and patient outcomes.

Keywords: Ultrasound, Screening, Bile ducts, Sonographers, Radiologists, Abdomen.

Article History

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1. INTRODUCTION

Point of care ultrasound (POCUS) evolved in recent years into a multidisciplinary technique that can be used in various contexts, but concerns are raised that can be perception errors due to the different academic preparation of the different professionals performing this imaging technique [1 - 4]. This case report presents a discrepancy in sonographic findings between a screening sonography performed by a Radiographer/Sonographer in a Basic Emergency Service (BES) and a subsequent ultrasound performed by a Radiologist Physician in a Referral Hospital (RH). The aim of this case

report is to discuss the possible reasons for the discrepancy and its implications for patient care.

2. CASE DESCRIPTION

A 47-year-old female was admitted to a Basic Emergency Service (BES) in Portugal with a chief complaint of epigastric pain and vomiting persisting for eight days. According to the Manchester Triage System, the patient was classified as “green,” suggesting a less urgent case. Upon examination by the referring physician at the BES, the patient was found to be in good general condition, with normal breathing and no abnormalities detected during cardiac and pulmonary auscultation. However, the patient exhibited abdominal tenderness and epigastric pain upon palpation, with no signs of

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peritoneal involvement. The patient's skin and mucous membranes were flushed and hydrated.

As part of the diagnostic evaluation, a simple blood count and screening ultrasound (SU) were performed at BES. The patient was also prescribed antiemetics and analgesics/antipyretics. The results of the blood count showed a white blood cell count of $5.6 \times 10^9/L$, granulocyte count of $78.3 \times 10^9/L$, red blood cell count of $3.95 \times 10^{12}/L$, hemoglobin of 12.4 g/L, hematocrit of 36.6 L/L, and platelet count of $230 \times 10^9/L$. The SU resumed in Fig. (1) indicated

“...dilation of the intrahepatic and extrahepatic bile ducts, non-uniform gallbladder parietal thickness (greater than 3 mm), and increased diameter of the Wirsung duct. No free fluid was observed in peritoneal recesses, and the topography and echographic texture of the remaining organs appeared normal...”. Based on the clinical presentation and the ultrasound findings, the patient was referred to the Referral Hospital (RH) for further evaluation and management.

Fig. (1) summarizes the main ultrasonographic images obtained at BES, performed by a Sonographer.

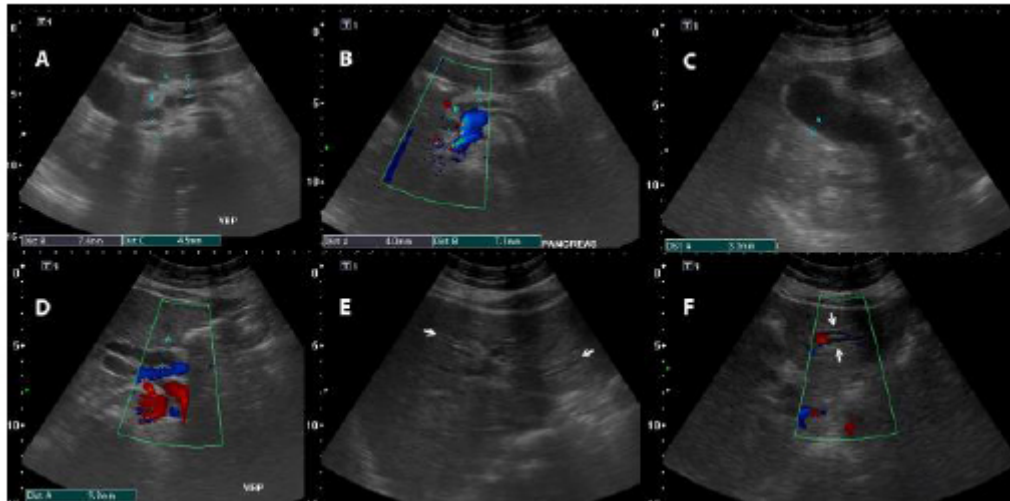


Fig. (1). Image (A)- Pancreas measures; b-extrahepatic CBD (7.4mm); c-Wirsung (4.5mm). Image (B)- Head of Pancreas with doppler signal over splenic vein(blue) a (Wirsung 4mm), b extrahepatic CBD (7.5mm). Image (C)- Gallbladder with asymmetric thickness wall. Image D- Porta-hepatis measure of intrahepatic CBD with 9.8mm, flow in the portal vein(blue). Image (E)- liver with double rail track sign in the right and left lobe. Image (F)- left liver lobe presenting double track sign with an absence of color flow inside patent biliary ducts. White arrows in Figures E and F point parallel ducts with an absence of doppler signal - the hallmark for biliary duct dilatation.

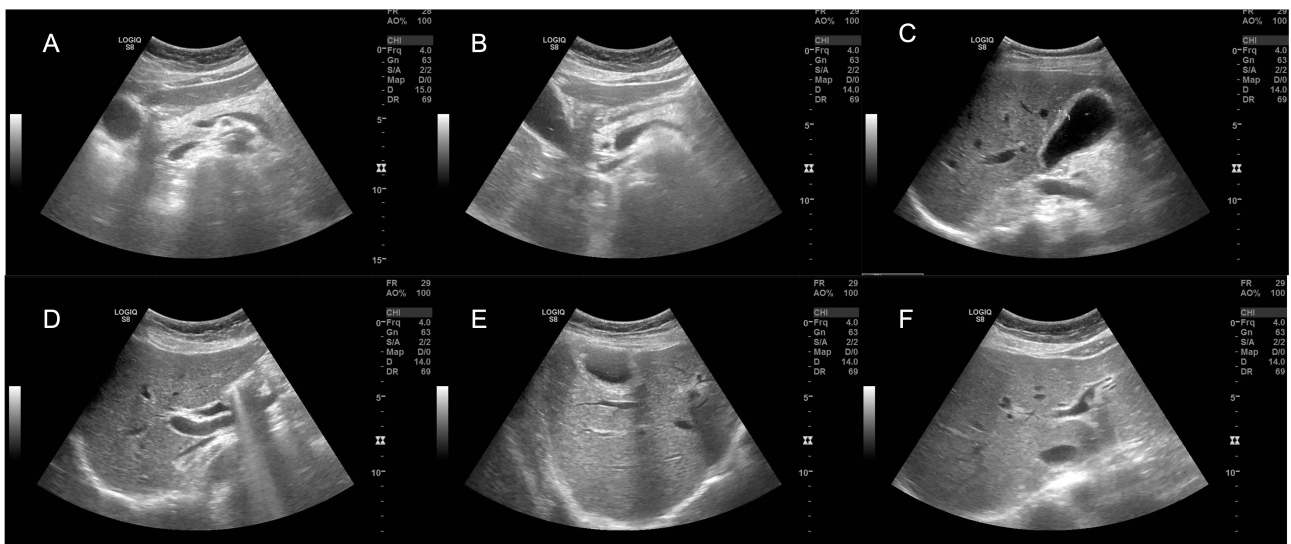


Fig. (2). (A) –Normal pancreas image. (B)-Pancreatic head with normal appearance of intrahepatic CBD. (C)- Gallbladder with 5.47 mm wall thickness (D)-Porta-hepatis with normal diameter regarding the portal triad. (E)- Right liver lobe and axial view of gallbladder presenting diffuse wall thickening. (F)-Left liver lobe presenting left portal branch with vestigial patency of biliary tract.

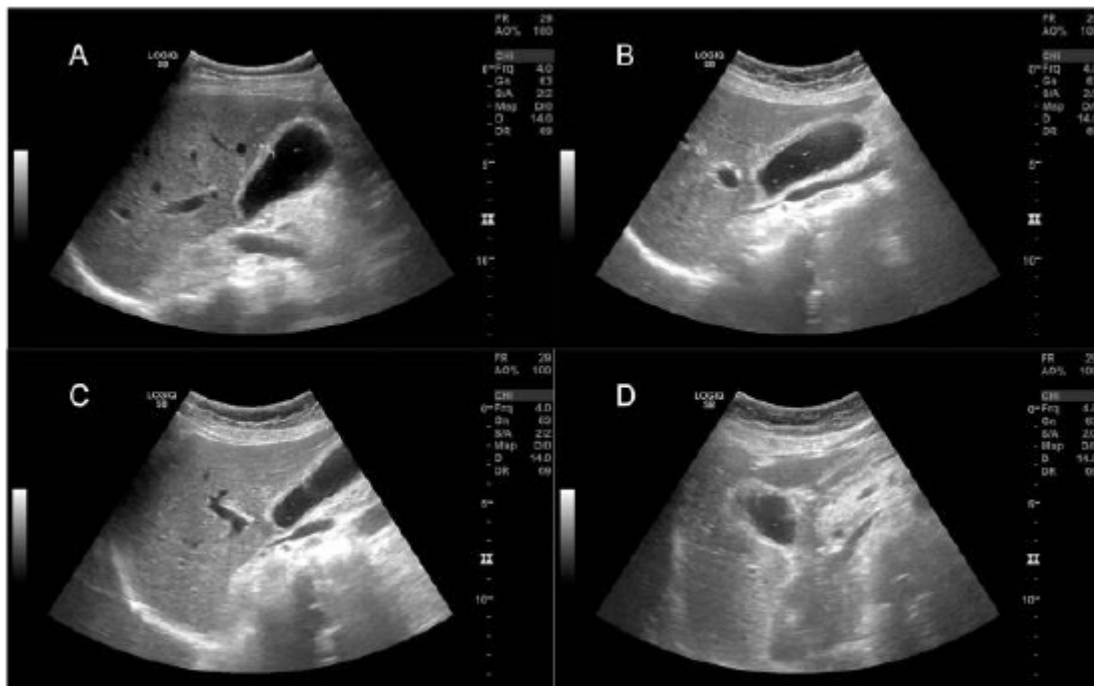


Fig. (3). (A)- Gallbladder thickness wall (5.47mm) (B)- Endoluminal hyperechogenic foci in suspension. (C)- Reverberation artifact (comet tail) due to calcium concretion trapped within the Rokitansky-Aschoff sinuses (RAS). (D)- Reverberation artifacts due to calcium concretion trapped in RAS and asymmetrical thickening of the gallbladder wall.

Upon arrival at the Referral Hospital (RH), the patient was promptly assessed by the medical personnel in the general emergency department. The initial treatment plan included the administration of a selective proton pump inhibitor, nonsteroidal anti-inflammatory drugs, and intravenous sodium chloride (1000 mL). Complete blood analysis was conducted, which revealed elevated levels of lipase (>1200 U/L), amylase (958 U/L), C-reactive protein (4 UL), total bilirubin (2.7 UL), transaminases (AST, 950 UI/L, and ALT, 844 UI/L), and alkaline phosphatase (165 UL). Notably, the patient did not exhibit leukocytosis throughout the course of the illness.

The patient also underwent an orthodox ultrasound in the Imaging department of the RH, approximately 13 hours after the initial screening ultrasound in the BES. The ultrasound results indicated that “the gallbladder was normally distended with a slight diffuse parietal thickening of a stratified appearance. There were signs of adenomyomatosis of the gallbladder, but no dilatation was observed in the bile ducts or the main pancreatic duct.” Fig. (2) shows the main ultrasonographic images obtained in the pancreas and liver, and Fig. (3) highlights the gallbladder ultrasonographic characteristics that allowed the correlation with possible adenomyomatosis. Both images (Figs. 2 and 3) were obtained in RH by a Radiologist Physician.

The patient exhibited a favorable response to the pharmacological treatment and demonstrated a substantial improvement in their clinical condition. Consequently, the patient was discharged from the hospital and referred to an outpatient clinic near her residence for further evaluation. Additional examinations were conducted, and a prophylactic cholecystectomy was subsequently performed.

3. DISCUSSION

After analyzing and interpreting the ultrasound images obtained at the Basic Emergency Service (BES) and Referral Hospital (RH), it was clear that the Sonographer at BES had not misinterpreted the images, according to the criteria described in the existing literature. The images revealed mild dilation of both the intrahepatic and extrahepatic portions of the Common Bile Duct (CBD) [5, 6] and the presence of intrahepatic biliary dilatation (IHBD) to a lesser extent. The sensitivity of sonography in detecting CBD dilation is reported to be 95% [7]. The clinical integration and image interpretation by the Radiologist Physician at RH were also found to be accurate, although he did not notice any CBD or IHBD dilatation, leading to the diagnosis of adenomyomatosis of the gallbladder (Fig. 3) [8]. The patient's laboratory results in the RH indicated elevated levels of amylase and lipase, suggesting pancreatitis, which is consistent with the absence of any apparent cause for the obstructions in the intra or extrahepatic biliary tract. However, it cannot be ruled out that a temporary obstructive condition or distal CBD stricture initially went undetected but later became dislodged, leading to a reduction in the dilation [9]. This may have contributed to the transitory cholestatic pattern, which resolved spontaneously.

The observed discrepancy in the results of the ultrasound exams can be attributed to a number of factors, including the 13-hour time interval between the two ultrasound exams and the prompt initiation of medication soon after the initial exam at the BES, as well as its reinforcement upon arrival at the referral hospital. It is likely that this medication led to a decrease in the inflammatory response and normalization of the

observed structures. Importantly, this case highlights the prompt resolution of unusual ultrasound findings between the initial exam at the BES and the subsequent exam by the Radiologist physician at the RH. Intrahepatic biliary dilatation (IHBD) with its multiple etiologies is a commonly observed pathological manifestation [10], and this case serves as an example of the potential impact of medication and the importance of the follow-up imaging time on the resolution of such pathological manifestations.

CONCLUSION

The primary objective of this clinical case was not to diagnose pancreatitis but to highlight the dynamic nature of ultrasound findings and their potential to change significantly over a short period, thus influencing clinical decision-making. Although the BES images corresponded with the patient's laboratory results, the disparity between the Radiologist's conclusions at the RH and those of the BES was not attributable to perceptual errors but rather to changes in the patient's health status over time. The role of the Radiologist in conducting ultrasound exams is pivotal in ensuring the comprehensiveness of the screening ultrasound performed by the Sonographer. By integrating the patient's clinical condition with the sonographic results in response to treatment, a definitive diagnosis can be established with greater precision. Further research is warranted to strengthen the insights gleaned from this case report as screening ultrasound is a powerful ally in guiding patients in remote healthcare units such as the BES.

LIST OF ABBREVIATIONS

POCUS	=	Point of care ultrasound
RH	=	Referral Hospital
BES	=	Basic Emergency Service
SU	=	Screening ultrasound
IHBD	=	Intrahepatic biliary dilatation

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Informed consent was obtained from the patient.

STANDARDS OF REPORTING

CARE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data and supportive information are available within the article.

FUNDING

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

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