

Point-of-care ultrasound diagnostic: a case report of a hepatic abscess

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Abstract

Point-of-care ultrasound is a diagnostic tool that has gained relevance in the in-hospital and out-of-hospital setting, as it is a non-invasive study that allows clinical findings to be directly correlated with the signs and symptoms presented by the patient. The present work aims to demonstrate the clinical utility applied to the case of a patient with persistent bacteremia, in which the focus of infection was identified by ultrasonographic evaluation, to subsequently direct the therapy. We present a clinical case in which, through this tool, the diagnosis of a clinically unsuspected hepatic abscess was established; its clinical use as an extension of the specialized medical evaluation is demonstrated by obtaining a favorable experience of its correct use in a complex case.

Keywords: Liver abscess, Diagnostic imaging, Ultrasonography, Antibacterial agents, Internal Medicine.

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Point-of-care ultrasound or ultrasonography is defined as ultrasound carried to the patient and performed by the provider in real-time.¹ This has become more relevant in recent years and allows, with appropriate training, to establish elusive diagnoses on physical examination.²⁻⁵ The present report demonstrates the clinical utility of this evaluation modality to more expeditiously establish unsuspected diagnoses despite a thorough physical examination and to appropriately direct therapeutic resources. We present a case report of point-of-care ultrasonographic evaluation by internal medicine experts, illustrative of this clinical utility in a highly complex in-hospital setting.

Clinical case:

A 68-year-old female patient with a personal pathological history of type 2 diabetes mellitus, hypertension, ischemic heart disease, and multiple myeloma IGG Kappa ISS 3, with no history of alcoholism, smoking, or drug addiction, consulted the emergency department for dysuria and pollakiuria associated with asthenia, myalgia, and febrile sensation. Physical examination showed a fever of 38 degrees and tachycardia, with no other important findings.

Initial studies showed a general urine examination with data of urinary tract infection, in addition to a hemogram showing leukocytosis with left shift associated with significant elevation of acute phase reactants (Table 1). Samples were taken for urine culture and blood cultures documented a multi-sensitive BLEE-negative *Escherichia coli* bacteremia, so cefotaxime was prescribed for 10 days. During her evolution, the

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patient deteriorated due to an acutely decompensated cardiopathy, which responded favorably to furosemide and oxygen therapy. Despite optimal antibiotic coverage, on the third day of treatment, the patient did not show clinical improvement, nor in the laboratory results and acute phase reactants, so it was decided to reconsider the initial diagnosis.

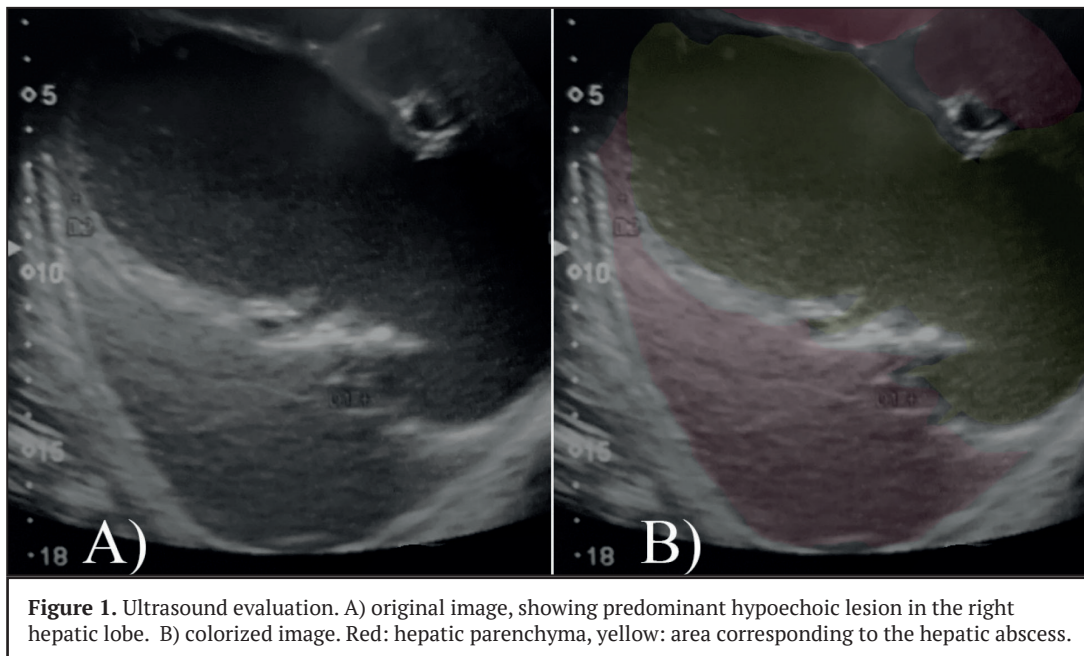
Table 1. Initial laboratory test results	
Hemogram	Electrolytes
Hb 12.2 g/L	Sodium 122 mmol/L
Hto 37.3 %.	Potassium 4.39 mmol/L
VCM 84.4	Chlorine 86.8 mmol/L
Leukocytes 15840 u/L	
Neutrophils 87%	
Lymphocytes 4.4%.	
Monocytes 7.4%	
Eosinophils 0.4%	
Basophils 0.1%.	
Renal function	Arterial gases
Creatinine 1 mg/dL	pH 7.49
Urea Nitrogen 20 mg/dL	P _a O ₂ 62 mmHg
	P _a CO ₂ 27 mm Hg
	HCO ₃ ⁻ 20.6 mmol/L
	Lactate 1 mmol/L
General Urine Test	Acute phase reactants
Leukocyte esterase positive	C Reactive Protein 350 mg/L
Nitrites ++	Procalcitonin 10 ng/mL
Negative proteins	
Leukocytes > 30 field	
Erythrocytes >10 field	
Bacteria many	
Scanty epithelial cells	

At that time, it was decided to perform a point-of-care ultrasound evaluation, aimed at assessing both kidneys to rule out a possible abscess. Using a convex transducer (3-5 Mhz) of a Sparq ultrasound machine® (Phillips, USA) the right hypochondrium was evaluated, and -incidentally- a well-defined hypoechoic lesion was documented in the right hepatic lobe that appeared to correspond to an abscess of significant volume (Figure 1).

Because of this finding, an abdominal ultrasound performed in the radiology department of the hospital was requested, which confirmed the presence of a hepatic abscess with an estimated volume of 1227cc. It was decided to percutaneously drain the abscess, and the cultures of the fluid obtained were positive for *E. coli*. After drainage, there was a significant improvement in the patient's clinical condition and antibiotic coverage was adjusted according to the antibiotic sensitivity test. The patient completed 30 days of treatment with oral ciprofloxacin at home.

Discussion

We present a case of diagnosis of liver abscess by point-of-care ultrasonographic evaluation, illustrative of the clinical utility of this tool in internal medicine in a highly complex in-hospital setting. Thanks to this evaluation at the bedside of



a patient with a torpid clinical course, the etiology of infection was rapidly identified, and a clinically unsuspected liver abscess was diagnosed. Other cases of point-of-care ultrasound diagnosis of this condition have been previously reported.⁶⁻⁸

The result of this evaluation made it possible to direct treatment and ensure a favorable evolution, despite the severity of the condition and in the absence of specific clinical signs and symptoms. It should be noted that the previously described case had an unusual presentation since its diagnosis was incidental, and the manifestations presented at the beginning were erroneously attributed to a complicated urinary tract infection.

The incidence of liver abscesses is about 2-3 per 100,000 inhabitants. Risk factors for this pathology include adulthood, diabetes mellitus, malnutrition, immunosuppression, male sex, or Asian descent. The patient presented several of these risk factors. Although liver abscess may present with fever, abdominal pain, and chills, along with laboratory abnormalities such as elevated transaminases, C-reactive protein, and leukocytosis, its manifestations are nonspecific, and diagnosis requires medical imaging.⁹ In our case, the ultrasonographic findings were congruent with those previously described in the suppurative phase of a liver abscess in which the ultrasonographic image is hypoechoic or anechoic with well-defined and encapsulated contours.⁹

Wen Jie Chan and collaborators demonstrated that clinical history and physical examination are not sufficient to diagnose this pathology; however, they were able to demonstrate a sensitivity of 85% when the study was performed in the emergency department. Although abdominal computed tomography obtained better diagnostic results, ultrasound shows advantages as it is non-invasive, less expensive, and easy to access.¹⁰

Point-of-care ultrasonography is an increasingly necessary tool in the management of sepsis because it allows antibiotic therapy to be started promptly, according to recent guidelines (less than 3 hours), to reduce mortality.^{3,11} This evaluation makes it possible to visualize foci of infection that have not been clinically suspected.¹² Cortellaro et al. evaluated the use of point-of-care ultrasonography (POCUS) to diagnose the septic focus in 178 of 200 patients (89%). The diagnosis identified by POCUS

had a sensitivity of 73% (95% CI 66-79%) and a specificity of 95% (95% CI 77-99%)³

Conclusion

We present the case of a patient with a diagnosis of a clinically unsuspected hepatic abscess, which was documented thanks to the extension of the physical examination through ultrasonographic imaging that allowed the identification of a hepatic collection. Our approach allowed modifying the therapeutic strategy and readjusting the antibiotic therapy promptly, favoring an adequate in-hospital evolution.

A greater extension of point-of-care ultrasonography in internal medicine wards could likely contribute to more accurate diagnoses. Therefore, we believe that any patient with an unidentified focus of sepsis should undergo a "bedside" ultrasonographic approach to contribute to the definition of its etiology.

References

1. Moore CL, Copel JA. Point-of-Care Ultrasonography. *New England Journal of Medicine*. 2011;364(8):749-757. doi:10.1056/NEJMra0909487
2. Abu-Zidan FM, Cevik AA. Diagnostic point-of-care ultrasound (POCUS) for gastrointestinal pathology: State of the art from basics to advanced. *World Journal of Emergency Surgery*. 2018;13(1):1-14. doi:10.1186/s13017-018-0209-y
3. Cortellaro F, Ferrari L, Molteni F, Aseni P, Velati M, Guarnieri L, et.al. Accuracy of point of care ultrasound to identify the source of infection in septic patients: a prospective study. *Internal and Emergency Medicine*. 2017;56(2):114-122. doi:10.1007/s11739-016-1470-2
4. Ma IWY, Arishenkoff S, Wiseman J, Desy J, Ailon J, Martin L, et al. Internal medicine point-of-care ultrasound curriculum: consensus recommendations from the Canadian Internal Medicine Ultrasound (CIMUS) Group. *J Gen Intern Med*. 2017;32(9):1052-1057. doi:10.1007/s11606-017-4071-5
5. Smallwood N, Dachsel M. Point-of-care ultrasound (POCUS): unnecessary gadgetry or evidence-based medicine? *Clin Med (Lond)*. 2018;18(3):219-224. doi:10.7861/clinmedicine.18-3-219

6. Iradukunda D, Lee J, Kim DJ. Unexpected source of fever: Liver abscess on point-of-care ultrasound. *Canadian Journal of Emergency Medicine*. 2018;20(5):802-803. doi:[10.1017/cem.2018.408](https://doi.org/10.1017/cem.2018.408)
7. Bitar ZI, Zaalouk TM, Maadarani OS, Elshabasy RD. It is always early with point-of-care ultrasound. *Case Rep Crit Care*. 2020;2020:9431496. doi:[10.1155/2020/9431496](https://doi.org/10.1155/2020/9431496)
8. Umgelter A, Wagner K, Gaa J, Stock K, Huber W, Reindl W. Pneumobilia caused by a clostridial liver abscess: rapid diagnosis by bedside sonography in the intensive care unit. *J Ultrasound Med*. 2007;26(9):1267-1269. doi:[10.7863/jum.2007.26.9.1267](https://doi.org/10.7863/jum.2007.26.9.1267)
9. Lardièrre-deguelte S, Ragot E, Amroun K, Piardi T, Dokmak S, Bruno O, et al. Hepatic abscess: diagnosis and management. *Journal of Visceral Surgery*. 2015;152(4):231-243. doi:[10.1016/j.jvisc Surg.2015.01.013](https://doi.org/10.1016/j.jvisc Surg.2015.01.013)
10. Chia DWJ, Kuan W Sen, Ho WH, Sim TB, Chua MT. Early predictors for the diagnosis of liver abscess in the emergency department. *Internal and Emergency Medicine*. 2019;(0123456789). doi:[10.1007/s11739-019-02061-z](https://doi.org/10.1007/s11739-019-02061-z)
11. Rhodes A, Evans LE, Alhazzani W, Levy M, Antonelli M, Ferrer R, et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016. *Crit Care Med*. 2017;45(3):486-552. doi:[10.1097/CCM.0000000000002255](https://doi.org/10.1097/CCM.0000000000002255)
12. Pontet J, Yic C, Díaz-Gómez JL, Rodriguez P, Sviridenko I, Mendez D, et al. Impact of an ultrasound-driven diagnostic protocol at early intensive-care stay: a randomized-controlled trial. *The Ultrasound Journal*. 2019;11(1). doi:[10.1186/s13089-019-0139-2](https://doi.org/10.1186/s13089-019-0139-2)