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Deteção precoce de doença metastática através de ecografia de triagem

Early detection of metastatic disease through screening ultrasound

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Resumo

A ecografia de triagem é crucial nos serviços de emergência, fornecendo orientação precisa para pacientes em diversas situações clínicas. A ecografia é móvel, produz imagens em tempo real e é isenta de radiação. É uma ferramenta apta para ambientes de meios tecnológicos limitados e ausência de médicos especialistas. O uso da ecografia de triagem entre profissionais de saúde, independentemente do seu nível de especialização em ultrassonografia, nasce da necessidade de responder a dúvidas clínicas concretas na prática quotidiana.

Este artigo enfatiza o papel crucial da ecografia de triagem num caso de abdómen agudo. A sua integração com a radiologia convencional melhora significativamente a orientação clínica, facilitando decisões de tratamento e encaminhamentos à especialidade quando necessário.

Neste caso específico, foram analisadas imagens de ecografia de triagem, radiografia abdominal e exame tomografia computorizada juntamente com relatórios clínicos para avaliar a orientação clínica dada num serviço de emergência básico periférico. O paciente em causa apresentava sintomas abdominais agudos, revelando suspeita de metástases hepáticas, líquido livre intraperitoneal e sinais de obstrução intestinal no exame de triagem ecográfica. Estes achados foram confirmados por tomografia computorizada no hospital de referência.

Abstract

Screening ultrasound is crucial in emergency care, providing precise guidance for patients in various situations. Its versatility, real-time imaging, and lack of radiation make it invaluable, especially in settings lacking diagnostic resources and specialized expertise. The widespread use of screening ultrasound among health professionals, regardless of their level of sonographic expertise, emphasizes the need for them to manage clinical uncertainties as part of their daily practice."

This article emphasizes the crucial role of screening ultrasound, especially in acute abdomen cases. Its integration alongside conventional radiology significantly improves clinical orientation, facilitating prompt treatment decisions and specialist referrals.

In a specific case, we reviewed screening ultrasound images, basic abdominal X-rays, and Computed Tomography scans alongside clinical reports to assess initial evaluations made at a peripheral emergency service. Our patient presented with acute abdominal symptoms, revealing suspected liver metastases, intraperitoneal free fluid, and signs of intestinal obstruction on ultrasound. These findings were confirmed through Computed Tomography at a referral hospital, showing ultrasound's role in prompt patient triage and transfer. Operator skill is crucial, but comprehensive training minimizes errors.

A ecografia de triagem pode revolucionar a segurança do paciente, economizando tempo ao detetar precocemente patologias, prevenindo sobrelotação nos departamentos de emergência de hospitais centrais de referência.

A deteção ultrassonográfica de imagens suspeitas de metástases é comum em ambientes hospitalares onde diversos meios diagnósticos avançados e especialidades médicas estão presentes. A utilização do ultrassom como ferramenta de triagem e orientação clínica de primeira linha em ambientes pré-hospitalares está em consonância com as estratégias médicas contemporâneas, que visam aprimorar a deteção e a intervenção precoces.

Palavras-chave - Metástase, Neoplasia, Emergência, Triagem, Ultrassom.

Screening sonography may revolutionize patient safety saving time by detecting pathologies early, preventing overcrowding in emergency departments of reference hospitals.

The ultrasonographic detection of images suspected to be metastases is a common occurrence in hospital settings where various advanced diagnostic means, and medical specialties are present. However, the detection of suspicious images of metastases in a pre-hospital context is innovative and provides clinicians with a much better understanding of the patient's clinical landscape.

Keywords - Metastasis, Neoplasm, Emergency, Screening, Ultrasound.

Introduction:

While screening ultrasound serves a valuable purpose and is highly recommended in the analysis of acute abdomen because can confirm or exclude pathology and answers direct questions such as whether (1,2) the exam is normal, abnormal or inconclusive and what is the relationship between what you see and the patient's clinical status at the time of the exam. However, it's crucial to note that characterizing and managing liver lesions demands a high level of expertise typically found in the medical specialty of Radiology (3). Correct characterization of liver lesions requires multidisciplinary collaboration between the Radiologist, Gastroenterologist/Hepatologist, Pathologist, hepatobiliary or transplant Surgeon, and medical Oncologist (4). Furthermore, Radiologists often supplement ultrasound findings with other imaging modalities like contrast enhanced ultrasonography (CEUS) computed tomography(CT) and Magnetic resonance imaging(MRI) which have accurate sensibility (5) diagnostic certainty. Ultimately, confirmation of suspected liver lesions may require pathological anatomy analysis.

An important consideration for non-Radiologists operators of emergency ultrasound protocols is to recognize its limitations, particularly when performed by non-specialists (6,7). It's crucial to refrain from making diagnoses beyond one's expertise and instead refer cases requiring specialized evaluation to the relevant specialty. This principle is especially pertinent given that ultrasound is utilized by various groups of professionals with differing levels of theoretical knowledge and practical training (8–10). By adhering to these guidelines, healthcare professionals can ensure accurate and appropriate management of patients while optimizing healthcare outcomes, respecting the ethical and scientific legacy of other medical specialties.

However, the detection of suspected liver lesions increase as imaging sonography modality expands, for abdominal screening purpose since liver lesions are multi etiologic and many time have insidious installation and sometimes are incidentally discovered (11).

Screening ultrasounds hasten patient referral for specialties a concomitantly shortening time to final diagnostic conclusions thus giving decision-making power to clinicians (12).

Furthermore, the use of ultrasound as a first-line screening and diagnostic tool in pre-hospital settings aligns with contemporary medical strategies aimed at improving early detection and intervention.

Case Description:

A 78-year-old woman was brought by ambulance to a Basic Emergency Service (BES) from her residence, marking her fourth visit to the BES in prior months with identical symptoms. She has been enduring persistent abdominal pain for the past month and presently presents with dark-colored vomiting, having not passed stool for four days. Upon assessment using the Manchester triage system, she was categorized as very urgent, indicated by an orange bracelet, with an abdominal pain intensity rating of 8 out of 10.

The patient displayed stable vital signs, presenting as afebrile with regular blood pressure, and an oxygen saturation level of 97% in ambient air. She was alert and oriented to person, time, and place.

Upon examination, the patient appeared pale, with hydrated skin and mucous membranes, and no signs of cyanosis or jaundice were observed. Abdominal inspection revealed distension and tenderness upon palpation in all quadrants, accompanied by decreased bowel sounds.

The patient underwent intubation with a nasogastric tube and was positioned for drainage, resulting in the expulsion of coffee-ground-colored contents. Blood samples collected by the Nurse revealed leukocytosis, with a count of 16x10^3/mm^3, exceeding the normal range of (4.0-10.0) 10^3/mm^3.

After a comprehensive anamnesis and physical examination, the emergency physician ordered an abdominal radiograph, as depicted in Figure 1. Due to the patient's discomfort preventing standing, the radiograph (XR) was conducted on the stretcher, revealing air-fluid levels and significant distension of the bowel loops.

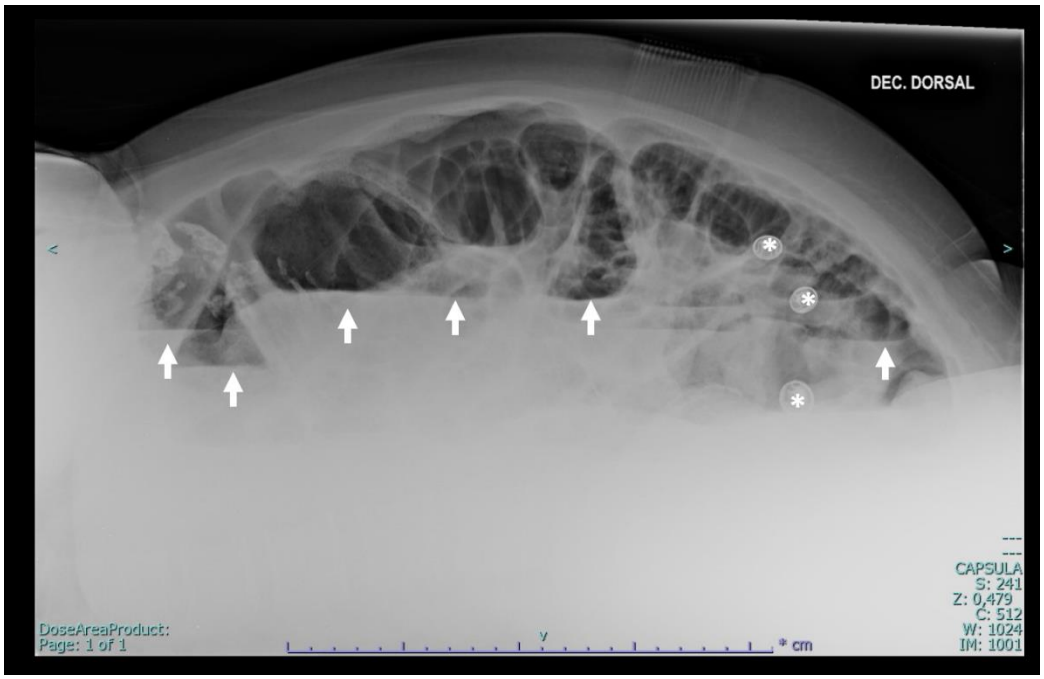

Figure 1 - Abdominal x-ray in dorsal decubitus with tangential ray technique, which shows generalized dilation of the intestinal loops (black area that corresponds to air in the bowel), with air-fluid levels (white arrows). the asterisks represent buttons belonging to the patient's clothing.

Furthermore, an abdominal and pelvic screening ultrasound, partially illustrated in Figures 2 and 3, was executed by a radiographer/sonographer.

The screening ultrasound faced challenges due to the patient's severe pain and the abundance of air in all abdominal quadrants. Nevertheless, it successfully revealed free fluid in the upper and inferior recesses, paracolic gutters, and consistent presence of free fluid between intestinal loops.

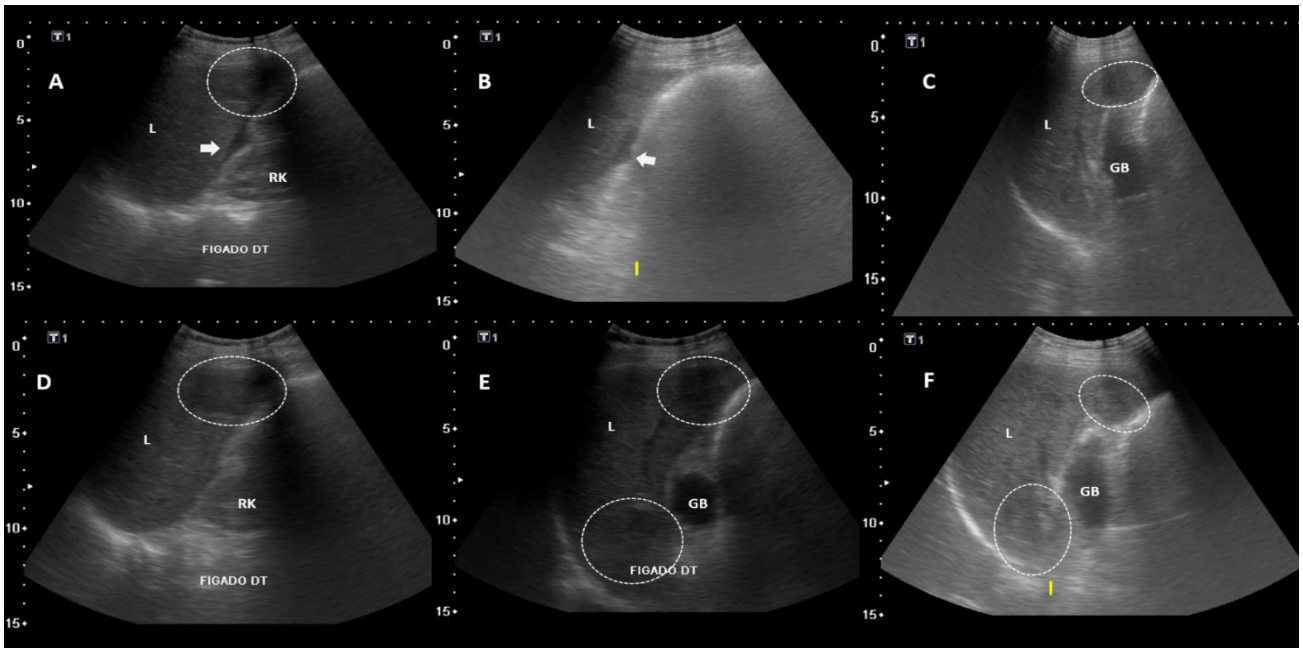

Figure 2 - Represents 6 images belonging to the screening ultrasound.

Image A we can see a coronal image orientation of the liver(L), the white arrow points to a thin anechoic layer of free liquid between the liver and the right kidney identified by (RK). The dotted ellipse evidence a hypoechoic nodular image

Image B represents a more internal coronal section of the liver (L) where it is possible to continue to see a free liquid noted by the white arrow.

Image C demonstrates the liver (L), where is present another hypoechoic nodular image marked by a dotted ellipse. (GB) represents a recurrent cut of the gallbladder.

Image D shows a coronal image orientation of the liver(L), the dotted ellipse evidence the same hypoechoic nodular image that image but visualized with more definition. Right kidney identified by (RK).

In images E and F, we show a recurrent section of the liver (L) where we can visualize two hypoechoic images of a nodular nature marked by the respective dotted ellipses. GB) represents a recurrent cut of the gallbladder, in image F seems to highlight a content that is not entirely pure of the gallbladder (GB).

In image A, B, C, D, E, F, it is possible to observe, closer to the lower left corner, a curvilinear hyperechogenic (bright) line that represents the diaphragm.

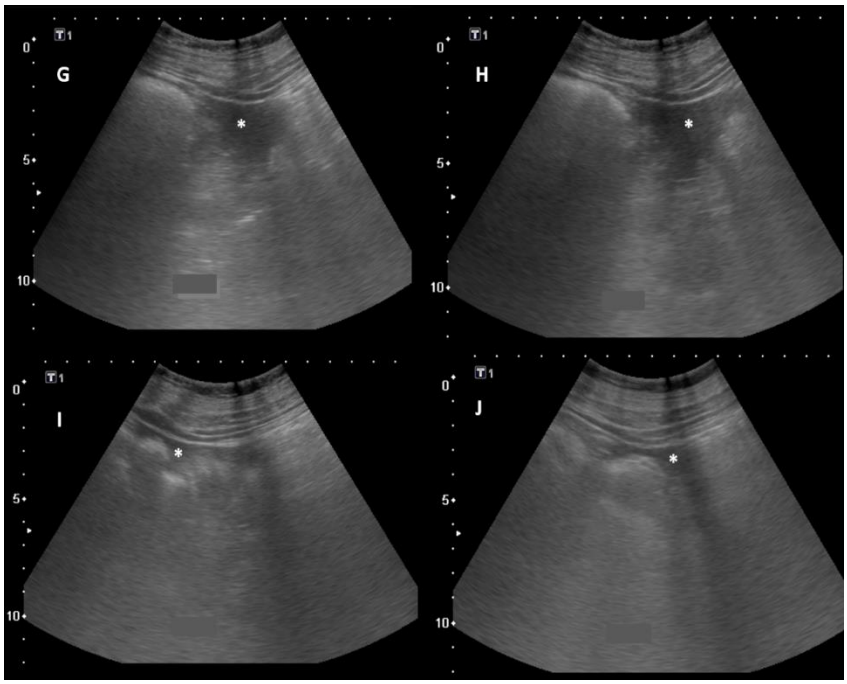

Figure 3 - Images G, H, I and J show anechoic images marked by (*) that represent free fluid in the left paracolic gutter in G and H and right paracolic gutter in I and J.

Furthermore, the liver exhibited several hypoechogenic nodular images across various segments, along with non-pure contents in the gallbladder and an increase in its parietal thickness.

Considering the patient's symptoms alongside findings from conventional radiology (13,14) and ultrasound (15–18), the physician suspects intestinal obstruction and requests transfer to the referral hospital (RH) for evaluation by a surgical team and potential additional imaging exams. While still at the BES, the patient received non-steroidal anti-inflammatory medication, opioid analgesics, antiemetics, and fluid therapy.

At the Reference Hospital (RH), the patient underwent a comprehensive set of clinical evaluations, which included an electrocardiogram showing no abnormalities. Blood tests revealed leucocytosis at 16 x10^9/L (normal range: 4.0 - 10.0), neutrophilia at 12.4 x10^9/L (normal range: 1.8 - 8.0), and discrete thrombocytosis at 549 x10^9/L (normal range: 150 – 400). Additionally, deviations were observed in Blood Urea Nitrogen (BUN) levels at 57 mg/dL (normal range: 9.8 - 20.1), Creatinine (serum) at 1.8 mg/dL (normal range: 0.6 - 1.1), and Protein C Reactive (CRP) at 35 mg/L (normal range: < 5).

A computed tomography was conducted, and its multiplanar results are depicted in Figures 4 and 5.

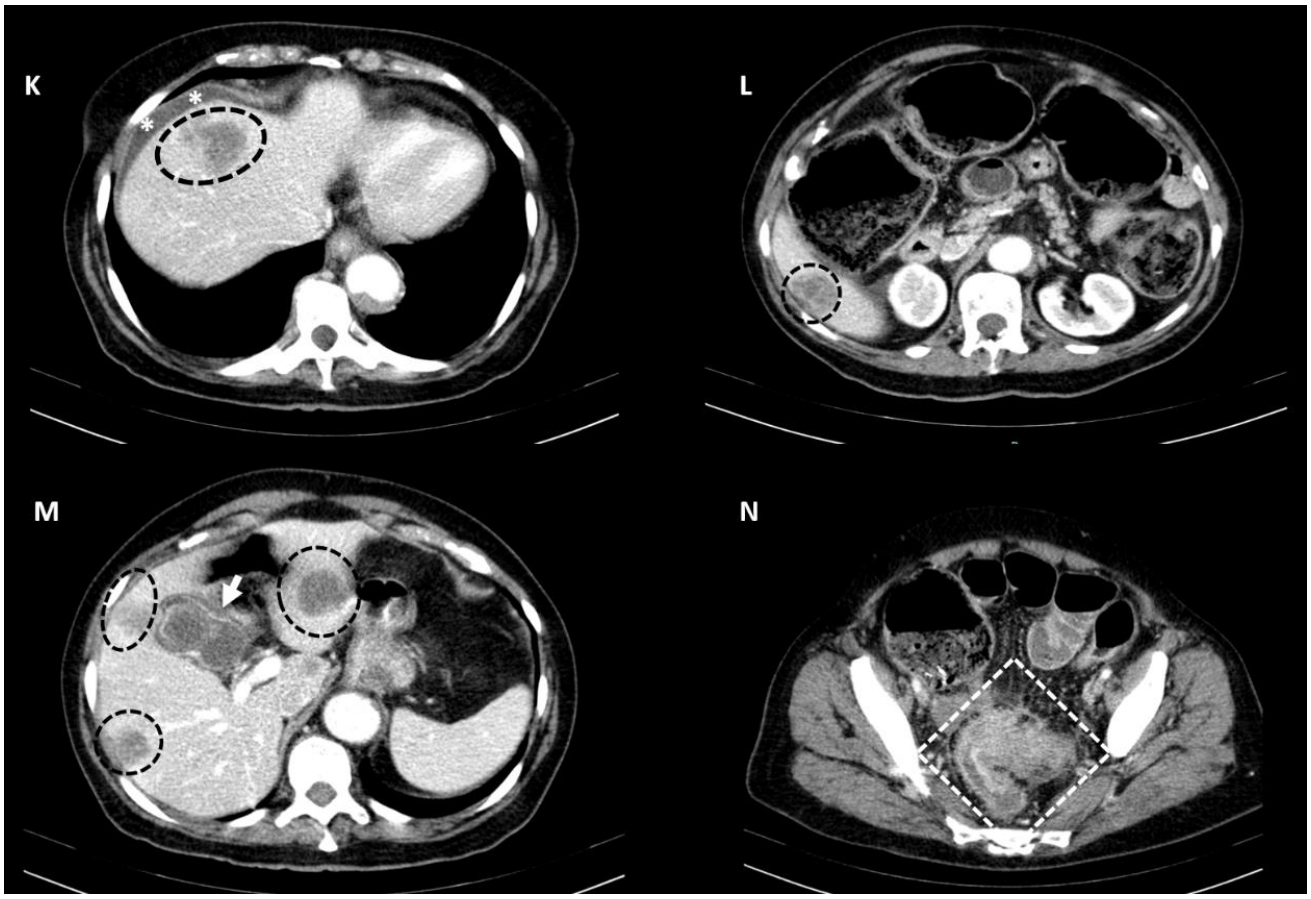

Figure 4 - Images K, l and M, represent axial images of computed tomography at the level of the liver where several hepatic metastases are visible, which are marked by black dotted ellipses. In image K the withe (*) identifies a thin perihepatic free fluid sheet. In image M arrow point to gallbladder with a non-total pure content.
In image N a black dotted square identifies high rectal adenocarcinoma.

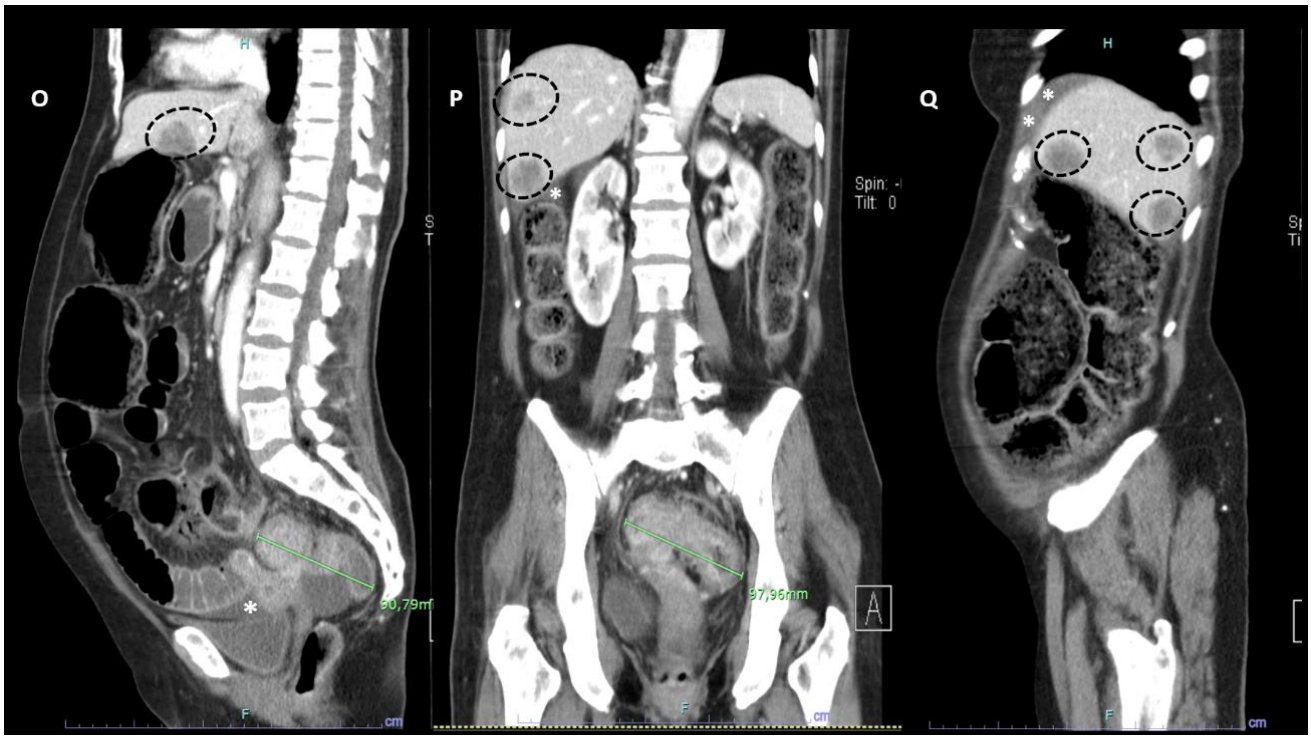

Figure 5 - Images O, P and Q, represent multiplanar reconstructions images here hepatic metastases are visible, marked by black dotted ellipses in images O, P, and Q.
In images O and P there are green measures in pelvic region that evidences approximate measures of high rectal adenocarcinoma.

An excerpt from the medical report follows.

".... Multiple hypodense nodules in the liver - metastases? Suggestion of neoplasm in the distal sigmoid, measuring approximately 9 cm; there is invasion of the adjacent fat and adjacent intestinal loop. In the adjacent fat there is an extra-luminal air bubble, there is peritoneal effusion ..."

The patient was diagnosed with intestinal obstruction, and pharmacological measures were initiated to manage pain. Additionally, several cleansing enemas were administered to alleviate discomfort and facilitate relief from intestinal obstruction.

The following day, the patient underwent exploratory laparotomy surgery, which involved ilio-colic anastomosis alongside lateral colostomy for high rectal neoplasia. During the procedure, millimetric carcinomatosis implants were discovered. Subsequent biopsy results revealed adenocarcinoma of the upper rectum, staged as cT3N1cM1, indicating intermediate to advanced tumor size, regional lymph node involvement, and hepatic metastasis (M1).

Discussion

The initial suspicions of intestinal occlusion associated with neoplastic disease, raised at the initial BES, were substantiated upon further investigation at the RH. While BES does not typically provide definitive diagnoses, the observation of characteristic features on abdominal X-ray, such as air-fluid levels and bowel loop distension, coupled with ultrasound screening findings indicating intraperitoneal fluid accumulation in superior, inferior recess as in the paracolic gutters. Dilated bowel loops, and presence of hepatic hypoechoic nodules, strongly suggested the presence of bowel obstruction due to a neoplastic process. This suspicion is further supported by the known predilection of intestinal carcinomas to metastasize to the liver, as documented in literature (19).

Based on the findings, the attending physician harbored concerns regarding the severity of the obstruction, prompting a prompt referral to specialized surgical intervention without undue delay. Given the gravity of the documented findings, the patient was spared the necessity of undergoing repeat ultrasound imaging and proceeded directly to computed tomography (CT), recognized as the gold standard examination for etiological detection of intestinal obstructions (20). This decision was based on the comprehensive evaluation of the patient's clinical presentation and the need for swift and accurate diagnostic measures to guide appropriate therapeutic interventions.

As the rectal neoplasm was determined to be unresectable, the surgical approach chosen involved ilio-colic anastomosis alongside lateral colostomy (21,22). Following a hospitalization period of 13 days, the patient was discharged and subsequently referred to oncology for further evaluation regarding the necessity of chemotherapy treatment.

While bowel ultrasound remains unfamiliar to many clinicians, its potential is substantial, supported by a growing body of literature (23,24), as demonstrated in this case report.

Conclusion

In the context of an acute abdomen, particularly in the clinical suspicion of intestinal obstruction, the identification of suspicious hepatic metastatic lesions via screening ultrasound in resource-limited settings represents a significant advancement, offering enhanced clinical decision-making capabilities to attending physicians. This article tries to highlight the considerable advantages afforded to medical teams operating within a human resources framework that includes trained sonographers proficient in emergency ultrasound, particularly crucial in emergency services located far from central hospitals where there are no medical specialties. The integration of such skilled personnel to execute screening sonography not only facilitates timely and accurate diagnosis but also optimizes resource allocation throughout the patient care continuum, thus yielding substantial benefits across all stakeholders involved, and, above all, a steadfast defender of the patient's best interests.

ETHICS STATEMENT

Each examination in this study was ordered by the attending physician in the Basic Emergency Service, and it should be viewed in the context of an emergency medical setting. No patient or institutional data was collected to adhere to general data protection regulations. The patient was duly informed about the study's objectives and provided explicit consent to participate, demonstrated by the signed informed consent form found in Appendix 1. The principal objective was to showcase the utility and efficiency of the screening ultrasound technique in remote environments. This research followed ethical standards for scientific investigations, including adherence to the Helsinki Declaration and the prevailing national data protection laws.

FINANCING

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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