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ABDOMINAL ULTRASOUND IN PATIENTS WITH ABDOMINAL PAIN AS A FIRST-LINE DIAGNOSTIC IMAGING METHOD

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Annotation. Hospital records of patients who underwent abdominal US as a first-line diagnostic examination at Bukhara Medical Institute Hospital from April 2022 to April 2024 were reviewed. Only patients who underwent abdominal US for the diagnosis of abdominal symptoms were included in this study. All patients with previous diagnostic imaging results were excluded from the study to reduce bias. The analyzed patients included 39 men with a mean age (mean ± standard deviation) of 65.8 ± 18.8 years and 37 women with a mean age of 53.7 ± 19.3 years. Abdominal ultrasound confirmed the final diagnosis in 66 of 76 patients. The final diagnosis of symptoms by abdominal ultrasound was unsuccessful in the remaining 10 patients, who required further evaluation. Acute cholangitis, acute cholecystitis, acute pancreatitis, acute appendicitis, colonic diverticulitis, and splenic rupture were correctly diagnosed. Various types of cancer, including colorectal cancer, were also successfully diagnosed. Bile duct cancer and sigmoid volvulus could not be diagnosed by abdominal ultrasound due to the presence of intestinal gas. Abnormal findings were detected by abdominal ultrasound, but further consultation with gynecologists was required for diagnosis. Abdominal ultrasound is appropriate for patients with abdominal symptoms. Patients are advised to undergo additional diagnostic imaging or consult with a gynecologist if large gas bubbles are present or if gynecological conditions are suspected. Ultrasound is becoming increasingly important in the diagnosis of gastrointestinal diseases. However, for colon cancers, the diagnostic value of conventional transabdominal sonography is limited. The aim of this study was to determine whether the assessment and staging of colon cancers could be improved by retrograde injection of water into the colon, a procedure called colon hydrosonography.

Key words: abdominal ultrasonography, tumor diseases, colorectal cancer, hydrocolonosonography.

УЛЬТРАЗВУКОВОЕ ИССЛЕДОВАНИЕ БРЮШНОЙ ПОЛОСТИ У ПАЦИЕНТОВ С БОЛЬЮ В ЖИВОТЕ КАК МЕТОД ДИАГНОСТИЧЕСКОЙ ВИЗУАЛИЗАЦИИ ПЕРВОЙ ЛИНИИ

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Аннотация. Были проанализированы больничные карты пациентов, которым в период с апреля 2022 по апрель 2024 года в больнице Бухарского медицинского института в качестве диагностического обследования первой линии проводилось УЗИ брюшной полости. В это исследование были

включены только пациенты, которым УЗИ брюшной полости проводилось для диагностики абдоминальных симптомов. Все пациенты, у которых ранее были получены результаты диагностической визуализации, были исключены из исследования для уменьшения предвзятости. Проанализированные пациенты включали 39 мужчин со средним возрастом (среднее ± стандартное отклонение) 65,8 ± 18,8 лет и 37 женщин со средним возрастом 53,7 ± 19,3 лет. Ультразвуковое исследование брюшной полости подтвердило окончательный диагноз у 66 из 76 пациентов. Окончательный диагноз симптомов с помощью ультразвукового исследования брюшной полости не был установлен у оставшихся 10 пациентов, которым потребовалось дополнительное обследование. Были правильно диагностированы острый холангит, острый холецистит, острый панкреатит, острый аппендицит, дивертикулит толстой кишки и разрыв селезенки. Также были успешно диагностированы различные виды рака, включая колоректальный рак. Рак желчных протоков и заворот сигмовидной кишки не удалось диагностировать с помощью ультразвукового исследования брюшной полости из-за наличия кишечных газов. Аномальные результаты были обнаружены при ультразвуковом исследовании брюшной полости, но для постановки диагноза потребовалась дополнительная консультация гинеколога. УЗИ брюшной полости подходит для пациентов с абдоминальными симптомами. Пациентам рекомендуется пройти дополнительную диагностическую визуализацию или проконсультироваться с гинекологом при наличии больших пузырьков газа или подозрении на гинекологические заболевания. Ультразвуковое исследование приобретает все большее значение в диагностике заболеваний желудочно-кишечного тракта. Однако при раке толстой кишки диагностическая ценность обычной трансабдоминальной сонографии ограничена. Целью данного исследования было определить, можно ли улучшить оценку и стадирование рака толстой кишки с помощью ретроградного введения воды в толстую кишку, процедуры, называемой гидросонографией толстой кишки.

Ключевые слова: ультразвуковое исследование брюшной полости, опухолевые заболевания, колоректальный рак, гидроколонос-сонография.

Introduction. Abdominal pain is one of the most common symptoms prompting patients to visit hospitals. Among such people, a number of patients have serious illnesses and require subsequent hospitalization or surgery. The diagnosis may include acute appendicitis, intestinal obstruction, and other serious conditions such as intestinal necrosis and volvulus (1). Accurate and prompt diagnosis is essential for proper patient management. The diagnosis of patients with abdominal pain is primarily determined by imaging techniques such as radiography, abdominal ultrasound (US), computed tomography (CT), and magnetic resonance imaging (MRI) (2). Among them, abdominal ultrasound is a non-invasive procedure that is readily available in most hospitals even during off-hours (weekends, nights, and holidays) and can be performed at the patient's bedside (3). Abdominal ultrasound is indispensable for the diagnosis of abdominal

diseases in patients with abdominal symptoms (4,5). In addition, abdominal ultrasound is also useful for the diagnosis of solid organ diseases, including acute cholangitis, acute cholecystitis, and acute pancreatitis (6–8). Abdominal ultrasound is also useful for the diagnosis of intestinal diseases based on pathological findings (9). Diagnostic criteria by abdominal ultrasound have been established for acute appendicitis and colonic diverticulitis, and colorectal cancer can be diagnosed by abdominal ultrasound. In many cases, patients are diagnosed based on a combination of laboratory data and diagnostic imaging results based on symptoms and physical examination. Regarding diagnostic imaging, CT scan is recommended as a first-line procedure; however, CT scan is not always available after hours in most hospitals. In these cases, abdominal ultrasound is the first-line procedure.

Based on the above considerations, the current study retrospectively analyzed the charts of patients who underwent abdominal ultrasound as a first-line diagnostic procedure to evaluate its usefulness and limitations in establishing a diagnosis in patients with abdominal symptoms. Ultrasound has become a widely accepted diagnostic tool for many abdominal diseases. In recent years, the resolution achieved by ultrasound equipment has significantly improved, making it possible to perform more accurate ultrasound diagnostics. Thus, traditional transabdominal sonography is becoming increasingly important in the diagnosis of gastrointestinal diseases. Today, ultrasound can even diagnose acute appendicitis. 1,2 However, traditional abdominal sonography has limitations. Colonic diseases cannot be reliably detected using sonography alone, as the colon cannot be fully visualized, and detailed assessment of wall structures and intraluminal lesions is difficult. Transabdominal sonography after retrograde colonic water infusion, a technique known as colon hydrosonography, can significantly improve conditions for colonic ultrasound imaging and evaluation. Studies have shown that this technique can diagnose not only colon tumors (3) but also inflammatory bowel diseases such as Crohn's disease and ulcerative colitis

Materials and methods. Medical records were retrospectively reviewed for 76 patients who underwent abdominal ultrasound as a first-line diagnostic imaging modality at Bukhara Medical Institute Hospital from April 2022 to April 2024. Abdominal ultrasound was performed during consultations or outside of office hours (weekdays, weekends, and holidays). Recruited patients were limited to those who underwent abdominal ultrasound as a first-line diagnostic approach to evaluate the diagnostic performance of abdominal ultrasound alone, without any potentially confounding information from other diagnostic imaging procedures. Patients were excluded if abdominal ultrasound was performed after other diagnostic imaging procedures, such as radiography, CT, or MRI, as the ultrasound technician would have been informed of the obtained results. The analyzed patients included 39 men with a mean age (mean ± standard deviation) of 65.8 ± 18.8 years and 37 women with a mean age of 53.7 ± 19.3 years.Patients were admitted to the hospital or referred to another hospital based on a diagnosis obtained by abdominal ultrasound, blood test results, clinical findings, or diagnostic imaging after abdominal ultrasound. Therefore, patients were referred to another hospital for a

gynecological consultation. Out-of-hours patient management was determined based on abdominal ultrasound findings and clinical symptoms. This study was not considered a clinical trial because abdominal ultrasound was performed as part of routine clinical practice. Written informed consent was not required for inclusion in the study. Patient records/information were anonymized and de-identified before analysis.

Ultrasound of the abdominal cavity. Abdominal ultrasound was performed by senior researchers at the Japanese Society of Medical Ultrasound (Tokyo, Japan; http :// www . jsum . or . jp / jsum - e / index . html) using the ultrasonic system SSA -700 A (Toshiba Medical Systems Corporation, Ohtawara, Japan) with a 3.75 MHz convex sensor (PVT -375 BT; Toshiba Medical Systems Corporation) or a linear sensor 8.0 MHz (PLT -805 AT; Toshiba Medical Systems Corporation).

Diagnostic criteria for diseases. Acute cholangitis is defined as inflammation caused by bile duct obstruction (6). Findings detected by abdominal ultrasound include bile duct dilation and evidence of its etiology, such as stricture, stones, or stent (6). In the present study, in the absence of these findings, acute cholangitis was not diagnosed by abdominal ultrasound but was based on a combination of symptoms, including systemic inflammation and cholestasis (6). Acute cholecystitis was diagnosed by a combination of local and systemic signs of inflammation (7). Abdominal ultrasound confirmed the diagnosis with the findings of distension, wall thickening, and sediment in the gallbladder (7). More specifically, the detection of the sonographic Murphy sign was considered the most reliable, as it is believed to suggest gallbladder inflammation.

Acute pancreatitis is typically diagnosed as abdominal pain, elevated serum amylase, and pancreatic edema using diagnostic imaging. In the current study, acute pancreatitis was diagnosed when abdominal ultrasound revealed a swollen pancreas, fluid collection, and inflammation of adjacent organs. Acute diverticulitis was diagnosed as a diverticulum with a thickened wall and high echogenicity from the surrounding tissue. Acute appendicitis was diagnosed as a swollen appendix with a diameter >10 mm and a thickened wall).

Conclusion. The diagnosis of acute appendicitis was complicated when the appendix could not be located. Bowel preparation consisted of a laxative orthograde bowel lavage on the morning of the examination. A total of up to 1500 ml of water was infused into the colon after an intravenous injection of 20 mg scopolamine- N -butyl bromide (Buscopan; Boehringer Ingelheim) to relax the bowel. The relaxant was necessary not only to achieve optimal bowel distension during water administration but was also useful in suppressing the feeling of urgency to defecate. A commercially available system commonly used for barium enemas (Pneumocolon; Barnes - Hind) was used to administer the water. Barium Products). Continuous transabdominal sonographic examination of the colon was performed, starting from the moment of water administration, using a real-time scanning device with 3.5, 5.0 and 7.5 MHz transducers (Picker CS 9500). The examination began with a 3.5 MHz transducer; 5.0 and 7.5 MHz transducers were used for a detailed assessment of the colonic wall structure. A manually controlled

tilt table allowed for patient positioning. To achieve optimal filling and distension of the sigmoid colon, the examination was initially performed with the patient in an upright position; 300 to 500 ml of water was administered. After examination of the sigmoid colon, the patient was placed supine for examination of the rest of the colon, during which another 1000 ml of water was administered. The lateral intercostal route was chosen for examination of the colonic flexures. Deep inspiration moves the colonic flexures downward and facilitates their sonographic visualization. The diagnosis of colonic tumors was based on sonographic evidence of intraluminal masses attached to the wall, the appearance of lesions in the structure of the colonic wall and surrounding connective tissue, or both. The depth of tumor infiltration into the colon wall was measured, and tumor stage was determined according to the classification system developed by the International Union Against Cancer. 6 The tumor was classified as T1 when infiltration was limited to layers 1 and 2 of the colon, as T2 when the tumor penetrated layers 1–3, as T3 when it penetrated layers 1–5 and surrounding connective tissue, and as T4 when the tumor extended to all layers and invaded other organs.

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