Color Doppler US and CEUS in colorectal cancer: A case report

C. Sileo^a, F. Costanzo^b, G. Carnevale Maffè^{b,*}

^a *Institute of Radiology, University of Pavia and IRCCS Foundation Policlinico San Matteo, Pavia, Italy*

^b *First Department of Medicine, University of Pavia and IRCCS Foundation Policlinico San Matteo, Pavia, Italy*

KEYWORDS

Colorectal Cancer;
Ultrasound;
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Abstract Colorectal cancer is the third most common cancer diagnosed in the world and the most frequently diagnosed gastrointestinal cancer. However, in the literature there are only a few studies which have evaluated the role of ultrasound (US) in the diagnosis of colorectal cancer and there is no evidence related to the use of contrast-enhanced US (CEUS). The following describes US, color-Doppler and CEUS appearance of a lesion of the large bowel.

Sommario La neoplasia colo-rettale rappresenta il terzo tumore più frequentemente diagnosticato nel mondo e quello gastrointestinale più frequente. In letteratura sono presenti solo pochi studi che hanno valutato il ruolo dell'ecografia nella diagnosi del carcinoma colo-rettale e non esistono evidenze circa l'impiego della eco-contrastografia (CEUS). Viene di seguito descritto l'aspetto ecografico, color-Doppler e CEUS di una neoplasia del grosso intestino.

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Introduction

Colorectal cancer is the third most common cancer diagnosed in the world after lung and breast cancer (9.7% of total) and the most frequently diagnosed gastrointestinal cancer [1]. Although mortality rate is lower than in other tumors, the frequent occurrence of this pathology makes it a major cause of death. From a histological point of view, adenocarcinoma is the most frequently diagnosed neoplasm in colorectal cancer [2]. At present colonoscopy is the gold standard for diagnosing colorectal lesions, and this

procedure furthermore has a preventive function as precancerous lesions can be removed [3]. Few studies have evaluated the role of ultrasound (US) in this pathology. We describe the appearance of US, color Doppler and contrast-enhanced US (CEUS) in a neoplastic lesion of the large bowel.

Case report

A 64-year-old woman was hospitalized due to fatigue, weight loss and iron deficiency anemia. Physical examination revealed a hard mass in the right iliac fossa. Abdominal US examination (Esaote Mylab 70 XVG, 1–8 MHz convex probe, 4–13 MHz linear probe) did not reveal focal lesions in the abdominal parenchymal organs, but a heterogeneous, hypoechoic mass, 6 cm in diameter, in the right side (Fig. 1A). Color Doppler showed vascularity within the mass

* Corresponding author. First Department of Medicine, University of Pavia and IRCCS Foundation Policlinico San Matteo, Pavia, Italy.
E-mail address: gcmaffe@smatteo.pv.it (G. Carnevale Maffè).

Fig. 1 US examination reveals abnormal hypoechoic wall thickening of the cecum/colon (A) which is richly vascularized at color-Doppler evaluation (B).

(Fig. 1B) thus suggesting a neoplastic lesion of the cecum/colon causing luminal substenosis. CEUS using intravenous administration of 2.4 ml contrast agent (SonoVue, Bracco, Milan, Italy) showed intense arterial contrast enhancement of the lesion involving the entire thickened bowel wall (Fig. 2). Endoscopic examination and biopsy confirmed the presence of an ulcerative vegetating neoplastic lesion (adenocarcinoma) causing luminal substenosis. Subsequent staging using computed tomography (CT) did not reveal additional lesions. After surgery the patient had a normal postoperative course.

Written informed consent was obtained from the patient for the publication of this case report and accompanying images.

Discussion and conclusions

Currently, endoscopy is undoubtedly the gold standard in diagnosing colorectal adenocarcinoma due to its high diagnostic accuracy. As far as screening is concerned, there is valid evidence showing that fecal occult blood test reduces mortality and that the incidence of cancer is reduced after removal of precancerous lesions. Endoscopy is not advantageous as an initial screening tool and should

be used for screening only in high-risk patient populations [3]. CT colonography in colorectal cancer should now be considered as an investigation which substitutes the barium enema in the presence of incomplete colonoscopy and in well-defined screening programs. Over the next years, CT colonography may become a first-level screening tool along with fecal occult blood test, sigmoidoscopy and colonoscopy [4].

Till today, not many studies have evaluated the role of US in the diagnosis of colorectal carcinoma. Excluding evaluation of the rectal ampulla, Martínez-Ares et al. achieved a sensitivity of 91.8%, specificity of 92.1%, positive predictive value of 80.9% and negative predictive value of 96.9% by considering US examination positive for malignancy when the identified mass was hypoechoic with loss of stratification and mobility of the wall. As expected, they furthermore showed that diagnosis of small polyps was not possible and that they were not resectable [5]. Like in our case, by observing the peristaltic movements, US can diagnose a substenotic or stenosis-free condition thus providing the clinician and the surgeon with information about the precise location and the cause of stenosis [6].

Fig. 2 After intravenous administration of US contrast agent, arterial contrast enhancement is observed (A) with moderate persistence over time (B).

Also endoscopic examination can yield these results, but US is more immediate, it can be performed at the bedside, is better tolerated by the patient and virtually risk-free and less costly. However, the method presents some limitations, such as patient constitution, bloating and poor compliance. US should be preferred as a first-line procedure when endoscopy is not possible or in patients with microcytic anemia and non-specific digestive symptoms. However, in patients over the age of 65 with microcytic anemia and symptoms suggestive of colon cancer, endoscopy should be performed despite normal US outcome for the detection of polypoid formations and the study of the rectum, as this area is inadequately evaluated at transabdominal US [5]. Segura et al. showed that hidrocolonic US can increase diagnostic accuracy of US achieving a sensitivity of 92%, specificity of 98%, positive predictive value of 95.8% and negative predictive value of 96.2% with improved specificity in polyps larger than 7 mm (100%) [7]. In recent years, CEUS has been used for studying the bowel in the evaluation of microvascularization of the bowel wall in inflammatory bowel diseases to assess the activity, particularly in Crohn's disease [8]. Also intestinal neuroendocrine tumors located in the bowel have been characterized using CEUS [9].

In the literature there is no evidence related to the use of CEUS for characterizing adenocarcinomas and making a differential diagnosis between different types of intestinal cancer. In our opinion, prospective studies are therefore required to clarify these issues and to assess whether the degree of vascularization of the tumor can be correlated to its aggressiveness. CEUS may become a complementary, although not substitutive, technique in the diagnosis and staging of bowel cancer also in patients with many comorbid conditions, as it is relatively simple and easy to perform.

Conflict of interest statement

The authors have no conflict of interest.

Appendix Supplementary material

Supplementary data related to this article can be found online at [doi:10.1016/j.jus.2011.04.001](https://doi.org/10.1016/j.jus.2011.04.001)

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