Colorectal Cancer Imaging

Sean D. Curran, FFR RCSI
and Laurence H. Schwartz, MD

Summary

Imaging of the colorectal cancer patient is employed in three basic settings: evaluation of extent of disease in the preoperative patient, evaluation of the presence or absence of recurrence in the surgically cured patient, and evaluation of the response or progression of disease in the patient with known metastatic cancer. This chapter explores the role of different imaging modalities in each of these scenarios.

Key Words: CT scan; MRI; PET scan; imaging.

1. INTRODUCTION

Imaging of colorectal cancer (CRC) has evolved dramatically over the last two decades, and can be divided into three basic areas: screening, local–regional evaluation of the primary tumor, and evaluation of metastatic disease. It is this latter area on which this chapter will focus. Double-contrast barium enema (DCBE) and computed tomography (CT) colonography (Fig. 1) are used for lesion detection (screening) in healthy individuals. DCBE is useful for exclusion of synchronous primaries preoperatively. Tailored imaging strategies have been developed in rectal cancer, for example, with transrectal ultrasound (TRUS) and magnetic resonance imaging (MRI) having specific roles in the evaluation and management of the primary tumor. CT is used widely for detection and assessment of adjacent organ involvement and distant metastases both preoperatively and during surveillance. $^{18}$F-fluorodeoxyglucose (FDG) positron emission tomography combined with CT (PET-CT) is helpful in selected cases where resection of metastatic disease is under consideration.

Imaging of the patient with CRC is employed in three basic settings: evaluation of extent of disease in the preoperative patient, evaluation of the presence or absence of recurrence in the surgically cured patient, and evaluation of the
response to progression of disease in the patient with known metastatic cancer. Detection of local spread and the existence and extent of distant metastases is the major goal of preoperative imaging. Although there is no clearly defined imaging algorithm for postoperative surveillance of patients after curative intent primary treatment, imaging can detect recurrence earlier than laboratory tests alone.

2. PREOPERATIVE STAGING

2.1. Computed Tomography

2.1.1. Technique

The standard CT examination includes the abdomen and pelvis from the domes of the diaphragm (included the lung bases) to the pubic symphysis. Either gastrografin or barium-based oral contrast is given to the patient to drink for 1 h prior to the scan. Patients tolerate this reasonably well unless obstruction is present. In cases where the patient is nauseated, administration of the oral contrast by nasogastric tube is helpful. It is important that there is good opacification in order to differentiate bowel from a possible abscess, as