Invited Commentary

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Imaging advances continue to be made in depicting the anatomy of the anal canal and rectum. The preceding chapters have highlighted the exquisite detail that is provided by contemporary ultrasound, including volumetric imaging and magnetic resonance imaging (MRI). Recent MR advances have been made possible by the wide availability of 3T magnets that provide superior anatomic detail and resolution. These high-field-strength magnets, coupled with improved engineering and the increased use of endorectal coils, are being used with increased frequency in centers specializing in management of anorectal disorders. Such high resolution multiplanar MRI of the anorectal region now provides detailed resolution capable of evaluating the spectrum of inflammatory and neoplastic disorders that are known to occur. At this stage of technical development, one anticipated focus is correlating imaging findings with subsequent management of different anorectal diseases. Many surgeons and gastroenterologists remain unfamiliar with the anatomic detail provided by contemporary MRI coupled with the exquisite delineation and characterization of different disease entities. Another focus will be to familiarize physicians with the capabilities of anorectal MRI such that these can be fully taken advantage of when evaluating disease processes and planning treatment, including surgical management. Another anticipated focus of research will be imaging for the evaluation of postoperative anatomy, especially dynamic changes that occur following surgery.

The ability to image dynamic pelvic floor anatomy has been covered in another chapter. While endoanal sonography remains widely used for depicting the anatomy of the anal canal, sonography is not routinely used for imaging the rectum. Since rectal imaging requires distention of a water-filled balloon to obtain acoustic coupling, the technique has found its widest application for staging of rectal cancers. For rigid endoscopes, which still provide superior anatomic detail compared with flexible systems, insertion above the rectosigmoid junction is unlikely to occur and is thus a limitation of this technology.

Two areas that are garnering increased attention are positron emission tomography/computed tomography (PET/CT) and the use of multiplanar high-resolution CT scanning for imaging rectal anatomy and evaluating rectal tumors (Fig. III.62). PET/CT is now routinely used for the

Fig. III.62. Thick-slab coronal maximum intensity projection (MIP) image of a T3 rectal cancer (*arrow*) growing up the left lateral rectal wall demonstrates tumor extension beyond the rectal wall

staging of colorectal tumors, especially during postoperative surveillance when other modalities are unlikely to confidently distinguish scarring from recurrence, but the anatomic detail provided by this modality is limited purely by the resolution of the CT scanner being used. Since CT scanning remains the current standard for exclusion of liver, lung, and intraperitoneal metastases in patients with rectal cancer, it is a logical extension to develop CT techniques aimed at local staging of rectal tumors. The superb submillimeter resolution now provided by 64-row multidetector CT (MDCT) scanners allows images to be reconstructed in multiple planes without loss of anatomic detail. For rectal imaging, this so-called isotropic imaging technique permits exquisite detail in the sagittal and coronal planes during different phases of contrast administration. In this way, CT scanning can now be used to show the extent of transmural tumor extension coupled with vascular anatomy for surgical planning. It must be emphasized that this is still being used in an experimental manner and that the detail provided by 3T MRI and transrectal ultrasound is still recognized as being the most accurate for purposes of tumor staging.