New Minimally Invasive Surgery Technologies

Chapter 43

Minimally Invasive Surgery Staplers

Surgical staplers are used in a variety of laparoscopic and thoracoscopic surgical procedures. Characteristics of an effective stapler include the ability to manage tissue variability, the ability to staple thick tissues effectively, the ability to staple with staggered compression, the ability to optimize hemostasis and burst pressure strength, and the ability to improve tissue retention during manipulation and transaction. The stapler must be ergonomically easy to grasp as well as being usable by a variety of hand sizes and strengths. An example of such a stapler that satisfies all of these characteristics is the recently released Endo GIA Ultra Universal Stapler (Covidien, Norwalk, Conn.) (Fig. 43-1). In addition, this stapler can be used as a grasper alone before firing the staples. Other companies produce similar products.

There are also a variety of staple heights available for each type of reload for the surgical stapler. Usually, the staple reloads are color coded according to the staple height, to allow for better recognition in the operating room. The larger staple height is better for thicker tissue, whereas the smaller height is more applicable to thinner tissue, or even vascular tissue. It is important to match staple height to the tissue to be stapled. Too tall of a staple may result in an inadequate seal as well as a potential for hemorrhage, whereas too short of a staple may not penetrate the tissue fully, potentially resulting in an anastomotic leak. Covidien has recently improved on the staple reloads with the Tri-Staple Technology (Fig. 43-2). This technology varies the staple height in a given reload to facilitate use over a broader range of tissue thickness and also includes a stronger fixed anvil for easier maneuverability. The cartridge face is stepped, as opposed to being flat in previous versions of the reload. This encourages lateral diffusion of tissue fluids during clamping and firing, which decreases the force required to compress the tissue. A stronger knife blade assists with cutting of thicker tissues, and larger anvil buckets are used to ensure good staple formation. The Extra Thick (black) reloads with the Tri-Staple Technology allow the reload to staple tissue up to 3-mm thick using 5-mm staples. This is especially useful for challenging cases such as bariatric revisions as well as pulmonary lobectomies in radiated tissue. The Endo GIA Curved Tip Reloads with Tri-Staple Technology include a gold-colored curved tip at the distal end of the reload, providing enhanced visualization of the anvil tip (Fig. 43-3). This curved tip can be used for blunt dissection and tissue manipulation before firing.