Surgical Management of Carcinoma of the Prostate

Vinod H. Nargund

This chapter discusses patient selection and treatment by radical prostatectomy, and the principles of various other operative procedures used in the management of prostate cancer.

Radical Surgery

Surgical Anatomy of the Prostate Gland

Knowledge of the fascial layers and neurovascular bundle is crucial in understanding the principles of radical surgery of the prostate gland. The prostate is situated deep in the lesser pelvis below the urinary bladder and in front of the rectum, and measures on average 4.0 to 4.5 cm in transverse diameter. The gland develops its adult morphology during puberty, and its structure gets distorted by disease (e.g., benign prostatic hypertrophy, BPH) by the fifth decade (1), and the variety of shape and size can be anticipated due to the associated BPH. The gland has its own capsule and fascia. The Denonvilliers fascia, which is situated between the prostate and the rectum, continues laterally with pararectal fascia posteriorly and lateral pelvic fascia anteriorly. The lateral pelvic fascia anteriorly becomes less prominent and gets attached to the capsule of the prostate (2). The neurovascular bundle (NVB) is posterolateral to the prostate in front of the rectum and is related to the lateral pelvic, prostatic, and Denonvilliers fascia (Fig. 18.3.1) (3). The nerves are particularly vulnerable near the apex, where they lie very close to the prostatic capsule at the 5 and 7 o’clock positions (4). The NVBs contain cavernosal nerves branching from the pelvic plexus, which is formed by parasympathetic (pelvic splanchnic) and sympathetic (hypogastric) nerves (5). The nerves become more condensed at the midprostate level. The nerve bundles should be released from the apical region prior to urethral transection. Careful apical dissection is important because of its closeness to the external sphincter and variations in the shape of prostate apex (6). The arterial supply comes from the inferior vesical artery, and venous drainage is from Santorini’s plexus. The blood vessels and nerves run between the lateral
pelvic and the prostatic fascia. Due to the close relationship between vessels and nerves, diathermy ideally should be avoided while dissecting in this area in nerve-sparing prostatectomy.

The radical prostatectomy (RP) consists of removal of the prostate gland with its capsule, seminal vesicles and ampulla of vas with or without the pelvic lymph nodes followed by anastomosis of the bladder neck with the urethra. The procedure may be accomplished by nerve preservation (cavernous nerve sparing) in selected cases. The RP is accomplished by the retropubic (open or laparoscopic/robotic) or perineal route.

**Preoperative Considerations**

The PSA, Gleason grading, and clinical assessment by the digital rectal examination (DRE) are the information available prior to surgery, and additional investigations are considered on an individual basis. Radical surgery is curative only if the tumor is confined to the prostate with intact capsule (stages T1a,b,c and T2). The operative mortality for RP is less than 1% in organ-confined cancer of the prostate (CaP), and it offers the best disease-free survival rates (80% to 90% in 10 to 15 years in several series).

Preoperative exclusion of locally advanced or distal metastatic disease is therefore of utmost importance. High-risk patients need further imaging studies, mainly magnetic resonance imaging (MRI). Current clinical parameters and investigations, however, do not answer important questions in relation