The advancement of surgery into the digital and computer-assisted era has generated a new amalgamation of known anesthetic challenges. This chapter is designed to provide both surgeons and anesthesiologists with a quick reference, guiding optimal peri-operative care in patients receiving robotic urologic surgery. In addition, information critical to ensuring patient safety when utilizing computer-assisted surgical techniques is discussed.

The patient population served in most robotic urologic surgeries where computer assistance is being utilized consists of males, aged 45 to 75 years old, ideally with minimal physiologic perturbations due to underlying disease. Laparoscopic considerations mostly revolve around the effects of insufflation of the abdominal cavity and the surgical site being less accessible than during open procedures. Robotic and positioning considerations would include the critical importance of maintaining patient paralysis and the physiologic implications of placing a patient in a high degree of Trendelenburg’s position. Generally, the patient’s recovery is similar to that of all patients receiving laparoscopic surgery and adequate pain management is easily achieved by utilizing multiple modalities (see Figure 9.1).

9.1. Patient Population

In order to provide adequate anesthesia for these procedures, an awareness of the nature of the patients involved is imperative. Males, aged 45 to 75 years old, have a variety of predictable medical issues of concern to the anesthesiologist. In western societies, the prevalence of obesity, diabetes, hypertension, underlying coronary artery disease, and/or peripheral vascular disease necessitates obtaining an adequate history and physical. Ideally, this should be accomplished prior to the day of surgery to ensure any laboratory or functional data can be collected, reviewed, and acted upon.

For example, obesity and hypertension have increasing prevalence with advancing age. Based on data collected in 1999 and 2000, the U.S. National Center for Health Statistics (NCHS) reported in 2003 that 30.1% of men aged 45 to 54 are obese, 32.9% of men aged 55 to 64 are obese, 33.4% of men aged 65 to 74 are obese, and 20.4% of men aged over 75 are obese. Similarly, the same publication reports 36.9% of men aged 45 to 54 have hypertension, 50.7% of men aged 55 to 64 have hypertension, 68.3% of men aged 65 to 74 have hypertension, and 70.7% of men aged over 75 have hypertension. Although nothing can be done about a patient’s obesity on or near the date of surgery, a patient’s hypertension can be medically optimized prior to surgery.

Obesity presents a variety of direct and indirect challenges to the anesthesiologist. In addition to its contribution to hypertension, coronary artery disease, and diabetes, obesity has direct physical and physiologic implications in patients receiving computer-assisted robotic laparoscopic procedures. Most important among these implications are the effects on pulmonary physiology. When a patient with a large volume of abdominal contents, adipose mass, and central girth is placed in
steep Trendelenburg’s position with a pressurized pneumoperitoneum, a substantial hindrance to normal diaphragmatic excursion can be generated. This hindrance, in addition to the patients’ body habitus, creates both a restrictive pulmonary deficit and atelectasis, with its resultant shunting. Hypercapnia can be seen due to the difficulty of achieving adequate minute ventilation and hypoxia secondary to atelectasis-based shunting are examples of the consequences of these physiologic disruptions and must be avoided.

Hypertension is characterized by increased afterload and decreased intravascular volume. Management of anesthesia in the hypertensive patient begins with preoperative evaluation to determine adequacy of blood pressure control, pharmacologic antihypertensive agents utilized, and presence of end-organ dysfunction. The presence of orthostatic hypotension, ischemic heart disease, cerebrovascular disease, peripheral vascular disease, and/or renal dysfunction should be uncovered. The anesthetic plan will need to incorporate adjustments for these disease states. Also, during induction of anesthesia in the hypertensive patient, one should attempt to minimize the duration of laryngoscopy and expect exaggerated blood pressure fluctuations secondary to vasodilation. The anesthesiologist should modify the dosage of volatile anesthetic to control blood pressure and compensate for any changes in patient position.

Postoperative management of the hypertensive patient includes anticipation of hypertension unrelated to pain and its adequate treatment.

Continuation of monitoring modalities utilized intraoperatively in the immediate postoperative period enables a prompt response to blood pressure fluctuations. Signs of myocardial ischemia can be concealed by pain medications and overt use of antihypertensive medication. Vigilance must be maintained during the immediate postoperative period.

Diabetes is an illness that can affect a multitude of organ systems and has many predisposing factors. Aside from the principal goals of maintaining good glycemic control and avoiding ketoacidosis and electrolyte disturbances, the anesthesiologist must appreciate the implications of diabetic autonomic neuropathy. Common manifestations of diabetic autonomic neuropathy include orthostatic hypotension, resting tachycardia, and gastroparesis. As mentioned elsewhere, the combination of a pneumoperitoneum and the placement of the patient in a physiologically challenging position will have perturbing effects on hemodynamics. These effects may be greatly exaggerated in the patient with diabetic autonomic neuropathy.

While no consensus exists on how tightly to maintain glycemic control or otherwise optimize medical management of the diabetic patient in the peri-operative period, discussions are ongoing. A recommendation from 1991, published in *Anesthesiology*, is to maintain the blood glucose concentration in the range of 120 to 180 mg/dL. As in many areas of anesthetic management, attempting to maintain a normal physiologic state is always desirable.

There are many specific anesthetic concerns relating to a patient with coronary artery disease and other vascular disease undergoing any surgical procedure requiring general endotracheal anesthesia. There exist a variety of risk factors for coronary artery disease and other vascular diseases. Obesity, hypertension, diabetes, advanced age, smoking, male gender, family history, stress, inactivity, and high cholesterol are widely recognized as predisposing factors for development of such illnesses. Clinicians should be mindful of these issues, as these illnesses influence the risk of anesthesia and surgery. Peri-operative evaluation, planning, and optimization should be conducted in such a manner as to minimize these risks.