A 79-year-old woman with benign prostatic hypertrophy was scheduled for transurethral resection of the prostate (TURP). Past medical history included myocardial infarction (MI) complicated by congestive heart failure (CHF) 7 months earlier. The patient had been taking diuretics, B-blockers, and calcium channel blocker.

What chronic medical conditions are common in patients who have undergone transurethral resection of the prostate (TURP)?

Patients who have undergone TURP are often elderly and suffer from cardiac, pulmonary, vascular, and endocrinologic disorders. The incidence of cardiac disease is 67%; cardiovascular disease, 50%; abnormal electrocardiogram (EeG), 77%; chronic obstructive pulmonary disease, 29%; and diabetes mellitus, 8%. Occasionally, these patients are dehydrated and depleted of essential electrolytes because of long-term diuretic therapy and restricted fluid intake.


What anesthetic technique is preferable for patients undergoing transurethral resection of the prostate (TURP) and why?

Regional anesthesia is the anesthetic technique of choice for patients undergoing TURP because of the following reasons:

- It allows monitoring of the patient's mentation and thereby early detection of signs of TURP syndrome.
- It promotes vasodilation and peripheral pooling of blood and thereby reduces the severity of circulatory overloading.
• It reduces blood loss by reducing the blood pressure during surgery.
• It provides postoperative analgesia and thereby reduces the incidence of postoperative hypertension and tachycardia, which often accompanies recovery from general anesthesia.


Is regional anesthesia associated with a lower incidence of perioperative mortality than general anesthesia?

Although spinal anesthesia offers certain distinct advantages over general anesthesia for transurethral resection of the prostate (TURP) surgery, mortality, and many markers of patient outcome have been similar for both groups. The 30-day mortality rate associated with TURP is reported to be between 0.2% and 0.8%. Mortality rates are reported to be similar in patients receiving regional anesthesia or general anesthesia. Increased morbidity was found in patients with resections exceeding 90 minutes, gland size greater than 45 g. acute urinary retention, and age older than 80 years. The incidence of postoperative complications, namely, myocardial infarction (MI), pulmonary embolism, cerebrovascular accidents, transient ischemia attacks, renal failure, hepatic insufficiency, and the need for prolonged ventilation, is similar when comparing patients receiving regional anesthesia with those receiving general anesthesia.
What are the important characteristics of irrigation solutions used during transurethral resection of the prostate (TURP)?

TURP irrigation solutions are either isotonic or nearly isotonic, electrically inert, nontoxic, and transparent. Hypotonic solutions are avoided because they can cause hemolysis. Electrolyte-containing solutions are also avoided because they can conduct electrical current from the resectoscope to the surrounding tissues and cause burns. Because significant absorption of irrigation solution occurs during TURP, only solutions with nontoxic solutes are used. Also, the solution must be transparent to allow the surgeon to visualize the surgical site.

Why is plain distilled water rarely used for irrigation during transurethral resection of the prostate (TURP)? What types of irrigation solutions are available?
Distilled water is totally transparent and electrically inert and in the past was regularly used for irrigation during TURP. However, because it is extremely hypotonic, when absorbed by the patient, it may cause hemolysis, shock, and renal failure.

Over the years, a number of isotonic and nearly isotonic irrigation solutions have been introduced and they almost totally replaced plain distilled water. The more commonly used solution currently is glycine (1.2% and 1.5%). Mannitol (3%), glucose (2.5% to 4%), Cytal (a mixture of sorbitol 2.7% and mannitol 0.54%), and urea (1%) solutions are also occasionally used. To maintain their transparency, these solutions are purposely prepared moderately hypotonic.


**What are the definition and signs and symptoms of the transurethral resection of the prostate (TURP) syndrome?**

Rapid absorption of a large-volume irrigation solution during TURP can lead to TURP syndrome. The TURP syndrome is characterized by intravascular volume shifts and plasma-solute (osmolarity) effects. The signs and symptoms of the TURP syndrome are as follows:

**Cardiopulmonary**

Hypertension
Bradycardia
Dysrhythmia
Respiratory distress
Cyanosis
Hypotension
Shock
Death

**Hematologic and renal**
Hyperglycinemia
Hyperammonemia
Hyponatremia
Hypoosmolality
Hemolysis/anemia
Acute renal failure
Death

**Central nervous system (CNS)**
Nausea/vomiting
Confusion/restlessness
Blindness
Twitches/seizures
Lethargy/paralysis
Dilated/nonreactive pupils
Coma
Death

The TURP syndrome can occur as early as a few minutes after surgery has started and as late as several hours after surgery. The patient begins to complain of dizziness, headaches, nausea, tightness in the chest and throat, and shortness of breath. He then becomes restless, confused, and starts to retch. Some patients complain of abdominal pain. The blood pressure rises (both systolic and diastolic), and the heart rate decreases. If not treated promptly, the patient becomes cyanotic and hypotensive and ultimately sustains cardiac arrest.

Occasionally, the TURP syndrome starts with neurologic signs. The patient first becomes lethargic and then unconscious and the pupils dilate and react sluggishly to light. This can be followed by short episodes of tonic-clonic seizures and then coma that lasts from a few minutes to many hours.
If the patient is under general anesthesia, the presenting signs of the TURP syndrome are typically a rise and then a fall in blood pressure, respiratory arrest, and severe refractory bradycardia. The electrocardiogram (ECG) may show nodal rhythm, ST-segment changes, U waves, and widening of the QRS complex. Recovery from general anesthesia is usually delayed.