COMPLICATIONS OF TURP AND OPEN PROSTATECTOMY

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- The overall morbidity of TURP continues to approach 20%

Intra operative complications

- Hemorrhage
- Perforation of prostatic capsule/ bladder
- TUR syndrome
- Hypothermia
- Bacteremia and sepsis
- Erection
- Ureteral injury

Hemorrhage

Bleeding requiring transfusion occurs in about 3% to 4.4% procedures

Depends on resection time (2-5 ml/min) and prostate size (20-50 ml/gr)

Every effort should be made to achieve hemostasis during the operation to prevent the need for a return to the operating room. (**Arterial bleeding should generally be fulgurated during the procedure** , Venous bleeding is classically more difficult to control, balloon tamponade may be most effective.)

Serial Hb/Hct levels are the most sensitive indicators of the need for transfusion.

Perforation

may occur at many places during the resection; the prostatovesical junction, prostatic capsule, or the bladder itself are all possibilities.

electroresection or overdistension

Most perforations are extra peritoneal, and in a conscious patient they result in pain in the periumbilical, inguinal,or suprapubic regions;

additionally, the urologist may notice reduced return of irrigation fluid.

Extraperitoneal rupture caused limited extravasation can almost always be managed with extended catheter drainage and careful observation. In cases of extraperitoneal rupture occurring with extensive extravasation, percutaneous or open drainage may be required.

Intraperitoneal perforation

Less common, but more serious.

In these patient abdominal pain is generalized, and the patient may complain shoulder tip pain. Other finding are nausea, vomiting and hypotention.

Perforation may present as sudden, unexpected hypotension under generalized anesthesia.

- Management consists of **immediade laparotomy** and correctin of the defect

TURP syndrome

is a term applied to a constellation of symptoms and signs caused primarily by excessive absorption of irrigating fluid.

The prostatic venous system has a pressure of approximately 10 mm Hg, and fluid at a pressure exceeding this will lead to fluid absorption when these vessels are exposed during resection.

The absorption of the hypo-osmolar irrigating fluid leads to an acute dilutional hyponatremia with resulting neurologic changes (confusion, nausea, vomiting, visual changes, hypertension, tachypnea, and bradycardia).

- **TUR syndrome was seen in 2% of cases in the AUA cooperative study.**

- The recent meta-analysis of RCTs found a lower incidence, with only 0.8% of patients suffering from TUR syndrome.
- Although most authors agree that TUR syndrome is caused by dilutional hyponatremia, there have been alternate etiologies proposed. Hoekstra et al. (1983) and Ryder et al. (1984) noted elevated serum ammonia levels after glycine irrigant resections.

- Now with the use of isotonic, iso-osmolar irrigating solution and the bipolar electroresection system, this risk has theoretically been eliminated.

TURP syndrome sign and symptoms

- **Triad classic:** Hypertension, Bradycardia, Altered mental status
- **Cardiovascular and Pulmonary :** Hypertension, Brady/tachyarrhythmia, Congestive heart failure, Pulmonary edema and hypoxia, Myocardial infarction, Hypotension
- **CNS:** Agitation/Confusion, Nausea and vomiting, Seizure, coma, visual disturbances (blindness)
- **Metabolic:** Hyponatremia, Hyperglycinemia, Hyperammonemia, Hypo-osmolality, Hemolysis

- **Hyponatremia**
- Dilutional hyponatremia (serum Na+ <130 mmol/L) is the hallmark of TURP-S syndrome.
- hyponatremia leads to a reduction in plasma osmolality. Hence, water enters the intracellular space causing cell edema, hemolysis, pulmonary edema and in severe cases cerebral edema.

- When serum sodium level is below 120 mEq/L, there is hypotension due to reduced myocardial contractility.

- Below 115 mEq/L, bradycardia, widening of QRS complexes and T-wave inversion are seen.

- At levels below 100 mEq/L generalized seizures, coma, respiratory arrest, ventricular tachycardia, ventricular fibrillation and finally cardiac arrest occurs.

Hypo-osmolality

The real cause of neuronal disturbance is the rapidly established hypo-osmolality and not hyponatremia.

The effective pore size of blood brain barrier is such that it makes the barriers essentially impermeable to sodium but freely permeable to water.

When there is acute change of serum osmolality (within minutes to hours) causes **cerebral edema and increased intracranial pressure, which in turn cause bradycardia and hypertension by cushing's reflex.**

A volume of more than 2 liters, gained in 1 hour can lead to TURP-S; >3.5 liters precipitates shock and multiple system dysfunction.

Hemolysis

When hypotonic irrigant such as distilled water is used, there is acute hypo-osmolality with massive hemolysis.

The hemoglobinemia and hemoglobinuria coupled with hypotension can cause acute renal failure.

Hyperkalemia occurring due to cell breakdown may cause cardiac arrest.

Hyperglycinemia

Although glycine is accepted as the most likely cause of ‘visual disturbance’ following TURP, it may also result in ‘glycine-induced encephalopathy and seizure' and 'toxic renal effects’.

Glycine is the major inhibitory neurotransmitter at the levels of retina.

Normal plasma glycine levels are 13-17 mg/ L whereas levels as high as 1,029 mg/L (up to 65 times normal) can be reached leading to **transient blindness.**

- The glycine absorbed with the irrigating fluid is metabolized at the hepatic and kidney level with the synthesis of ammonia, glyoxylic acid, glycolic acid, serine and elastase, which are accumulated both in blood and cerebrospinal fluid (CSF).

- High ammonia concentration suppresses norepinephrine and dopamine release in the brain. This causes the encephalopathy of TURP-S.

Factors which increase risk of TURP syndrome

1- Duration of the procedure (greater than 90 minutes)

On average, ***10 to 30 mL of fluid is absorbed per minute*** of resection time, with as much as 6 to 8 L absorbed in some procedures lasting up to 2 hours.

2- Larger glands (greater than 45 g)

3- Height of bag above the patient

Hydrostatic pressure > 60 cm H2O

4- Capsular or bladder perforation

Investigations required for diagnosis

1- serum sodium level

2- ECG – QRS widening, ST elevation, T wave inversion (below sodume level of 115 mEq/l

3- serum ammonium level

Management of TURP syndrome

- **Terminate surgery as soon as after proper hemostasis.**
- **IV furosemide (40-100 mg) to induce diuresis.**
- Draw arterial blood sample for ABG and serum electrolytes.

- Patient should be closely monitored on an intensive care unit
- **Correct hyponatremia by using hypertonic saline (3%).**

1. About 1mmol/l/hour. Not exceeding an increase 20 mmol/l in the first 24 hour
2. Therapy should be stopped when symptoms cease or sodium level reaches 124-132 mmol/l
3. Rapid correction causes central pontine myelinolysis

- When there is hypotension, peripheral vasoconstrictors are useful.
- In case of convulsion, short-acting anti-convulsants diazepam or midazolam IV and in resistant cases, phenytoin or barbiturates can be given.
- Packed RBC rather than whole blood is indicated in case of significant blood loss.
- Restricted and cautious administration of IV fluid is necessary as these patients are very prone to pulmonary edema.
- For temporary total blindness, reassurance that unimpaired vision is expected to return within 24 hours is the best treatment as half-life of glycine is only 85 minutes.

post operative complications

- Hemorrhage
- Urinary retention
- UTI
- Epididymo-orchitis
- DVT and PE
- Myocardial infarction and CVA
- Bladder neck stenosis
- Urethral Stricture
- Incontinence
- Urinary storage symptoms
- Retrograde ejaculation
- Erectile dysfunction

bladder neck contracture

- 2%- 21% of cases
- This complication is thought to result from overresection of the tissue at the bladder neck paired with injudicious fulguration of this area.
- Patients with this complication customarily report excellent flow rates in the immediate postoperative period that slowly decrease in the coming weeks, months, or years.
- The average time : 6 months after surgery (3 weeks to 10 years)
- **Prompt office cystoscopy should be performed to verify the diagnosis.**

- **Treatment**

1. Gentle dilation with sounds or a dilating balloon (in the office)
2. Endoscopic incision (generally aggressive dilatation)
3. open VY-plasty

Urethral stricture

- 4.1% cases
- **Etiology**

1. resectoscope trauma
2. catheter usage
3. bacterial infection in the postoperative period.

Calibration and gentle dilation of the meatus along with careful visual inspection of the urethra on insertion of the cystoscope may help in preventing trauma that may lead to stricture.

Incontinence

- **Incidence of SUI: 0.6% (up to 5%).**
- **This is often a transient issue and rarely requires additional intervention.**
- **The verumontanum is an invaluable landmark and should be preserved** not only as a landmark during the ongoing resection, but also for any future identification during cystouretheroscopy.
- Resections that are terminated proximal or adjacent to the verumontanum are unlikely to have a significant injury to the external sphincter.

Urinary storage symptoms

are a common finding after surgery.

The raw prostatic fossa takes time to re-epithelialize, and the patient will likely frequently experience symptoms of **urgency** or **dysuria** during this time.

Dysuria in 2.2% (0% to 22%) of cases

Urgency in 0.8% (0% to 38%) of cases

Retrograde ejaculation

In 60% to 80% of TURP cases and 80% to 90% open prostatectomy

Erectile dysfuntion

- **3% TO 5% after open prostatectomy**
- In a trial of 644 men, 30% noted an improvement in erections after the procedure, and only 20% noted worsening function. The percentage of men engaging in sexual activity before and after surgery was essentially identical.

- **In a comparative study of patients undergoing either TURP or transurethral resection of bladder tumor (TURBT), the baseline voiding and erectile function in the TURBT group was statistically far superior. However, after prostate resection, the TURP group displayed significant improvements in almost all International Index of Erectile Function-15 (IIEF-15) subdomains with an impressive improvement in erectile function (improving from 7.18 to 20.74). After TURP, the groups were no longer statistically different with regard to voiding and sexual function.**

Thanks for your attention