

Anaesthesia for urological surgery

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Abstract

Anaesthesia is commonly used to facilitate urological procedures and many patients are elderly with multiple co-morbidities. Urological procedures range from minor day case to major surgery in which extensive resources are needed both intra- and postoperatively. For simple day case procedures like cystoscopy or ureteroscopy, general anaesthesia is most commonly used because it allows for early ambulation. Transurethral resection of the prostate (TURP) needs special attention. TURP syndrome due to excessive absorption of the irrigation fluid can be catastrophic if not managed early. Avoiding contributing factors and choosing regional anaesthesia which allows for early detection are key. Careful perioperative planning and risk stratification is important in major urological cancer surgery. Most of these procedures will require general anaesthesia (due to longer operative time and more extensive surgical trauma). Postoperative pain management in the form of epidural or patient-controlled multimodal analgesia are essential. Postoperative high-dependency care is beneficial.

Keywords General anaesthesia; postoperative care; preoperative assessment; regional anaesthesia; surgery; transurethral resection of prostate syndrome; urology

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Introduction

Anaesthesia is commonly used to facilitate urological procedures and many patients are elderly with multiple co-morbidities. Urological procedures range from minor day case procedures, to major surgery in which extensive resources are needed both intra- and postoperatively (high-dependency unit (HDU)/intensive care unit (ICU)). Consequently anaesthesia may encompass local, monitored anaesthesia care (MAC), regional or general techniques.¹

Preoperative assessment

A thorough assessment of the patient history, including any anaesthetic records, is important in detecting any underlying co-

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Learning objectives

After reading this article, you should be able to:

- formulate an anaesthetic plan and analgesic regime for the management of common urological procedures
- identify the clinical manifestations of transurethral resection of the prostate syndrome and know how to manage it
- name commonly used drugs in anaesthesia with a potential for significant accumulation in patients with renal impairment or that may induce nephrotoxicity

morbidities and to assess the degree of major organ function. Exercise tolerance is a good predictor of propensity to postoperative complications and can be assessed as metabolic equivalent tasks (METs) where 1 MET is the metabolic equivalent of a resting adult. Under 4 METs, or the inability to walk up two flights of stairs, is associated with increased risk.

Special attention should be paid to the drug history and their effects on renal function.

Physical examination and laboratory investigations can be performed based on history and physical examination. Most perioperative medical complications involve the cardiac and/or respiratory systems so these deserve special attention. Renal function may also be compromised and many patients will require testing preoperatively.

The lithotomy position is most commonly used during urological surgeries and patient suitability for this may need to be assessed and any limitation of movement in hip/knee joints documented.

Intraoperative care

Standard American Society of Anesthesiologists (ASA) monitoring (non-invasive blood pressure (NIBP), electrocardiography (ECG), pulse oximetry, capnometry, temperature) should be used in all patients. Further more invasive monitoring will depend on the type of surgery and patient co-morbidity.

For obvious anatomical reasons, urological surgery is a field where regional anaesthesia is widely practised. Benefits of regional anaesthesia include lesser effects on the respiratory function, faster postoperative oral intake, pain relief, a lower incidence of postoperative deep vein thrombosis (DVT), and easier detection of neurological symptoms during transurethral resection of the prostate (TURP) surgery (see below).

General anaesthesia (GA) is mostly chosen for very short procedures (day case cystoscopy), for lengthy major surgery (radical cystectomy, nephrectomy) or when particular positioning is required (e.g. lateral or head down). It is, of course, possible to combine regional and general anaesthesia with the use of epidural techniques. This can have the advantage of reducing general anaesthetic drug requirements and can facilitate more prolonged postoperative analgesia. Epidural anaesthesia can also help reduce intraoperative blood loss and bowel distension during pelvic and intra-abdominal cancer surgery.

Renal function may be impaired and, therefore, it is prudent to choose drugs which are not likely to further compromise renal function and which are not metabolized in the kidney (Table 1).

Commonly used drugs in anaesthesia with a potential for significant accumulation in patients with renal impairment

Muscle relaxants	Rocronium, vecronium
Analgesics	Pethidine, morphine
Induction agents	Barbiturates
Anticholinergics	Atropine, glycopyrolate
Cholinesterase inhibitors	Neostigmine, edrophonium
Antibiotics	Penicillins, cephalosporins, aminoglycosides, vancomycin
Antihypertensives	Clonidine, methyldopa, hydralazine, diuretics
Miscellaneous	Inotropes, digoxins

Table 1

Where this is not possible, then the pharmacodynamic effects must be closely monitored. For example muscle relaxants such as atracurium or cisatracurium would be preferable to rocuronium, but if there was a good reason to use rocuronium then neuromuscular function can be assessed and the effects reversed with sugammadex if necessary. Suxamethonium is best avoided in patients with renal impairment in which serum potassium may be raised.

Non-steroidal anti-inflammatory drugs (NSAIDs) and cyclooxygenase 2 inhibitors (coxibs) can interfere with renal autoregulation. Total intravenous anaesthesia (TIVA) with propofol and remifentanyl is safe in renal dysfunction. Patients may be more sensitive to the pharmacodynamic effects in the presence of uraemia and protein binding may be reduced leading to higher free drug fractions. Consequently careful titration of drugs with target-controlled infusion (TCI) is a suitable technique.

Postoperative nausea and vomiting (PONV) is not a particular problem for this type of surgery but can be reduced by good pain management (minimizing opioid use, where possible), adequate hydration and prophylactic antiemetic use.

Postoperative care

Postoperative pain management aims to provide good analgesia with little or minimal residual sedation to facilitate faster discharge. For day case procedures, short-acting opioids like fentanyl along with paracetamol can be safely used.

Postoperative pain management in inpatients usually includes patient-controlled analgesia (PCA) or epidurals. If PCA is to be used, one should keep in mind the renal functions and the cumulative effects of opioid metabolites. Some anaesthetists advocate using fentanyl rather than morphine as fentanyl has no active metabolites, whereas morphine is metabolized by the liver to morphine-6-glucuronide (M6G) which is then excreted by the kidneys.² Drugs like paracetamol can be used safely.

Endoscopic procedures of the lower genitourinary tract

Examination of the bladder and lower genitourinary (GU) tract are very common procedures both for the diagnosis and treatment of diseases. Cystoscopy can be performed with a flexible

fibrescope under local anaesthesia (lignocaine lubricant gel) with or without mild sedation. Rigid cystoscopy is indicated for the diagnosis of the lower GU pathology, and/or dilatation of urethral strictures.

General anaesthesia in the lithotomy position is most commonly used as most of these procedures are short day cases requiring early ambulation. Spinal anaesthesia may also be used and one must ensure a block to around the T10 dermatome to achieve satisfactory conditions for surgery.

Transurethral resection of the prostate (TURP)

Benign prostatic hyperplasia occurs in around 40% of men above 60 years old so, consequently, transurethral resection of the prostate is the most common surgical intervention in the urological patients. During the procedure, a resectoscope is inserted through a modified cystoscope and facilitates the prostatic tissue to be cut and coagulated. Significant bleeding may occur due to opening of venous sinuses.

Various complications can develop during the procedure. The most important of these is bleeding and TURP syndrome. Other complications may include hypothermia, bladder perforation, coagulopathy and postoperative sepsis.

Patients are usually elderly (>60 years) with multiple comorbidities. Chronic renal impairment is not unusual in the elderly and where there has been significant urinary tract outflow obstruction. A detailed pre-anaesthesia check must be performed. The mortality for TURP ranges between 0.5 and 0.7% mainly due to heart failure, pulmonary oedema and renal failure. Cross-matched blood should be available.

Care must be taken during patient positioning (lithotomy). Two people are needed to move the legs simultaneously up or down to avoid stressing the spinal ligaments. Pressure points must be padded, most importantly to avoid the straps of the legs from exerting excessive pressure on contact points. Iatrogenic nerve palsies recorded before include: injury to the common peroneal nerve (loss of dorsiflexion of the foot) due to strap pressure against the head of the fibula; injury to the saphenous nerve (numbness of the medial calf) due to tight straps over the medial aspect of the legs; and injury to the obturator component of the femoral nerve due to excessive flexion of the thigh against the groin.

Unless contraindicated, regional anaesthesia (single subarachnoid injection) is the recommended popular technique for TURP, as it allows early identification of the neurological manifestation of TURP syndrome. Also the vasodilatation produced and the venous pooling helps reduce the circulatory overload, and decreases the incidence of postoperative DVT. If GA is chosen, it is best achieved with controlled ventilation via a supraglottic airway device. High airway pressures must be avoided as this increases bleeding from the prostatic bed. A large-calibre intravenous cannula is sited in case of significant bleeding. A forced air warmer, fluid warmer and body temperature irrigation fluids should be used to maintain normothermia.

TURP syndrome

TURP syndrome refers to the symptoms and signs that occur as a result of the absorption of large amounts of irrigation fluid. It can present either intra- or postoperatively. Prompt recognition and

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