Management of intraoperative penile erection with salbutamol aerosol

Sir,

Intraoperative penile erection during endoscopic surgery can result in postponement of the proposed procedure. We describe the successful management of intraoperative penile erection that developed in a young patient under general anesthesia by the use of salbutamol aerosol delivered via Metered Dose Inhaler (MDI).

A 23-year-old, 48 kg, normotensive male with a right renal calculus was scheduled for percutaneous nephrolithotomy (PCNL). History, physical examination, and investigations were unremarkable. Patient was premedicated with oral alprazolam. In the operating room, standard monitoring was initiated. Baseline heart rate (HR) was 54/min and blood pressure (BP) was 115/74 mmHg. Glycopyrrolate 0.2 mg and fentanyl 100 μg were administered intravenously. Anesthesia was induced with propofol 100 mg and orotracheal intubation was facilitated with vecuronium 5 mg. Anesthesia was maintained with isoflurane 0.6% and nitrous oxide (N_2O) (66%) in oxygen (O_2). During instrumentation with a 24 F cystoscope a rigid penile erection developed. At this time HR was 53/min and BP was 89/57 mmHg. HR decreased to 49/min and BP to 88/57 mmHg during the next 5 min. Atropine 0.6 mg was administered intravenously resulting in a rise in HR to 99/min and BP to 158/113 mmHg. Anesthesia was deepened with isoflurane 1.5% for a short time to counter the rise in blood pressure. Thereafter, anesthesia was maintained with isoflurane 0.4–0.6% and N_2O (66%) in O_2. After waiting for 5 min for spontaneous detumescence to occur, four actuations of salbutamol (100 μg) MDI were administered via the tracheal tube and the dose was repeated after 15 min.

As there was no relief, a decision was taken to perform

intracorporal injection of phenylephrine to relieve penile erection. While the injection was being prepared, we administered eight puffs of salbutamol as a last attempt to relieve priapism. Within 2–3 min penile rigidity decreased and there was complete penile detumescence by 5 min. The erection had lasted approximately 45 min. There was no systemic change in BP or HR following salbutamol administration. The patient had a normal recovery from anesthesia. Patient had no past psychiatric history, drug abuse, or previous episodes of priapism or erectile dysfunction.

Intraoperative severe and prolonged erection is a urologic emergency. While a significant proportion of penile erections are idiopathic (30%), they can be induced by certain drugs (antidepressants, antihypertensives, and recreational drugs) and medical conditions (polycythemia, leukemia, and pelvic thrombophlebitis). Our patient had no associated medical condition and was not on any medication. The etiology of intraoperative erection during general anesthesia is unclear, but both reflexogenic and psychogenic mechanisms have been suggested.[1] An association between propofol and priapism has been reported[2] and the dose-dependent vasodilation caused by propofol has been suggested as the possible mechanism. Our patient developed hypotension following induction of anesthesia with propofol.

Several methods (local application of ice packs or ethyl chloride spray) and pharmacological agents have been described for control of penile erection. Glycopyrrolate has been used effectively to relieve intraoperative penile erection.[3] Our patient had received glycopyrrolate before induction of anesthesia (to prevent drainage of saliva in prone position and possible loosening of the tape securing the tracheal tube) and also atropine (for bradycardia with hypotension) with no therapeutic benefit on penile erection. Direct intracorporal injection of epinephrine, norepinephrine, metaraminol, dopamine, and phenylephrine has been used to relieve priapism.[4] Intracorporal injection can result in pain, hematoma, infection and fibrosis of the penis, systemic adverse effects, and accidental intravenous injection.

Terbutaline, a beta-2-adrenergic agonist (5 mg orally or 0.25–0.5 mg subcutaneously or intravenously) has been found to be effective for the treatment of intraoperative penile erection in patients undergoing surgery.[1] Terbutaline acts by relaxing the smooth muscle of the cavernous tissue, arteries, veins, polsters in these blood vessels, and tunica albuginea and its trabeculae in the pelvis. As a result, blood from arteries, cavernous sinusoids, and capillaries flows easily through the veins and out of the penis, resulting in detumescence. Salbutamol, a beta-2-adrenergic agonist, binds to beta-2-adrenoceptor in the cell membrane causing activation of adenylcyclase that catalyses the intracellular conversion of adenosine triphosphate (ATP) to cyclic 3,5-adenosinemonophosphate (cAMP). This activates specific protein kinases, which reduce the phosphorylation of myosin light chain, causing a reduction in calcium-dependent coupling of actin and myosin. This leads to relaxation of smooth muscle leading to bronchodilation and vasodilation.

Intravenous administration of beta-2 agonists can result in tremors and tachycardia. Inhaled salbutamol used in the present case resulted in successful penile detumescence without any adverse cardiovascular effects. We chose to give four puffs initially as four puffs of salbutamol administered by an MDI provide the best combination of bronchodilator effect and safety in stable mechanically ventilated patients.[5] However, for relief of erection a larger dose than that used for local bronchodilatory effect is required. Rapid therapeutic effect was observed in this patient after administration of eight actuations of MDI (total dose 16 actuations; 1600 μg). Removal of the triggering agent and increasing the depth of anesthesia are other important therapeutic measures.

Smita Prakash, Sandeep Sharma, Sandeep Miglani, Anoop R Gogia

Department of Anesthesia and Intensive Care, Vardhman Mahavir Medical College and Safdarjang Hospital, New Delhi – 110 029, India

Address for correspondence: Dr. Smita Prakash, Consultant, C 17 HUDCO Place, New Delhi – 110 049, India.
E-mail: drsunilprakash@gmail.com

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