Meeting the challenges in HIV patients undergoing robotic oncosurgery

Madam,
Immunosuppressive and inflammatory conditions such as acquired immunodeficiency syndrome (AIDS) are known to cause cancer progression.\(^1\) Most common cause of human immunodeficiency virus (HIV)-related death in affluent societies is cancer\(^2\) (especially AIDS-defining malignancies such as Kaposi’s sarcoma, non-Hodgkin lymphoma, and cervical cancer). Recent evidence implicates several perioperative factors (psychological stress, intraoperative hypothermia, allogenic blood transfusion, pain) for immunosuppression and cancer progression.\(^{1,2}\) Radiotherapy and chemotherapy are cancer treatment modalities that may cause severe immunosuppression (thus cancer recurrence), while surgery appears the safer alternative. Surgery itself is known to stimulate neuroendocrine and cytokine stress response, suppress cell-mediated immunity, and disperse tumour “emboli.” Robotic surgery is advantageous as it induces lesser inflammatory stress response than open surgery, and hence, theoretically reduces the chances of cancer progression. Robotic cancer surgery is a safe possibility for HIV patients in developing countries where economic limitations apply for disposables. The expensive nondisposable robotic instruments necessitate a stringent sterilization regimen before being reused. However, retropositive patients, being immunocompromised hosts, require special care or they may contract new infection which may lead to poor prognosis.

A 46-year-old male with squamous cell carcinoma of the tongue became HIV positive whilst undergoing a robotic surgery (hemiglossectomy with neck dissection). Here, we
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share the principles followed in managing this patient for robotic surgery aimed at preventing HIV transmission and cancer recurrence.

Preanesthetic evaluation should screen for effectiveness and side effects of antiretroviral drugs (HAART) (our patient had elevated hepatic enzymes and CD4+ T-cell count of 624 cells/mm³). Induction/inhibition of hepatic CYP 450 3A4 enzyme by HAART may prolong the effect of neuromuscular blockers, calcium channel blockers, fentanyl, midazolam, and cause lignocaine toxicity.[3] Protease inhibitors (saquinavir, ritonavir) increase the effect of sevoflurane, pethidine, dextropropoxyphene, amiodarone, and propofol. Etomidate, atracurium, desflurane, and remifentanil are not metabolized by CYP450, and hence, maybe preferred. Propofol possesses anticancer properties (attenuates cancer cell migration, proliferation, and metastasis in vitro besides inhibiting cycloxygenase).[4] Regional and local anesthesia attenuates immunosuppression.[2,4] Neuromaxial anesthesia concerns include, pre-existing peripheral neuropathy, and risk of HIV seeding of central nervous system (CNS) via a bloody tap. When surgical site precludes regional anesthesia, anesthetic technique should include induction and maintenance with propofol and infiltration of robotic neck dissection tunnel with local anesthetics. Nonimmunosuppressive, opioid-sparing drugs (nonsteroidal anti-inflammatory drugs, cyclo-oxygenase–II inhibitors, ketorolac, gabapentin), systemic glucocorticoids, and β-blockers[2,4] merit preference. Succinylcholine poses risk of hyperkalemia in HIV-related myopathy and neuropathy patients. Volatile anesthetics, alpha 2 agonists (clonidine, dexmedetomidine), opioids, and blood transfusion are also known to cause immunosuppression and tumor recurrence.[2,4]

Transmission risk to staff mounts during invasive procedures and is minimized if universal precautions are universally followed. Needle stick injury carries a transmission risk of 0.03–0.3% depending on the type (hypodermic) of needle, depth of puncture, and quantity of blood inoculated.[3] Disposable equipment and linen, hydrophobic filter fitted circuits, visors, double gloves, and protective footwear should be utilized to avoid contact with blood, semen, cerebrospinal, pleural, pericardial, peritoneal, and amniotic fluids and tissues. Sweat, tears, saliva, sputum, urine, and stools are considered noninfectious unless contaminated by above.[3] Robotic endoscopic equipment tray is Gas plasma sterilized (STERRAD 100S) before reuse.[5] Robotic instruments are soaked in cold water or sprayed with pH-neutral enzymatic cleaner followed by an ultrasonic bath (performance ≥13 W/L; frequency ≥38 kHz; fully submerge; ≥1 inch clearance from edges of bath).[3] The transparent robotic arm covers (costing 28000 INR per set) are disposable (but usually reused 3–4 times after ETO sterilization in developing countries). Because covers are discarded after surgery on HIV positive patients, covers already used 2–3 times previously provide economy.

Occupational Safety and Health Administration’s blood borne pathogen standards,[6] offer three tiers of protection (Modification of tools with which we operate rather than attempting to change human behavior; work practice controls; personal protective equipment). Retractable lancets, blunt needles, guarded introducer needles, and programmed single use cannulae are safety innovations.

Robotic surgery may not only attenuate tumor progression but also reduces the surgeon’s risk of contracting HIV from the patient. Anesthesiologists should stay updated about the possible long-term effect of anesthetic-analgesic techniques on the progression of cancer growth.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Kounis syndrome in anesthesia: The coronary arteries as the primary target of anaphylaxis

Madam,
We have read with great interest the report published by Kerai et al. [1] concerning a 47-year-old male patient who developed anaphylactic shock and type I variant of Kounis with ventricular fibrillation following diclofenac intramuscular administration during parotid gland excision operation. The fluid administration was not helpful and the patient improved with anti-allergic treatment and inotropic support.

This report brings to light the following issues. All the drugs used for induction of anesthesia namely midazolam, fentanyl, propofol, vecuronium, and sevoflurane have been incriminated for mild or severe hypersensitivity reactions. [2] Clinical studies have shown that patients simultaneously exposed to multiple allergens present more symptoms than monosensitized individuals. [3] Furthermore, immunoglobulin E (IgE) antibodies with different specificities can have additive effects and small, even sub-threshold amounts might trigger mast cell degranulation and inflammatory mediator release. [4]

From the sequence of events and the lip swelling appeared after the intramuscular injection, it seems reasonable to conclude that the hypersensitivity reaction can be attributed to the last drug administered, the diclofenac. However, in the this case, the diclofenac constituted the sixth consecutive administered drug, further supporting our view that a potential sensitization should not be clinically regarded as a consequence of a single drug exposure but rather evaluated in the context of multiple drug sensitization. Anaphylactic shock is caused by systemic vasodilatation, volume loss from vascular permeability, plasma leakage, and reduced venous return, that lead to cardiac output reduction and coronary hypoperfusion with subsequent myocardial damage. However, experimental studies have revealed that left ventricular end diastolic pressure increases rapidly during anaphylactic shock and reduces cardiac output. [5] This indicates pump failure and not coronary hypoperfusion because blood pressure declined steadily after 4 min and administration of fluids to counter a presumed peripheral vasodilatation was ineffective. Contrarily, the patient developed dynamic ischemic electrocardiographic changes and ventricular fibrillation that finally resolved with anti-allergic and inotrope medications.

The elevated tryptase levels document anaphylactic reaction while acute coronary syndrome (troponin elevation combined with ischemic changes) could be attributed to adverse effects of drug administration. Studies have shown that tryptase is elevated in acute coronary events of non-allergic etiology and that troponin could also increase in allergic reactions. [6] This endorses the findings of Kounis of a common pathway for coronary events in both allergic and non-allergic reactions. [7] Therefore, the described patient seems to have suffered an anaphylactic reaction manifesting as Kounis syndrome I variant with normal coronary vasculature but with both tryptase and troponin elevation triggered by diclofenac intramuscular administration although the other anesthetic drugs could have contributed.

Keeping in mind that the coronary arteries could be the primary target for anaphylaxis, the use of fewer anesthetic agents may have a beneficial effect for patients.

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