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Inadvertent Intra-Arterial Injection of Dexamethasone and Reversal Agent

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I. INTRODUCTION

Accidental intra-arterial injection of anesthetic drugs is not an uncommon thing to happen in the operating room (OR). An overwhelming number of case reports have been published on inadvertent injections of different drugs with varying uses and physicochemical properties since 1943 when McIntosh and Hayworth reported the injection of thiopentone into the brachial artery.We report two cases in which an inadvertent injection of dexamethasone, neostigmine, and glycopyrrolate combination was injected intra-arterially.Written informed consent was obtained from the families of both patients regarding the publication of the literature as case reports.

II. CASE REPORT

The first case was a 12-year-old child scheduled for tracheostomy due to prolonged mechanical ventilation for COVID ARDS.The patient received dexamethasone injections and a stress dose of 4 mg was administered prior to the start of the procedure.At the end of the procedure, the injection was administered via the intra-arterial route.Immediate inspection of the hand revealed no discoloration, changes in oxygen saturation, or radial artery pulse.The second case involved a 45-year-old female getting surgery for post-COVID rhino-orbital mucormycosis, debridement, and left maxillectomy.The radial artery was cannulated with a 20G arterial cannula in view of previous HDU admission for COVID-ARDS and dependence on minimum oxygen support at present.Toward the end of the procedure, a combination of neostigmine and glycopyrrolate was injected in amounts of 3.5 mg and 0.7 mg.The patient was extubated uneventfully. At the time of removal of the arterial line, in view of no further indication, it was realised that it could not be flushed forward with heparinised saline.Inadvertent reversal drugs were immediately injected into the arterial line through a three-way port with a 10 cm extension.Blood was aspirated from the cannula using a 10 ml syringe around three times the volume of the injected drug (30 ml).The arterial line was flushed with heparinised saline, the hand was elevated, and patency was confirmed by checking the radial and ulnar artery pulses and oxygen saturation in all fingers of the left hand.Both patients were followed for 5 days for any delayed complications.

III. DISCUSSION

Aqueous drugs such as dexamethasone, neostigmine, and glycopyrrolate have been safely used without vascular complications (1).The physicochemical properties of some drugs render them safe when injected intra-arterially.However, the preservatives present in glycopyrrolate and neostigmine (benzyl alcohol and methylsulfate) may cause vasospasm.Nonaqueous and alkaline drugs are known to cause adverse complications during arterial injection.Promethazine, diazepam, propofol, etomidate, thiopentone, and phenytoin(2).

There is ongoing research on possible modalities to treat accidental arterial injection of harmful drugs, and Keene et al. mentioned high-dose steroids as a way of managing this complication.Leaving the arterial catheter in situ to administer medications to treat immediate vasospasm is advisable (4).Anticoagulants such as low-molecular-weight heparin injections to decrease the chances of thrombosis are also a treatment modality.The role of high-dose steroids can be explained by the enhancement of local tissue repair.Local vasodilatation in cases of vasospasm can be induced using vasodilators, such as local anesthetic infiltration, hyperbaric oxygen, and nitropaste.Elevation of the limb helps increase venous drainage and decrease tissue oedema.

IV. CONCLUSION

In the operation room, most of the medication errors are action-based execution errors that include communication barriers during verbal transmission of orders, orders written in illegible handwriting, look-alike sound-alike drugs, wrongly labeled syringe, and carelessness in confirming drugs (4)(5).No specific treatment has been advocated, and inadvertent intra-arterial injections should be prevented.Quality improvement in health care helps improve patient outcomes by adopting changes and making rapid adaptations.Newer e-tools like Patient data management systems will enhance the quality of perioperative care and research (6).

Declarations

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