A Case of Accidental Vincristine Overdose and Effective use of Therapeutic Plasma Exchange in Its Management

Abstract
Vincristine is a common drug used in hematological malignancy with a maximum per dose limited to 2 mg mainly to limit neurotoxicity. Vincristine overdose and wrong route of administration, though has been reported in world literature, but its appropriate management is still undefined. We report a case of Hodgkin lymphoma being treated with adriamycin, bleomycin, vinblastine and dacarbazine protocol, where vincristine was accidently administrated instead of vinblastine due to its “look-alike, sound-alike” nature. The patient developed severe toxicity due to the same, which was effectively managed by therapeutic plasma exchange.

Keywords: Look-alike, sound-alike drugs, medication error, overdose, therapeutic plasma exchange, vincristine

Introduction
Vincristine is an antimicrotubular agent belonging to vinca alkaloid subtype of antineoplastic drugs. The common adverse effects of it are alopecia, constipation, myelosuppression, and neuropathy. Other drugs belonging to the same subtype of antineoplastic drugs are Vinblastine, Vindesine and Vinorelbine. Due to this subtype of antineoplastic drugs being “Look-alike, sound-alike” (LASA) drugs and part of various protocols of haematological malignancies, there are high chances of human errors occurring during administration of these drugs. Despite high chances of human error, only a limited number of case reports have been published in literature about wrong doses, route of administration, with the adverse effects and management of the same.

Vincristine overdose and wrong route of administration though has been reported in world literature and their appropriate management is still undefined. Till date, from India only one case report of the wrong route of administration without report of vincristine overdose has been published despite vincristine being a common drug used in haematological malignancies.[1] We present here the first reported case of vincristine overdose from India with effective use of therapeutic plasma exchange (TPE) to combat its toxicity.

Case Report
An 18-year-old male, a recently diagnosed case of Hodgkin lymphoma, was admitted for doxorubicin (adriamycin), bleomycin, vinblastine and dacarbazine (ABVD) protocol. During the first cycle day 1 vincristine 9 mg (6 mg/m²) was accidently administrated instead of vinblastine. The mistake was immediately identified and the patient was then immediately started on folinic acid 100 mg intravenous every 3 h for the first 24 h and then every 6 h, prokinetics with laxatives, oral care with betadine mouthwash and gargles, intravenous fluids with sodium chloride (0.9%), vitamin B-complex and other supportive measures. Despite above measures, the patient had severe jaw pain, severe oral mucositis, generalized weakness, obstipation, nausea, loss of appetite, weight loss (4 kg on day 4), reticent behaviour with episodes of restlessness in between, hyponatremia (syndrome of inappropriate antidiuretic hormone secretion) from day 2–3 which increased with time. His laboratory parameters on day 4 were (before TPE): haemoglobin - 11.9 g/dl, platelet count - 2.8 lakh/µL, total leucocyte count - 12,400/µL (neutrophils: 91%,...
Vincristine has a high terminal phase with frequency and dosing. It is indicated in this subtype, antineoplastic drugs being LASA drugs and drugs are Vinblastine, Vindesine and Vinorelbine. Due to other drugs belonging to same subtype of antineoplastic drugs are high. Vincristine, an antimicrotubular agent, belonging to vinca alkaloid subtype of antineoplastic drugs is a common drug used in oncology especially in haematological malignancy. With many approved and off-label indications it is only administrated intravenously with usual dose varying between 0.5 and 1.4 mg/m² with frequency and dosing based on the protocol and treatment phase. Its maximum per dose is limited to 2 mg mainly to limit neurotoxicity. The common adverse effects of it being alopecia, constipation, myelosuppression and neuropathy. There is no specific antidote for overdose but folinic acid and TPE is recommended, based on anecdotal experience and treatment is mainly supportive to alleviate its adverse effects predominantly that of neurotoxicity, myelosuppression and ileus.[2,3] Other drugs belonging to same subtype of antineoplastic drugs are Vinblastine, Vindesine and Vinorelbine. Due to this subtype, antineoplastic drugs being LASA drugs and part of various protocols of haematological malignancies, chances of human error during administration of these drugs are high.

Though an accidently overdosing due to LASA drug resulted in toxicity our case; it adds to the few case reports in the literature supporting use of TPE in vincristine overdose. Overdose of drugs is American Society for Apheresis category II indication for TPE.[4] It is indicated in drugs with low volume of distribution, high protein binding and long half-life.[5] Vincristine has a high terminal phase of elimination especially in higher dose thus a suitable target for TPE in overdose toxicity.[9]

We also learn from this case that medication errors should be prevented, especially with respect to antineoplastic drugs as these errors can be potentially life-threatening. It also emphasizes the need of implementation for medication safety practices, with a few important ones being listed below.

- Double cross verification of drugs (including prescription error), dose (including decimal errors) and its administration method
- Computerized or printed orders with use of tall-man lettering for LASA drug names
- Regulating dispensing of drugs
- Instant access to chemotherapy protocols and drug information by the staff
- Administration of drug especially, chemotherapy only by a trained and experienced staff attending regular continuous medical education
- Avoid initiation and/or administration of chemotherapy during night
- Medication error reporting system.

The root cause analysis of the overdosing in our case found that the medication error mainly due to similar sounding names of the drug and required stricter implementation of medication safety practices to prevent or minimize any medication error in the future.

Discussion

Vincristine, an antimicrotubular agent, belonging to vinca alkaloid subtype of antineoplastic drugs is a common drug used in oncology especially in haematological malignancy. With many approved and off-label indications it is only administrated intravenously with usual dose varying between 0.5 and 1.4 mg/m² with frequency and dosing based on the protocol and treatment phase. Its maximum per dose is limited to 2 mg mainly to limit neurotoxicity. The common adverse effects of it being alopecia, constipation, myelosuppression and neuropathy. There is no specific antidote for overdose but folinic acid and TPE is recommended, based on anecdotal experience and treatment is mainly supportive to alleviate its adverse effects predominantly that of neurotoxicity, myelosuppression and ileus.[2,3] Other drugs belonging to same subtype of antineoplastic drugs are Vinblastine, Vindesine and Vinorelbine. Due to this subtype, antineoplastic drugs being LASA drugs and...
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Conflicts of interest
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References