



SUCCESSFUL REVIVAL OF CARDIAC ARREST PATIENT FOLLOWING DRUG ERROR ---A CASE REPORT

Anesthesiology

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ABSTRACT

Medication /Drug errors can happen in hospital or out of hospital practice and are more frequent among the beginners starting with their health care practice. The untoward reactions can vary from mild to fatal. The common causes of Medication errors are miscommunication regarding drug dilution, route and speed of administration, confusion over similar looking labels on drug ampoules etc. We present here a case of drug error, who suffered cardiac arrest due to rapid intravenous injection of Vitamin K but revived with prompt cardiopulmonary resuscitation. He recovered fully, so as to undergo surgical closure of jejunostomy for which he was admitted. Drug error could be avoided with close loop communication, clear instruction and paying full attention to the drugs while administering them to the patients. The health care workers should also have a clear understanding about the patient's pathophysiology while giving medication.

KEYWORDS

VITAMIN K, DRUG ERROR, CARDIAC ARREST

INTRODUCTION

In our medical practice wide range of drugs are administered with similar looking labels or manufacturing design due to which extreme vigilance is required as there is possibility of medical error due to miscommunication or confusion while administering the drugs.

A medication error can be defined as "a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient" [1,2]. Medication error could be possible when there are errors during writing the prescription, drug manufacturing, packaging, dispensing, drug administration and monitoring after drug administration³.

Wrong drug, dosage or route of administration, all can lead to devastating complications like anaphylaxis leading to cardiac arrest. Early diagnosis and prompt cardiopulmonary resuscitations (CPR) are the key to revive a patient from cardiac arrest.

Here we present a case of sudden cardiac arrest due to suspected drug error; in hospital and he's revival with CPR who later continued with an uneventful recovery and discharged from hospital.

Case report

A 50-year-old male patient presented to the hospital for malfunctioning colostomy and bilious vomiting since past four days. He was a follow-up case of carcinoma rectum for which he underwent abdomino-perineal resection with colostomy 6 months back followed by chemo and radiotherapy as per protocol. He was a non-hypertensive but diabetic patient which was controlled with diet modification only. A diagnosis of intestinal obstruction was made by surgeon for which resection of approximately 4 feet of gangrenous small bowel was done along with double barrel jejunostomy under general anesthesia uneventfully.

Patient was kept in surgery ward for parental nutrition and further planning for closure of stoma. Along with diet, patient was also receiving injection Vitamin-K intramuscularly and inj. Magnesium sulphate infusion as supplements. On one such occasion while giving the medication intravenously (i.v) the nursing student noticed that the patient started having labored breathing, became unresponsive with up rolling of eyeballs. She immediately stopped i.v. medication and alerted the doctor on duty, who started cardiopulmonary resuscitation as soon as possible after finding the patient as pulseless and unresponsive. Patient was intubated and injection calcium gluconate 10ml, Inj Hydrocortisone 100mg and Inj. Dexamethasone 8mg was given intravenously. Return of spontaneous circulation was achieved after two minutes of continued CPR and then the patient was shifted to Intensive Care Unit (ICU) for further management. Patient had an uneventful stay in ICU where he was gradually weaned off from ventilator and extubated after three days of primary event. Then the patient was shifted to Surgery Ward again. His biochemical parameters

where within normal limits. After about eight weeks of the primary event, the patient presented to us for pre-anesthesia checkup (PAC) for stoma closure. A detailed PAC done. All the hemodynamic and biochemical parameters were found to be within normal limits. ECG and chest x-ray revealed nothing significant and echocardiography was done which shows that all parameters within normal limit with an ejection fraction of 55%. The patient was accepted for surgery under regional anesthesia i.e. subarachnoid block. Inj Bupivacaine (heavy) 2.4 ml and 15 µg of fentanyl were mixed and injected at L3-L4 intervertebral space for subarachnoid block after taking all aseptic precautions. A sensory level of T6 was achieved and surgery was performed uneventfully. Surgical duration was two hours with minimal blood loss. Two liters of Plasma-Lyte was used for intraoperative fluid management.

DISCUSSION

Sudden cardiac arrest tends to happen without warning. Usually the first sign is someone collapsing, fainting or appearing lifeless. In sudden cardiac arrest the heart stops pumping as its electrical system stops working. It can occur in people without heart disease but in almost 80% of cases there is existing coronary artery disease.

According to literature, only about 10% of people survive after a sudden cardiac arrest. But the odds of surviving are much higher if someone witnesses the event and start CPR immediately and uses early defibrillation as cardiac arrest is most often caused by dangerous heart rhythm called ventricular fibrillation.

This patient was on parenteral nutrition following intestinal surgery due to gangrenous bowel in which approximately 4 feet of small-bowel is resected. This can lead to intestinal failure which is defined as reduction in functioning bowel mass below the minimal amount necessary for adequate digestion and absorption of the nutrients and fluid requirement for maintenance in adults and growth in children 4. This can also lead to short Bowel Syndrome which is associated with high mortality, due to the presence of sepsis malnutrition and fluid/electrolyte abnormalities⁵.

Intestinal failure is considered as severe if patient requires parental nutrition, moderate when enteral and mild when oral supplements are needed 6. Calcium, potassium, magnesium deficiencies are common in these patients who undergo jejunal resection due to diarrhea and severe fat malabsorption 7. All these make these patients vulnerable to many infections, malnutrition, and extremely sensitive to many intravenous (IV) medications.

In this case, the patient suffered cardiac arrest as some intravenous medication was being given to the patient which the student nurse claims to be injection vitamin K. But then she was not sure as she was gripped with panic reaction realizing the severity of the situation.

Severe anaphylaxis has been reported with IV Vitamin K injection [8,9].

Recommended dose and route of administration vary for different indications and one should see the package inside for the route to be chosen. Intravenous route has been used in many emergency situations as the subcutaneous and intra muscular administration may be less efficacious due to unpredictable absorption [10,11].

It appears to be a case of anaphylactic reaction as the patient was already receiving I/M vitamin K for the past few days but suffered cardiovascular collapse on getting it intravenously and maybe it was pushed too fast or with inadequate dilution as these can also be the reason behind the adverse effect caused by vitamin K given intravenously.

The ACCP guidelines advocate the use of vitamin K as 5 to 10 mg (lowest effective dose), in at least 50 ml dilution to be given over 20 minutes. Severe reaction to parenteral vitamin K, can result during or within 20 minutes in dyspnea, breathlessness, bronchospasm, rhythm abnormality, severe hypotension, cardiac arrest and death¹².

In this patient also all these events occurred but due to timely intervention, the patient was revived from cardiac arrest with immediate resuscitative measures. Cardiopulmonary resuscitation has its own complications like: Skeletal injury: Fracture of rib, internal Organ injury like injury to spleen and liver, pneumothorax, hemo-pericardium etc. and post resuscitation residual neurological deficit due to cerebral edema and deranged cerebral autoregulation etc. Such patient when present to us for surgery, one has to be very careful in pre-anesthetic checkup (PAC) and assessment. Underlying heart disease should also be ruled out on careful history, examination and supported by biochemical parameters, ECG echocardiography, Holter monitoring and chest x-ray should be done and cardiologist opinion should be taken to rule out any existing coronary artery disease or any requirement of temporary pacemaker during and after the surgery.

CONFLICTS OF INTEREST: There are no conflicts of interest

REFERENCES:

1. Ferner R, Aronson J. Clarification of Terminology in Medication Errors. *Drug Safety*. 2006;29(11):1011-1022.
2. Aronson J. Medication errors: definitions and classification. *British Journal of Clinical Pharmacology*. 2009;67(6):599-604.
3. Aronson J. Medication errors: what they are, how they happen, and how to avoid them. *QJM*. 2009;102(8):513-521.
4. Goulet O, Ruemmele F. Causes and management of intestinal failure in children. *Gastroenterology*. 2006 Feb 1;130(2):S16-28.
5. EVENSON A, FISCHER J. Current Management of Enterocutaneous Fistula. *Journal of Gastrointestinal Surgery*. 2006;10(3):455-464.
6. Nightingale J. The medical management of intestinal failure: methods to reduce the severity. *Proceedings of the Nutrition Society*. 2003;62(3):703-710.
7. Hanna S, Macintyre I. THE INFLUENCE OF ALDOSTERONE ON MAGNESIUM METABOLISM. *The Lancet*. 1960;276(7146):348-350.
8. Aronson KJ. *Meyler's Side Effects of Cardiovascular Drugs*. Amsterdam ; Boston: Elsevier; 2009:449-556.
9. Hoffman R, Nelson L, Howland M, Lewin N, Flomenbaum N, Goldfrank L. *Goldfrank's manual of toxicologic emergencies*. 10th ed. New York, N.Y: McGraw-Hill Medical; 2015.
10. Makris M, Van Veen J, Tait C, Mumford A, Laffan M. Guideline on the management of bleeding in patients on antithrombotic agents. *British Journal of Haematology*. 2012;160(1):35-46.
11. Makris M, van Veen J, Maclean R. Warfarin anticoagulation reversal: management of the asymptomatic and bleeding patient. *Journal of Thrombosis and Thrombolysis*. 2009;29(2):171-181.
12. Holbrook A, Schulman S, Witt DM, Vandvik PO, Fish J, Kovacs MJ, Svensson PJ, Veenstra DL, Crowther M, Guyatt GH. Evidence-based management of anticoagulant therapy: antithrombotic therapy and prevention of thrombosis: American College of Chest Physicians evidence-based clinical practice guidelines. *Chest*. 2012 Feb 1;141(2):e152S-84S.