



Spurious Hyperkalemia due to EDTA Contamination: commonly overlooked and potentially dangerous

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Severe hyperkalemia is a medical emergency and lack of immediate intervention to correct it is potentially life threatening. Spurious hyperkalemia or pseudohyperkalemia occurring due to errors during sample collection can be misleading and may adversely affect patient management.¹

A 63-year-old man admitted in our ICU postoperatively after the evacuation of Subdural hematoma, developed hyperkalemia during the course of mannitol infusion for increased Intracranial pressure (ICP). Laboratory tests showed: $K^+ = 7.6$ mmol/L, $Na^+ = 138$ mmol/L, creatinine = 1.2 mg/dl and blood urea = 30 mg/dl. Arterial blood gas analysis showed: pH = 7.43, $pCO_2 = 32$ mmHg, $pO_2 = 95$ mmHg. ECG showed peaked T waves with bradycardia. Injection Calcium Gluconate was immediately given followed by dextrose insulin infusion. Serum electrolytes were monitored every 4 hours. Serum potassium levels came within normal limits on day 4 following which daily monitoring of electrolytes were done. On day 6, we received a

critical alert from the Biochemistry lab informing that the potassium value of the patient was 8 mmol/L. Patient appeared to be clinically stable with a normal ECG. The resident in the biochemistry lab was contacted and was informed regarding the situation. The sample was analyzed in Roche Cobas 6000 integrated autoanalyzer. On reanalysis of the sample, similar potassium value was obtained. The sample was centrifuged and analyzed within one hour of collection in the lab and was not hemolyzed, icteric or lipemic. Daily quality control of the parameters, external quality assessment scheme (EQAS) values as well as calibration of the equipment were satisfactory. Since errors in the analysis of the sample was unlikely, pre analytical factors were considered for the discrepancy. Serum calcium and alkaline phosphatase were analyzed in the sample and were found to be abnormally low. The resident suspected EDTA contamination and the nurse on duty was enquired about the steps followed during the sample collection. The nurse informed that she had collected blood for electrolyte estimation and

complete blood count in a yellow capped gel tube followed by lavender capped EDTA tube. Since she filled the EDTA tube slightly above the mark provided in the tube, so she transferred a little blood from the EDTA tube into the gel tube so that the EDTA tube was filled exactly upto the mark. A fresh sample was sent for potassium estimation which gave a value of 4.5 mmol/L. The nurse on duty was found to be a new recruit. Appropriate training of the nursing staff was conducted to avoid such errors in the future.

Laboratory results from one of the important bases of management of patients. But laboratory reports are not immune to errors. It has been estimated that upto 75% of laboratory errors occur during the pre-analytical phase (PP).² Phlebotomy is critical part of the PP.³ Simultaneous requisition for different blood parameters of a patient is common. Sample tubes containing potassium ethylenediaminetetraacetic acid (K-EDTA) are widely used for haematological investigations. Contamination of serum tubes with K-EDTA from blood collection tubes can lead to spuriously increased potassium value due to potassium introduction from the EDTA salts.⁴ To avoid such cross contamination, a specified order of draw should be followed in which sample in an EDTA tube should always be collected after serum tubes.² Also, sample from EDTA tube should never be decanted into another sample collection tube at any cost. The knowledge of the nitty-gritty of sample collection procedure and mindfulness regarding the inadvertent mistakes in the same can contribute significantly in preventing inconvenience and mismanagement of patients as well as in saving healthcare resources.^{4,5}

It is pertinent that in case of a suddenly discrepant potassium value not matching with the clinical presentation, a prompt consultation with the laboratory must be considered before administering any treatment to the patient. Also, periodic orientation trainings and refresher courses for the nursing staff about phlebotomy protocols is very essential.

References

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