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Case report

Reactive thrombocytosis and pseudohyperkalemia-entities we come across occasionally

R. Subha *, **Rachel Cherian Koshy**

Department of Anaesthesiology, Regional Cancer Centre, Trivandrum 695011, India

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Abstract Thrombocytosis and hyperkalemia are entities which can have sinister complications in the perioperative period and can be worrisome to the alert anesthesiologist. Hence it is good to be aware of variants which are quite benign and need not lead to delaying of anaesthesia administration. One such case is reported to highlight this fact.

61 year old lady was diagnosed with carcinoma colon for which she underwent right hemicolectomy under General anesthesia and epidural analgesia. She was discharged after a week. She got readmitted with burst abdomen for which she had an emergency laparotomy. Partial dehiscence of ileocolic anastomosis was found, repaired and the abdomen was closed. Six weeks later she was again hospitalized for repair of enterocutaneous fistula. It was at this instance that her platelet count was found to be elevated (6.5 lakh per mm^3) and potassium level was found to be high (5.5 meq/L). The ESR was 136 mm and C-reactive protein was 14.7 mg/L (normal – less than 10 mg/L).This was diagnosed as reactive thrombocytosis and the hyperkalemia was found to be pseudohyperkalemia. Emergency surgery was done under General anesthesia. Segmental resection and enterocolic anastomosis were performed. The platelet count gradually reduced and normalized in a few days time and the patient was discharged after **8** days.

Thrombocytosis is defined as platelet count more than 4.5×10^9/L [1]. WHO defines thrombocytosis as platelet count more than 6 lakhs [2]. Thrombocytosis is of 2 main types. Primary or essential, a myeloproliferative disorder of the bone marrow and reactive thrombocytosis. Thrombohemorrhagic complications can occur in essential but not in reactive thrombocytosis [3]. Reactive thrombocytosis per se is not detrimental in the context of malignancy, inflammation and infection. It is considered to be an epiphenomenon of a systemic acute phase reaction that is accompanied by excess of thrombopoietic growth factors interleukin-6 and tumor necrosis factor-alpha [4].

The common causes of reactive thrombocytosis are tissue damage, infection, malignancy, chronic inflammation, iron deficiency, severe exercise and other causes of acute phase response. It is usually characterized by increased ESR and C-reactive protein. Peripheral smear may show features to indicate an underlying cause. If the clinical scenario is not consistent with reactive thrombocytosis, a bone marrow examination is recommended to confirm the diagnosis of essential thrombocytosis [5].

Thrombocytosis results in increased release of potassium during the clotting process. Sevastos et al., examined platelet count and release of potassium during the clotting process and found an average increase of 0.82 mmol/L of potassium during the clotting process (range of platelet count: 400–

* Corresponding author at: Department of Anaesthesiology, Regional Cancer Centre, Trivandrum 695011, India. Tel.: +91 9446700525.

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$1500 \times 10^3/mm^3$. In the absence of ecg changes and obvious causes of increased potassium levels such as ARF and tumor lysis syndrome, we should entertain the possibility of hemolysis, lab error, pseudohyperkalemia and reverse pseudohyperkalemia. Simultaneous measurement of serum and plasma potassium levels helps diagnose pseudohyperkalemia and reverse pseudohyperkalemia. A serum to plasma potassium gradient of more than 0.4 mmol/L is diagnostic of pseudohyperkalemia, provided that samples are collected under strict techniques, remain at room temperature and are tested within 1 h from blood specimen collection) [6]. Reverse pseudohyperkalemia is when plasma potassium is falsely high, but serum potassium is normal. This phenomenon has been reported in samples of patients with leukemia/lymphoma [7].

The ratio between intra cellular and extracellular potassium is approximately 40:1 and a change in the ratio as small as 2.5% will increase the potassium concentration by 0.1 meq/L. Constituents of blood (RBC, WBC, Platelets) and skeletal muscle release intracellular potassium either due to disease states or faulty collection techniques. Other than patient factors which include thrombocytosis red cell and white cell dyscrasias, other causes for pseudo hyperkalemia include tourniquet, ethanol containing antiseptics, cold temperature, time delay in sample transport, contaminants like potassium containing intravenous fluids, potassium salts of tube additives and heparin induced WBC lysis for reverse pseudohyperkalemia [8].

For our patient ,without knowing it to be pseudohyperkalemia, we had started potassium lowering treatment with intravenous glucose insulin drip, calcium gluconate and beta adrenergic agonist nebulization. But on reviewing literature on thrombocytosis, we realized it to be a case of reactive thrombocytosis with pseudohyperkalemia and the measures were withheld.

Conclusion

Reactive thrombocytosis and pseudohyperkalemia are entities we have to know about so that we can correctly identify them and undue delays in providing anesthesia can be avoided.

Conflict of interest

None declared.

References

[1] Harrison CN, Bareford D, Butt N, Campbell P, Conneally E, Drummond M, et al. Guideline for investigation and management of adults and children presenting with a thrombocytosis. Brit J Haematol 2010;149:352–75.
[2] Vardiman JW, Brunning RD, Harris NL. WHO histological classification of chronic myeloproliferative diseases. In: Jaffe ES, Harris NL, Stein H, Vardiman JW, editors. World Health Organization classification of tumors: tumours of the haematopoietic and lymphoid tissues. Lyon (France): International Agency for Research on Cancer (IARC) Press; 2001. p. 17–44.
[3] Buss DH, Cashell AW, O'Connor ML, Richards 2nd F, Case LD. Occurrence, etiology, and clinical significance of extreme thrombocytosis: a study of 280 cases. Am J Med 1994;96(3):247–53.
[4] Dan K, Gomi S, Inokuchi K, Ogata K, Yamada T, Ohki I, et al. Effects of interleukin-1 and tumor necrosis factor on megakaryocytopoiesis: mechanism of reactive thrombocytosis. Acta Haematol 1995;93(2–4):67–72.
[5] Schafer Al. Thrombocytosis. N Engl J Med 2004;350(121):1–19.
[6] Sevastos N, Theodossiades G, Efstathiou S, Papatheodoridis GV, Manesis E, Archimandritis AJ. Pseudohyperkalemia in serum: the phenomenon and its clinical magnitude. J Lab Clin Med 2006;147:139–44.
[7] Meng QH, Krahn J. Reverse pseudohyperkalemia in heparin plasma samples from a patient with chronic lymphocytic leukemia. Clin Biochem 2011;44:728–30.
[8] Asirvatham IR, Moses V, Bjornson L. Errors in potassium measurement: a laboratory perspective for the clinician. N Am J Med Sci 2013;5(4):255–9.