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Short Communication

Pathology Section

Unusual Analytic Error Which Can Mimic as a Preanalytical Error

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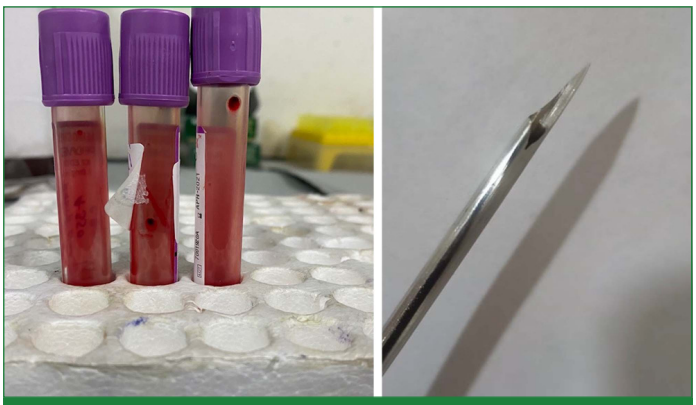
In today's era, diagnosis of disease is mainly dependent on reliable laboratory data. Laboratories play an important role in the decision-making in the management of patient. More than 60% of clinical decisions regarding outdoor patient care, indoor patient care, admission and discharge are based on laboratory results [1]. Since laboratory results play a significant role, hence quality of laboratory tests is of paramount importance [2]. In the past few decades, there is substantial development in the functioning of laboratories due to advancement in, sample collection, transportation, automation and dispatch of reports [1]. However, errors can occur in any phase during processing of sample. Depending on the phase of presentation, these errors in laboratory practice are traditionally classified into preanalytical, analytical, and postanalytical phase [3-5].

Preanalytical phase is an important part of laboratory medicine as maximum chances of error (62%) occurs in this phase [1,5]. The preanalytical errors are like misidentifying the patient, mixing and missing requisition forms, performing wrong test, mismatched labelling of vials, contaminated, clotted, haemolysed sample, not maintaining the blood to anticoagulant ratio, not maintaining the cold chain during storage and transportation of sample etc., [6,7]. Therefore, these pre-analytical error results in undue increase in laboratories workload [8,9]. However, due to advancement in technology and automation in haematology laboratories, analytical errors have been reduced drastically [10].

In the present study, the authors are presenting a very rare occurrence of analytic error which mimicked as a pre-analytic error. A lab technician was asked to rerun the haemogram sample of a paediatric patient whose Complete Blood Cell (CBC) parameters were not correlating with the peripheral smear findings. The technician detected a visible clot in the Ethylene Diamine Tetra-acetic Acid (EDTA) sample. He rejected it and called the paediatric ward to send repeat fresh blood. At the same time, a peculiar finding was noticed by the same technician from his last few previous days. He noticed that whenever samples are made to rerun visible macro-clots were seen in the vacutainers. On careful observation it was seen that these were clots. It was observed that these pseudo clots were sticking to the walls of the vacutainer or sometime seen floating in the sample [Table/Fig-1]. These clots were seen in 5-6 tubes out of the rack of 20 tubes. Another important finding was that these clots were seen on sample run in one machine only. Other machine of same model and make up installed in laboratory do not show any such clots.

The authors, out of curosity, confirmed the structure of clots by microscopy. On microscopy, they were found to be pseudo-clots showing acellular solid material, which turned out to be the piece EDTA's vials cap. We tried to find out the reason for it. There were two possibilities. Firstly, there may be defective EDTA vials, but this possibility was little bit remote as this was seen with one machine only. Secondly, there may be a problem with machine. Service engineer was called, keeping in view of the problem with the machine. He suspected that there might be a defect with piercing needle which could have blunted resulting in uneven cutting of the rubber cap of the vacutainer. The engineer replaced the piercing needle which resolved the above problem of analytic error [Table/Fig-2].



[Table/Fig-1]: Pseudo clots were sticking to the walls of the vacutainer.
[Table/Fig-2]: Piercing needle. (images from left to right)

In modern days, automated haematology analysers have enhanced the productivity of laboratories. One of these machines is 5-part differential, which is an automatic sample analyser. It processes up to 80 samples/hour. These analysers work on technologies such as Multi-Distribution Sampling System (MDSSTM) and Double Hydrodynamic Sampling System (DHSSTM). In DHSSTM Technology combines the focused flow impedance method, light absorbance measurement and cytochemistry to measure the cell volume and cellular content in one unique flow cell.

In MDSSTM Micro Sampling Technology, only the minimum amount of sample required for each measurement. It performs accurate measurements using minimum sample volume. Firstly, pincer of machine pierces rubber cap of EDTA vial and then other suction needle comes out to draw the sample for analysis. After this, most of the time pierced rubber part of cap is cleaned in cleaning chamber. Furthermore, this aspirated blood sample is then taken into different chambers for dilution and analysis.

Contrastingly, in the present case it was the impact of blunt piercing needle. The blunted needle would have cut larger area of the vacutainer cap, leading to larger rubber bit which was unable to get sucked in cleaning chamber. This error did not affect the sample into the machine for the first time. Sometimes sample is very crucial as it may be taken from babies or taken from critically ill patients and asking for new sample from these patients may be difficult and unethical. Here, the authors are emphasised that one should be vigilant in the laboratories so that such type of error can be avoided. Mostly, this needle is part of annual maintenance is replaced every six monthly. Likewise, this machine also undergoes six monthly maintenances, but due to the heavy workload, this needle got worn out early. Therefore, it is possible that piercing needle can get worn out before its due replacement.

To conclude, rubber artifact may mimic blood clot and may cause over rejection of sample which may lead to false preanalytical errors. The authors presented this unusual error that can be avoided if one can keep this type of error in mind and be more vigilant.

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