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Identifying the "culprit" of inaccurate hypocalcaemia results via POCT – A collaborative investigative process

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INTRODUCTION

The Children's Emergency (CE) at KK Women's and Children's Hospital sees an average of 490 patients a day, many of whom receive point of care (POC) testing as part of their management in the emergency department. One such POC test is the use of a portable handheld blood gas Analyzer for evaluation of acid – base balance and Microelectrolytes.

PROBLEM

An unusual spike of hypocalcemia seen in patients who underwent POC test using the handheld blood gas analyzer over a short frame of time. The blood results did not match with the patients' clinical conditions.

AIM

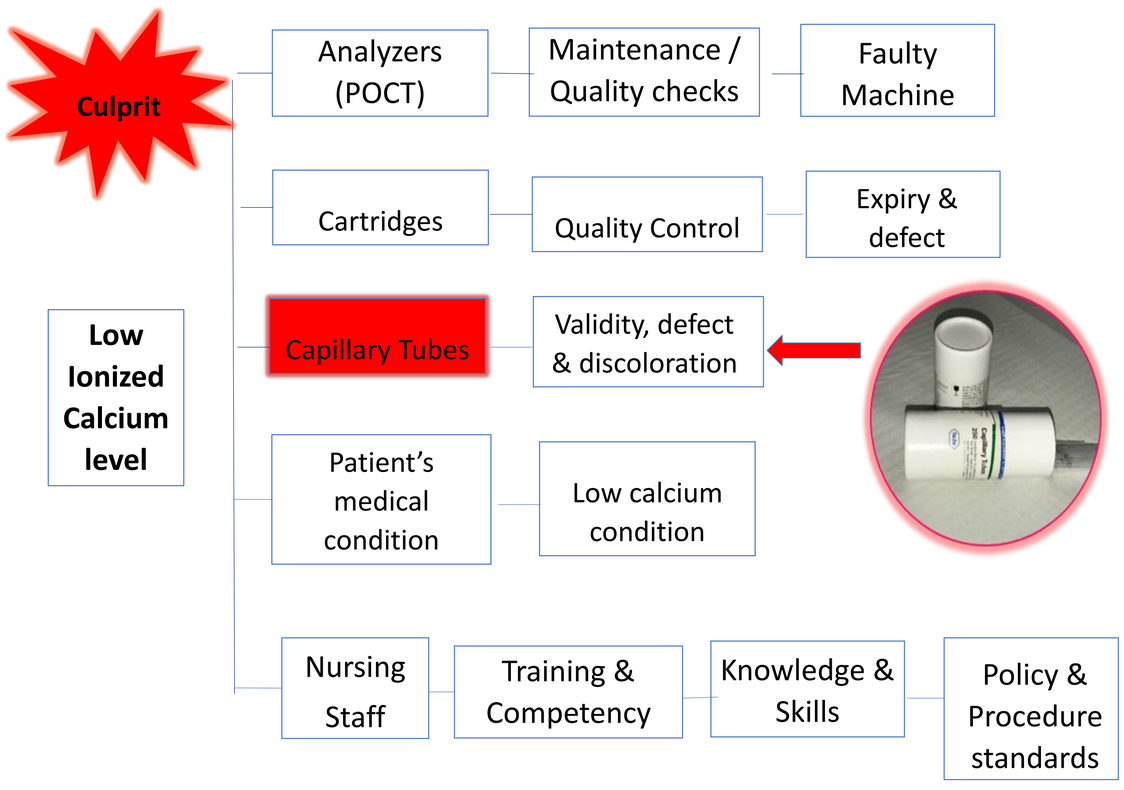
To identify the source of non-correlative hypocalcaemia results, and the rectifications performed to prevent potential harm to patients.

METHODOLOGY

Concerns of non-correlative hypocalcaemia results were raised by the Children's Emergency medical team and subsequently brought to the attention to the CE Senior Nursing team, the Biomedical Equipment department, the Department of Pathology and Laboratory Medicine (DPLM) and the licensed vendor.

The team came together to find the cause that contributed to the abnormal test result; all the possible involved variables were considered – the POCT (Point-of-Care Technology) analyzer unit, its complementary cartridges and capillary tubes, as well as contributory human factors.

Root Cause Analysis



The analyzer unit in question was checked and replaced. A comparison was also done between the POCT device and laboratory analyses with blood samples drawn from ten healthy volunteers, of which all of the former had demonstrated lower levels of ionized calcium.

DISCUSSION

Literature have sited that most POCT errors have occurred due to:

- Incorrect sampling time
- Patient identification
- Sampling sites
- Technique
- Tubes under filled
- Inadequate sample mixing (clotted sample, micro clots, incomplete clotting -fibrin interference) and Haemolysed sample (acutecaretesting .org,2012).

Further investigation by the CE Senior Nursing team revealed that different batches of capillary tubes yielded different ionized calcium results from the same individual and this premise was later confirmed by DPLM team

In this case scenario, surprising we have learnt that **capillary tube** can contribute to result errors and the team was very focus to exclude all possible causes. This action reveals: "Quality management is the artful application of finite resources to an infinite problem" (Anaesthesia Quality Institute, 2014).

RESULTS

A product alert was broadcasted to all clinical areas in the hospital and the faulty batch of capillary tubes were withdrawn from circulation. The hospital cluster's Group Procurement Office was also informed. New capillary tubes were sourced and validated by DPLM prior to distribution to clinical areas for use.

QUALITY ASSURANCE

All new lots of capillary tubes delivered to the Material management department(MMD) are checked for quality assurance by the KKH Laboratory prior to release for hospital usage.

CONCLUSION

POCT has become a standard practice in patient's management in many clinical settings today; hospital staff should consider all possible factors in the testing process that may contribute to POCT errors.

We learnt that recognizing unusual trends, speaking up and pooling the appropriate personnel / resources are crucial in identifying the cause of system errors. Teamwork across various departments is also a paramount key in resolution of systemic problems to prevent downstream effects that can potentially result in patient harm.

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