In vitro haemolysis has always been a major concern for clinical laboratories around the world.

Defined as red blood cell break down and the release of haemoglobin and intracellular contents into the plasma, haemolysis can seriously impact patient care and a laboratory’s reputation through its affect on test results. It is important to be aware of those tests most highly affected by haemolysis.

Multiple medical states can cause haemolysis in vivo. Factors affecting haemolysis in vitro can occur beginning at the patient’s bedside and continue through analysis and storage. Factors vary depending upon the patient’s condition (fragile veins), the skill of the person collecting the sample (training), and the local environment (temperature, length of transport).

The major causes of haemolysis are improper specimen collection and handling. These procedures are normally not under the control of the laboratory; even so, rejected samples and inaccurate test results are often attributed to laboratory errors. A great deal of knowledge, skill, and experience is required to collect a quality specimen that yields desired results.

Gathering data in your healthcare organisation will help identify the areas where haemolysis occurs most frequently (emergency room, intensive care unit, maternity), which can, in turn, guide further analysis about why it is occurring. Once these elements are known, practices and procedures can be implemented to dramatically reduce haemolysis and avoid erroneous laboratory results affecting patient care and increasing laboratory costs.

**Practices & Procedures to Reduce In Vitro Haemolysis:**

- Carefully review practices and procedures when collecting blood samples from patients with fragile veins, such as geriatric & oncology patients.
- Carefully review practices and procedures when collecting blood samples from catheterised patients such as those in emergency, intensive care, and maternity departments.
- Key aspects to focus on during collection include: Avoid collection from a hematoma site, prolonged tourniquet time, and equipment and connections that may lead to turbulent blood path; use appropriate techniques for syringe collection; ensure correct tube volume is collected; do not subject a sample to vigorous mixing.
- Define practices and procedures for sample transportation to preserve appropriate temperature, and to avoid prolonged transportation time and excessive sample agitation.
- Centrifuge within an appropriate time of collection, aliquot supernatant (serum or plasma) from red cells unless using a gel based separator tube.
- Ensure appropriate centrifugation conditions and pay particular attention to g force, spin time and temperature.
- Review patient history for factors that may affect in vivo haemolysis: metabolic disorders (liver disease, sickle cell anaemia), drugs (analgesics, antimalarial drugs), mechanical heart valve, and haemolytic anaemia.
- Third degree burns and infections.
- When possible use analytical method unaffected by haemolysis.
- Consider using the instrument features such as the haemolysis index to determine the level of haemolysis in samples. This can be used to monitor sample quality over time and provide information about problem areas to focus on for improvement.

**References:**