

# **Preamalytical errors during sample collection**

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# Introduction

- Three phases of testing
  - Pre analytical
  - Analytical
  - Post analytical
- Pre analytical
  - Sample collection
  - Transport
  - Processing

- Analytical
  - Testing
- Post analytical
  - Result transmission
  - Result interpretation
  - Dispatch
  - Retesting
- Almost 90% errors in PRE\* and POST\* analytical phases

# Pre analytical variables

- Uncontrollable
  - Age
  - Sex
  - Disease
  - Diet etc...
- Controllable
  - Collection
  - Transport
  - Process

# Preanalytical errors

- Pt. Identification
- Pt. Preparation
- Site and preparation
- Procedure
  - Venipuncture
  - Needle
  - Order of draw
  - Tube mixing
  - Volume
- Handling
- Transport
- Processing

# Patient Identification

- Ask the patient
  - Full name
  - Age
  - Ward/OPD
- Tube labeled
- Date and Time of collection

# Preparation

- Patient preparation
  - Diet (fasting 12hr)
  - Exercise (LDH, Creatinine, Cortisol)
  - Timing
  - Smoking
- Preparation of site
  - Allow to dry (30-60 sec)

# Procedures

- Phlebotomist
- Patient
- Identify the site
- Tourniquet
- Needle
- Order of draw
- Tube mixing
- Volume



- Phlebotomist
  - Lab. Coat
  - Gloves
  - Face mask
- Patient
  - Sitting position
  - Should be relax
- Site
  - Find out appropriate vein
- Needle
  - Adult – 20 gauge
  - Children – 22-24 gauge

- Tourniquet
  - 4-6 inches above the site
  - Not more than 1 min.
    - Hemo concentration
    - Cholesterol, Tg, Albumin
    - Constituents bound to protein
  - No fist clenching ---> Increase K, IP, Lactate(pH)
- Tube
  - Vacuum lost over time----> expiration time
- Order of draw (CLSI- Clinical and Laboratory Standards Institute)
  - To prevent cross contamination for blood additive

1. Culture --- Yellow
2. Sod. Citrate --- Blue
3. Plain (clot activator) --- Red
4. Heparin --- Green
5. EDTA --- Lavender
6. Fluoride --- Gray
7. Sod. Citrate(3.8%) --- Black

Why this order?

- Back flow
  - Hand should be in lower position
- Blood in tube should be mixed properly
- Volume should be in proportion to additive

## Urine Sample

- Mid strim

# Handling, Transporting and Processing

- Vertical
- No shaking
- Away from light
- Temperature
- Time < 2 hr

# Hemolysis

- Hb > 200mg/L ---> Visible (bright red)
- Parameters affected
  - Na
  - K
  - Mg
  - Ca
  - Iron
  - IP
  - Haptoglobin
  - Amylase
  - ALT
  - AST
  - ALP
  - GGT
  - Folate
  - TP
  - LDH
  - many more

- **Causes of Hemolysis**

- Vein should be large enough
- Alcohol
- Large and Small needle
- Under filled tube (fluoride)
- From IV catheter
- Mixing tubes
- Transport
- Temperature
- Centrifugation before clotting
- Same needle for another puncture in same patient
- Prolonged tourniquet time
- Prolonged storage
- Repeated change in temperature

# Questions

1. What is order of draw for blood sample collection?
2. How will you prepare the patient for GTT
3. What are the points to be kept in mind while applying tourniquet?
4. How will you handle, process and transport the blood samples after collection?
5. What can be done to reduce the incidence of hemolysis?



**Thank you**