

Phlebotomy- An Update

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ABSTRACT

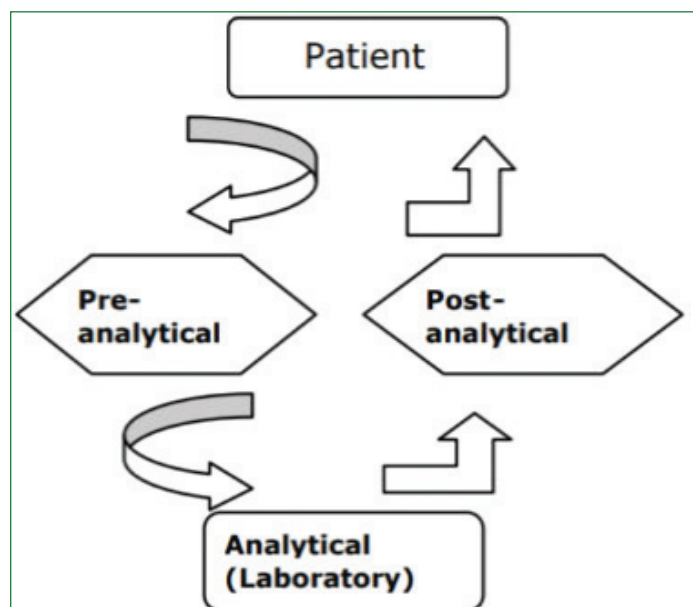
Phlebotomy is the utmost important and underestimated procedure in the laboratory. The specimen collection plays a major role to give accurate results. The probability of errors increases when manual procedure is present. Certified courses and Continued Medical Education (CME) aids us in reducing the errors which can lead to misdiagnosis of the condition.

Keywords: Continued medical education, Phlebotomist, Preanalytical error

INTRODUCTION

Phlebotomy is undoubtedly the most underestimated and underappreciated procedure of laboratory medicine. As a matter of fact phlebotomy should be considered as “real face of any laboratory” as it functions as a vital support of medical laboratory services [1,2].

Although the effect of phlebotomy on laboratory services is very important, there is no uniformity and standardisation of the phlebotomy practice as considerable variation on phlebotomy techniques is noted from laboratory to laboratory [1,3]. Total testing process starts and ends with the patient [Table/Fig-1] [4]. Possible consequences of preanalytical errors and their degree of seriousness is tabulated [Table/Fig-2] [4].



[Table/Fig-1]: Total testing process starts and ends with the patient [4].

| Preanalytical error | Possible consequence | Degree of seriousness |
|----------------------------|------------------------------------------------|------------------------------|
| Identification of patient | Sample collected from incorrect patient | Mild threat to life |
| Labelling of test tubes | Blood sample of wrong patient in the test tube | Mild life threat |
| Test request management | Erroneous test | Mild to moderate life threat |
| Inversion of test tube | Mixing of blood not done | Mild to none |
| Vertical test tube storage | Coagulation of samples id incorrect | Mild to none |

[Table/Fig-2]: Possible consequences of preanalytical errors and their degree of seriousness [4].

Contrary to the popular belief phlebotomy is not just about venepuncture but it is much more than that as phlebotomy involves multiple criteria's including interior designing of the waiting room and drawing stations along with the availability of sufficient seating arrangements, proper reading materials with the presence of pleasant and adequately trained staff having good manners [4-6]. Phlebotomy procedure consists of explanation of procedure to the patient, assessing physical status of the patient, appropriate positioning of patient, checking the requisition form, selection of suitable site, preparation of the site using chlorhexidine, equipment for the patient (swabs, tray, gauzepiece, syringes, needles, tourniquet, sterile gloves) performing venepuncture, selecting appropriate vacutainer, labelling of the tubes and sending them to laboratory immediately for evaluation. During the phlebotomy procedure, patients comfort level is one of the most important criteria to be taken care of because “the first impression is the last impression” and every laboratory should endeavour that every patient walks back with a pleasant experience regarding the phlebotomy services of the laboratory [6,7]. Phlebotomy is of great commercial importance of every laboratory. The most sophisticated laboratory equipment fails to give accurate results from a specimen that was collected incorrectly [1]. When a manual procedure is brought into play, the probability of errors increases [7-9]. Phlebotomy is never fully automated and it is considered as backbone of analytical process. The atmosphere of trust and confidence should be created by phlebotomists while drawing blood in skillful, safe and reliable manner [2]. The profession must encourage phlebotomists of both genders who are polite, interactive and diligent with good communication skills [1,9].

The presence of good communication skills is absolutely essential as the phlebotomist has to explain all the required procedural steps including the potential hazards to the patient/client and ultimately obtain their written consent [1,10]. Phlebotomist should always maintain personal as well as environmental cleanliness and practice hand hygiene, wear personal protective equipment such as gloves, apron use a disinfected tourniquet, decontaminate skin before puncture as the higher risk of phlebotomy induced staphylococcal infections increases [2,11]. The common perception among many people is that is that anyone can draw a blood specimen after a few hours of basic training [3,12]. This misconception has neglected the field of phlebotomy as an independent subject [13,14]. The efficiency and reputation of any laboratory depends on professional and effective phlebotomy. The key to success to any laboratory is the lowest turn around time and trained phlebotomists which will help in achieving this [1,9].

Blood collection vacutainers are supposed to be drawn in a particular order. This will help to avoid cross-contamination. A vacutainer is a sterile glass or plastic tube with a closure or lid that has vacuum inside the tube facilitating the draw of liquid and there are varieties of sample collection based on proper phlebotomy techniques [Table/Fig-3] [3,5,14]. Samples can be rejected on various criteria [Table/Fig-4].

| Type of specimen | Definition |
|------------------------|---------------------------------------------------------------------------------------------|
| Icteric sample | If there is visible detection of icterus, it is considered as variable and unreliable |
| Clotted sample | If there is visible clot or instrument flags |
| Plasma or serum sample | Interfering substances if not known |
| Haemolysed sample | Post centrifugation if visible haemolysis is seen. |
| Lipemic sample | If there is turbidity due to elevated concentrations of lipids, visible lipema can be seen. |

[Table/Fig-3]: Varieties of sample collection based on proper phlebotomy techniques [3,5,14].

| | |
|---------------------------|----------------------------------|
| Clotted specimens | Haemolysed samples |
| Old specimens | Broken tubes or leaking tubes |
| Improper labelling | Wrong patient identification |
| Incorrect specimens | Specimens which are contaminated |
| Improper filling of tubes | Specimen quantity not sufficient |

[Table/Fig-4]: Examples of sample rejection criteria.

Importance of phlebotomy techniques to reduce sample rejection rate. The following improper phlebotomy techniques like- wrong site selection, not using alcohol swabs, not wearing sterile hand gloves, not making the patient sit on a chair/stool while doing the procedure, results in increased rejection rate and needs to be minimised [6,8].

It is very crucial to teach and make the staff understand who are involved with specimen collection and handling, to help them avoid errors as phlebotomy be usually performed manually [8]. New training programmes and courses are to be included to improve the standards in phlebotomy procedure [9]. CME, programmes are recommended to be held at certain intervals to help increase in efficacy, improve the knowledge and working skills of all the phlebotomists. The courses should also give academic grades and help them improve better [7]. Technology has provided many

useful devices to help phlebotomists in their craft quality of collected specimens and safety of the patients. It depends on individual patient status to choose the correct site, correct needle and correct angle to perform phlebotomy [9]. The certainty is made from all the efforts which are done to grant the safety of the patients and the accuracy of the service allows phlebotomy to bridge the gap between patient and the laboratory [2,3].

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