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### Original Article

# Rate of Hematology Specimens Rejection, Association with area of collection and reason of rejection

Ruba Abed MD\*

\*Department of Pharmacology, Dr. B.R. Ambedkar Medical College, Bangalore.

\*\*Department of dermatology, Dr. B.R. Ambedkar Medical College, Bangalore.

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#### ABSTRACT

Objective: To calculate the rate of rejected specimens received in hematology laboratory stratified by area of collection and reason of rejection. Design: Retrospective study conducted at Prince Hamzah Hospital, Amman/Jordan over a six months period; January 1, 2011 to June 30, 2011. Data were retrieved from the laboratory records. Results: The rate of specimen rejection was highest in the medical ward and clotted specimens were the commonest cause for rejection followed by wrong patient identification. Conclusion: A constellation of factors, mainly related to phlebotomy technique and wrong patient identification are the reasons for rejection of specimens in the hematology laboratory, which necessitates investigating the practice of blood sample collection, and that lesser proficiency of the nursing staff in phlebotomy and importance of correct patient identification may be reasons for this observation.

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### 1. Introduction

Prince Hamzah hospital is a governmental property, licensed for 450 beds. There are approximately 20000 patient admissions to the hospital each year, more than 100000 outpatient clinic visits and more than 20000 visits to the emergency department annually. Care of the patient is administered as services for outpatient and inpatients and tertiary care programs.

Laboratory services are administered on routine and emergency basis. The laboratory is composed of a main lab and a stat lab. The laboratory offers both inpatient and outpatient testing and maintains a blood collection area in the main lab for easy access by outpatients.

The medical laboratory is open five days a week from Sunday to Thursday 8 am – 5 pm. After hours & public holidays: Prince Hamzah Hospital Emergency Lab 24 hours / 7 days.

A properly collected blood specimen is essential to quality performance in the laboratory.

Hematology testing is performed on whole blood. (1)

The laboratory data from a submitted specimen is reliable only if the specimen is adequately collected, labeled and transported to the laboratory in a timely fashion.

In our laboratory manual, in order to accept a specimen, it must meet the following criteria:

- 1- Must be collected in the correct specimen container, LAVENDER TOP K2 EDTA anticoagulant tubes.
- 2- Must be legibly identified.

The following information must be legibly recorded on a label affixed in an irreversible fashion to the specimen container:

- Patients full name (Four Parts)
- Medical Record Number or other unique identifier (ID)
- Date and, if appropriate, time when specimen was obtained
- Specimen source
- Signature/ initials of collector

As soon as a blood specimen is withdrawn from a patient, it is mixed with an anticoagulant to prevent coagulation. The anticoagulant used for routine hematological tests is K2EDTA where coagulation is prevented by the binding of calcium in the specimen to sites on the large EDTA molecule, thereby preventing the participation of the calcium in the coagulation cascade. (2)

\* Corresponding Author : : **Dr. Komala. R.**  
PG/Tutor in Department of Pharmacology,  
Dr. B. R. Ambedkar Medical College,  
Kadugondanahalli,  
Bangalore - 560054,  
Karnataka, India.

**Objectives:**

No special preparation of the patient is necessary.

Hematology specimens brought to the laboratory may be rejected if conditions are present that would compromise the validity of the test results.

Major reasons for specimen rejection at hematology department are the following:

1. Unlabeled or mislabeled specimens; wrong patient identification.
2. Collection in the wrong tube
3. Hemolysis
4. Lipemia
5. Clotted specimen
6. Specimens without a requisition form
7. Use of outdated blood collection tubes

**2. Material and Methods**

A retrospective study conducted at the main lab at PHH medical laboratory from January 1, 2011 to June 30 2011. The data were retrieved from the laboratory records.

**3. Results**

The total numbers of hematology specimens as well as the number of rejected specimens were collected. The areas of collection as well as the reason of rejection were recorded and the results were as follows.

**Table 1. Rejected Specimens, Site of collection**

Month, 2012	Total No of Received Specimens	No of rejected specimens	OPD	General Medicine	General Surgery	ICU	CCU	Gyne	Sub Surg.
Jan	1992	40 (2%)	5(12.5%)	15(37.5%)	4(10%)	7(17.5%)	1(2.5%)	3(7.5%)	5(12.5%)
Feb	2184	39(1.8%)	4(10.3%)	13(33.3%)	5(12.8%)	7(17.9%)	2(5.1%)	1(2.6%)	7(17.9%)
March	2010	56(2.8%)	8(14.3%)	21(37.5%)	5(8.9%)	9(16.1%)	4(7.1%)	4(7.1%)	5(8.9%)
April	1980	45(2.3%)	3(6.7%)	20(44.4%)	2(4.4%)	5(11.1%)	7(15.5%)	4(8.9%)	4(8.9%)
May	2000	24(1.2%)	1(4.2%)	14(58.3%)	2(8.3%)	2(8.3%)	1(4.2%)	2(8.3%)	2(8.3%)
June	2120	45(2.1%)	5(11.1)	22(48.9%)	2(4.4%)	3(6.7%)	5(11.1%)	3(6.7%)	5(11.1)

The overall rejection rate ranged from 1.2% on May 2011 to 2.8% on Mach 2011.

**Table 2; Rejected specimens, Reason of rejection**

Reason for rejection	Jan, n 40	Feb, n 39	Mar, n 56	Apr, n 45	May, n 24	June, n 45
Clotted specimen	15(37.5%)	13(33.3%)	22(39.3%)	18(40%)	10(41.7%)	17(37.8%)
Collection in the wrong tube	6(15%)	6(15.4%)	4(7.1%)	5(11.1%)	2(8.3%)	4(8.9%)
Hemolysis	2(5%)	2(5.1%)	4(7.1%)	3(6.7%)	1(4.7%)	4(8.9%)
Lipemia	1(2.5%)	1(2.6%)	2(3.6%)	1(2.2%)	0	1(2.2%)
Unlabeled or mislabeled specimens	10(25%)	12(30.8%)	18(32.1%)	13(28.9%)	9(37.5%)	14(31.1%)
Specimens without a requisition form	5(12.5%)	3(7.7%)	4(7.1%)	4(8.9%)	1(4.7%)	4(8.9%)
Use of outdated blood collection tubes	1(2.5%)	2(5.1%)	2(3.6%)	1(2.2%)	1(4.7%)	1(2.2%)

The overall rejection rate ranged from 1.2% on May 2011 to 2.8% on Mach 2011.

#### 4. Discussion

The highest rate of rejection was from the medical ward throughout the study period (ranging from 33% to 58%).

The most common cause for rejection was clotted specimen (ranging from 33% to 42%) followed by wrong patient identification (ranging from 25% to 37%).

#### 5. Discussion

The role of clinical pathology and laboratory medicine continues to grow as the single largest component of objective scientific data within the medical record of patients.(2)

The result of any laboratory examination is only as good as the sample received in the laboratory. (2)

Some specimens are time-dependent. In order for the laboratory departments to process them correctly, specimens must be collected/received within their time constraints to be accepted by the Laboratory. The Laboratory Manual should be consulted for specimen time limitations. (3)

Many national and international programs to track laboratory quality have reported laboratory specimen rejection rates ranging from 0.3% in outpatient facilities to 0.83% in hospital based laboratories. (4)

It is known that approximately 56% of laboratory error occurs during the preanalytic phase (processes that occur before testing of the sample) of laboratory testing, In 1997 Jones et al3 reported that preanalytical errors constituted between 25% and 50% of the total errors in the clinical laboratory.(5)

Preanalytical errors are the responsibility of the blood collector and include the following (2):

Monitoring of specimen ordering

Correct patient identification

Patient communication and safety

Patient preparation

Timing of collections

Phlebotomy equipment

Collection techniques

Specimen labeling

Specimen transportation to the laboratory

Specimen processing

In this study, we chose the hematology laboratory for calculating the rate of specimen rejection stratified by the area of collection and the reason for rejection.

The results point clearly to a defect in the phlebotomy technique in addition to wrong patient identification, which should be targeted throughout the hospital with special emphasis on the medical ward, since the highest rate of specimen rejection was encountered from there.

Recommendations to solve such issue is to organize a team of nursing as well as laboratory staff in conjunction with the quality department with the target of creating a procedure manual to provide health care personnel with concise information on the proper techniques to collect quality blood specimens with minimal patient discomfort. So as to minimize the errors encountered in blood collection that can lead to unsuitable specimens eventually rejected when received in the medical laboratory.

#### 6. References

- 1- Turgeon, Mary Louise, "Clinical Hematology, Theory and Procedures." Boston/Toronto: Little, Brown and Co., 1988.
- 2- Blood Collection, A SHORT COURSE EDITION 2
- 3- Arch Pathol Lab Med. 2007 Apr; 131(4):588-92.
- 4- Dale JC, Novis DA. Outpatient phlebotomy success and reasons for specimen rejection: a Q-Probes study. Arch Pathol Lab Med. 2002; 126:416-419.
- 5- Jones BA, Calam RR, Howanitz PJ. Chemistry specimen acceptability, a College of American Pathologists Q-Probes study of 453 laboratories. Arch Pathol Lab Med. 1997; 121:19-26.

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