Fundamentals of Phlebotomy

May 2012

Historical Origins: Superstition

Phlebotomy Today: Diagnostic tool

Potential Exposure from Needle Stick Injuries

• 1 in 6 - Hepatitis B
• 1 in 20 - Hepatitis C
• 1 in 300 - HIV
Tracking at Mayo Clinic Rochester
1983-1996

Decline from 1.5 Exposures/10,000 to 0.2 Exposures/10,000

1985 1-handed recapping blocks
1987 Disposal of evacuated holders
1988 CDC Universal Precautions
1989 CDC HIV and Hepatitis B prevention guidelines
1991 OSHA occupational exposure to bloodborne pathogens final rule

Decline from 1.5 Exposures/10,000 to 0.2 Exposures/10,000

Tracking at Mayo Clinic Rochester (cont)
1983-1996

Decline from 1.5 Exposures/10,000 to 0.2 Exposures/10,000

1992 Resheathing needles and retractable lancets
1992 Biohazard container improvement initiative
1994 “Clean” needle stick removed from database
1995 Discontinued changing needles for blood cultures

Tracking at Mayo Clinic Rochester
1983-1996

1983 1.5
1984 1.5
1985 1.5
1986 1.5
1987 1.5
1988 1.5
1989 0.8
1990 0.6
1991 0.4
1992 0.2
1993 0.2
1994 0.2
1995 0.2
1996 0.2

Frequency Rate per 10,000 punctures
2010 Blood/Body-Fluid Exposures

• 592 Needlestick and Blood/Body-Fluid Exposures occurred to Mayo staff during 2010 (161 “hollow core punctures” – or needles)

Order Entry, Phlebotomy Supplies and Safety

New Device / Equipment Evaluation

<table>
<thead>
<tr>
<th>Device / Equipment Name</th>
<th>Evaluation Site</th>
<th>Date of Evaluation</th>
<th>Rating Scale</th>
<th>Strongly Agree</th>
<th>(please circle)</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Comments
Research from Center for Disease Control (CDC)

“Research from CDC … indicates that selecting safer medical devices could prevent 62-88% of sharps injuries in the hospital setting…”


Orders for Collection & Preparing the Accession Order

• Ordering the collection
  • Physician
  • Designated healthcare professional

• Preparing the order for collection
  • The phlebotomist

Phlebotomy Safety: Hand Cleansing

• Soap & Water
• Waterless Hand Sanitizer
Safety: Latex Allergy

- Studies indicate that 5-17% of healthcare workers show latex sensitivity, compared to 1-6% of the general population
- Exposure can be reduced by switching to lower allergen products, or by using non-latex substitutes

Phlebotomy Supplies: Needles
Phlebotomy Supplies:
Evacuated / Syringe / Winged Infusion

Phlebotomy Supplies:
Skin Preparations
- 70% Isopropyl Alcohol
- Tincture of Iodine

Phlebotomy Supplies:
Gauze and Pad & Gauze Roll
Phlebotomy Supplies: Capillary Collection Devices

Capillary Collection

Phlebotomy Supplies: Needle Gauge*

* Determined by the size & condition of the vein
Considerations Prior to the Collection

• Thorough patient history
• Patient condition
• Time of collection
  • Basal state
  • Fasting
• Age
• Gender
• Diurnal or daily variations

Additional Considerations

• Age
• Growth
• Development
• Safety Considerations
• Communication

Physical Conditions of a Patient Affecting Blood Collections

• Stress
• Dehydration
• Strenuous exercise
• Pregnancy
• Smoking habits
• Weight, age and other factors
Mayo Clinic Patient Identifiers

- Patient must state and spell their first and last name
- Patient must state their date of birth

Patient Identification

Additional Variables to Patient Identification

- Language or cultural barriers
- Pediatric patients
- Unidentified patients
- Unconscious patients
- Dementia, intubated patients and other possibilities
NOTE:

• It is the responsibility of the phlebotomist to perform PATIENT IDENTIFICATION with each and every patient interaction regardless of how many times in a work shift the phlebotomist may see the same patient for additional collections.

Patient Identification, Arm Anatomy, & Collection Materials

Approach & Identify the Patient

• Identifying yourself
• Observe surroundings
• Considerations
• Patient to spell first & last name
• Patient to give date of birth
• Tech code or initial all collection labels
Vein Assessment

• Site selection process and anatomical structure.

Arm Anatomy: Preferred Sites/Veins

- Cephalic Vein
- Median Cubital Vein
- Basilic Vein

Three Phlebotomy Methods

• Evacuated
• Syringe
• Winged Infusion (Butterfly)
Joint Commission Recommended Guideline for Age Groups

- Infant and toddlers: 0 to 3 years
- Young children: 4 to 6 years
- Older children: 7 to 12 years
- Adolescence: 13 to 20 years
- Young adults: 21 to 39 years
- Middle adults: 40 to 64 years
- Adults: 65+ years

Site Selection Process: Considerations

- Burn and/or Scars
- Skin Integrity
- Edema
- Hematoma
- Mastectomy

The Venipuncture Procedure
Evacuated Tubes

- Color Codes
- Anticoagulated Tubes
  - Citrate – light blue
  - Heparin - green
  - EDTA – Purple, pink, or lavender
  - Oxalate/Fluoride (antiglycolytic) - gray
- Serum tubes
  - Gel Separator - gold or red/black
  - Non-gel separator - red

CLSI (NCCLS) H3-A5 Order of Draw

- Culture tubes (not illustrated)
- Coagulation tubes
- Serum tubes
  - with or without clot activator
  - with or without gel
- Heparin tubes
  - with or without gel
- EDTA tubes
- Oxalate/fluoride tubes

Mayo Clinic Order of Draw

- Serum Gel Separator
- Serum (Red)
- Anticoagulant Tubes
  - Citrate
  - Heparin
  - EDTA
  - Oxalate/Fluoride
Evacuated Tube Considerations

- Mixing* by gentle inversion
- Fill volumes of the of tubes

* Follow manufacture’s guidelines for the number of inversions

Patient and Sample Identification

- The consequences of an incorrectly labeled tube are the same as an incorrectly identified patient.

Tips for Phlebotomists

- Remain calm, professional and polite
- Place no blame
- Look at all possible sites for second collection
- Apply heat
- Consider reduced amounts
- Consult a more experienced phlebotomist
Conditions That Cause a Hematoma

- Needle placement
- Failure to remove the tourniquet before removing the needle
- Not applying adequate pressure on the site after the needle is removed

Needle Placement Conditions That Cause a Hematoma

- Accessing the vein too slowly
- Needle is too deep and has gone completely through the vein

Ways to Prevent a Hematoma

- Penetrate only the upper most vein wall
- Remove the tourniquet before removing the needle
- Use major veins, not superficial veins
- Apply gentle pressure to the site with gauze after needle removal and while bandaging
Acute Hemolysis

Common Complications of Phlebotomy

- Fainting
- Nausea

WHAT TO DO?

- Safety of the patient is the first concern
- Immediately stop procedure
- Do not leave patient unattended
- Call for assistance if needed
The Venipuncture Process: Evacuated Method

- Patient Identification
- Tourniquet application
- Site selection & cleansing
- Phlebotomy collection
- Removal of the tourniquet
- Remove needle and apply pressure
- Wrap and secure site
- Label tubes

The Venipuncture Process: Winged Infusion with a Syringe

- Patient Identification
- Tourniquet application
- Site selection & cleansing
- Phlebotomy collection
- Removal of the tourniquet
- Remove needle and apply pressure
- Wrap and secure site
- Dispense blood
- Label tubes

The Venipuncture Process: Syringe Method

- Patient Identification
- Tourniquet application
- Site selection & cleansing
- Phlebotomy collection
- Removal of the tourniquet
- Remove needle and apply pressure
- Wrap and secure site
- Dispense blood
- Label tubes
The Venipuncture Process: Winged Infusion /Evacuated Method

1. Patient Identification
2. Tourniquet application
3. Site selection & cleansing
4. Phlebotomy collection
5. Removal of the tourniquet
6. Remove needle and apply pressure
7. Wrap and secure site
8. Label tubes

References