

Johns Hopkins Bayview Medical Center

CLINICAL RESEARCH UNIT

Policy No: 155

Heated-hand box (Hot box)

Previous Date: 11/14/02
Reviewed Date: 8/26/08

Purpose: To provide a policy and standardized procedure for the safe operation and maintenance of the convection type hot air warming box.

Policy:

1. The heated-hand box is used to facilitate serial and/or frequent blood draw or to encourage venous access for intravenous peripheral catheter placement. The hand/arm is warmed thus dilating blood vessels and/or preventing vasospasm.
2. For “arterialized-venous blood” sampling, the heat box with the 12-inch internal sleeve is used; sleeves over 12 inches are used for venous only sampling. The boxes are marked accordingly “may be used for arterialized sampling” and “not for arterialized sampling”. The 12 inch sleeve box was designed for hand placement of 2-6 hours as often required for metabolic studies like euglycemic multi-step clamp with insulin infusion.
3. The heated-hand box will be maintained at within the safe range of 45 to 55 degrees C.
4. A constant air temperature of 50⁰C is recommended for extended placement, when the hand is left in the box.
5. For intermittent sampling, an air temperature of 55⁰C is recommended. The hand should be placed in the box at least ten (10) minutes prior to sampling and the removed until time for the next sampling. Do not turn off the box on/off between sampling times. Leave the box on for the entire study period. When the hand is removed from the box, drape a folded towel over the front opening to maintain the heated air within the heated box.
6. To obtain an arterialized-venous sample, the skin temperature must be above 40° C. This is accomplished by prolonged exposure to an air temperature of 50° C.
7. Arterialized-venous blood may be obtained in a short period of time (10-15 minutes) by setting the air temperature to 55° C.

Caution:

- a. The set point should never be above 55° C.
- b. Prolonged exposure to 60° or higher will result in a burn injury.
8. When repeated sampling is required at intervals of 15 minutes or less, the hand must remain in the box. After 15 minutes of exposure to 55° C, the temperature set point is lowered to 50° C. A hand may generally remain in the box at this temperature for several hours
9. Air temperature within the heated-hand box will be monitored and documented on the protocol flowsheet every 30 minutes.
10. Do not turn off the power between sampling times. The box should remain at a constant temperature for the entire study period.
11. The extremity used for sampling will be monitored for redness, blanching or discoloration of the skin throughout the warming and sampling process.
12. In the event of adverse effects discontinue the use of the heated box immediately and notify the MD. Any adverse effects will be noted in the research record and reported per the adverse event policy.
13. The heated hand box may be operated by the Clinical Research Unit nurses only.
14. The heated box must be cleaned after each participant use.

Johns Hopkins Bayview Medical Center

CLINICAL RESEARCH UNIT

Policy No: 155

Heated-hand box (Hot box)

Previous Date: 11/14/02
Reviewed Date: 8/26/08

Procedures

Heated Box Set-up

1. Assure that the box is clean and ready to be used.
2. Check for frayed wiring and electrical/clinical safety check date within the last year.
3. The temperature in the box (measured in centigrade) is adjusted using the thumb wheel controls located on the top of the box.
4. The displayed temperature reading is measured at the tip of the sensor, which is located at the top and center of the removable insert.
 - a. Placement of the sensor can significantly alter the temperature within the insert.
 - b. The internal temperature reading should stabilize within $\pm 1^{\circ}\text{C}$ of the set point. If it fails to do so, JHBMC Clinical Engineering must be called at 0-0264 to adjust the feedback control. The box **must not** be used on a participant until the correct internal temperature is maintained.
 - c. With the heater set to full power, the box takes at least 30 minutes to warm from room temperature to set point of 55°C and stabilize there. There should be no smoke or smell when heating. If this occurs remove the unit from service, label 'broken do not use' and call Clinical Engineering.
5. Prior to warming, place a folded towel in the removal sleeve to serve as a cushion for the participant's hand. A second towel is draped over the open sleeve area to prevent heat escape.

Procedure for Use

1. Assure that the heated box is set up according to policy.
2. Explain procedure to the participant and demonstrate by placing your hand in the box.
3. Assess the skin condition of the participant's hand and arm prior to placing in the box. Document all observations.
4. Have the participant remove all jewelry from the hand and arm before placing it in the heated box sleeve.
5. Conduct skin checks at least every 30 minutes looking for color, temperature and skin condition. This can be done without removing the participant's hand from the box, by observing through the acrylic walls of the box and by reaching in and touching the participant's hand. Document findings.
6. Monitor box temperature continuously and check with participant for assessment of comfort. A towel may be used to pad under the participant's hand and arm.
7. Remove hand from the box every 60 minutes for direct observation. Periodic removal of the hand from the box does not jeopardize arterialized sampling. Be sure to place a towel drape over the open sleeve to preserve the heated air within the box.

Johns Hopkins Bayview Medical Center

CLINICAL RESEARCH UNIT

Policy No: 155

Heated-hand box (Hot box)

Previous Date: 11/14/02
Reviewed Date: 8/26/08

Cleaning of Heated Hand Box

1. Turn off and unplug the Heated Hand Box.
2. Wipe interior and exterior of box with Cavicide and water between participants. Keep solutions off of electrical parts. Water will damage the electrical components.
3. Wash the insert sleeve in antibacterial soap and dry. The insert sleeve can be submerged in water
4. Place sleeve back into the unit and wrap the clean box in plastic using a clear trash bag or saran wrap. Place a piece of tape on the plastic stating the date of last cleaning.
5. Store the box off the floor in a secure place with moderate temperatures.

Picture of unit



References:

Heated Hand Box procedure and web site by Dr. Dwight Matthew, University of Vermont
http://www.uvm.edu/~dmatthew/dem_res/?Page=heated_hand.html

Reviewers: CRU Patient Care Manager
Infection control,
CRU Nursing Staff

Pamela Ouyang, MBBS
CRU Program Director

John Preto, MS, RN
Director Medical Nursing

Heated-hand box (Hot box)