A Blood-Labeling System to Prevent Cross-Contamination and Misadministration

Dorothy Walsh, William C. Porter, Robert Gutkowski and Howard Dworkin

Department of Nuclear Medicine, William Beaumont Hospital, West Bloomfield, Michigan and Department of Nuclear Medicine, Henry Ford Hospital, Detroit, Michigan

Objective: To avoid misadministrations involving radiolabeled blood products, strict attention must be given to patient identification when blood is drawn or administered and continuous identification of blood samples during radiolabeling. We report on a blood labeling system which we believe safeguards patients.

Methods: The dose for a syringe is entered into a computer. A unique color is assigned to each patient and is not reused that day. Labels are printed which designate the patient and procedure and are affixed to syringes, the blood labeling log, all supplies which will contact the blood and a patient ID bracelet. The syringe, ID bracelet and request are verified by two people. When the blood is drawn, the ID bracelet is placed on the patient. Color-coded racks are used to contain all components. Prior to reinjection, the rack contents and final product are verified by two people. Upon reinjection, the ID bracelet is verified then removed.

Results: By utilizing this color-coded system, we have virtually eliminated the risk of cross-contamination or misadministration in our nuclear medicine department.

Conclusion: This system has been used on 429 patients and neither disrupts nor lengthens the labeling procedure.

Key Words: blood-labeling system; cross-contamination

J Nucl Med Technol 1994; 22:225–228

The Centers for Disease Control (CDC) have alerted practitioners to the fact that certain nuclear medicine procedures involving withdrawal and reinjection of blood and blood products have infected three patients with human immunodeficiency virus (HIV) since 1989 (*1,2*). Two were in U.S. hospitals, (California and New York), the other in the Netherlands. In two cases, the patient was misidentified and injected with labeled blood cells which were drawn from a different patient who was HIV-positive. In the third instance, the used syringe from a patient with HIV was inadvertently used for another patient.

For reprints contact: Dorothy Walsh, CNMT, William Beaumont Hospital, Dept. of Nuclear Medicine, 6900 Orchard Lake Rd., West Bloomfield, MI 48322.

According to Dr. Robert Lull from the American College of Nuclear Physicians (ACNP) and other practicing nuclear medicine physicians, the most prominent infection control problem in nuclear medicine appears to be in the inadvertent administration of a labeled blood product to the wrong patient (*personal communication*).

As a result of the three reported erroneous injections which occurred within a 6-mo period, the CDC has developed an eight-point plan which they encourage institutions and clinics practicing nuclear medicine to adopt. The CDC states that by implementing policies and procedures to assure routine adherence to this plan, the risk of patient exposure to blood-borne pathogens may be reduced.

This article will address two of the eight points in the CDC's plan. Specifically: "all syringes should be labeled with appropriate identifying information, including the patient's name and the pharmaceutical; a unique identification number should also be used" and "consideration should be given to implementing a system when administering biologic products, similar to that used for administering blood. This requires the presence of two persons to cross-check all labeling of the product to be injected, the prescription and the patient identification" (*1,3*).

The nuclear medicine department at William Beaumont Hospital has labeled autologous blood components since 1972 with no reported complications. However, with the increased use of radiolabeled blood, we are labeling as many as six different leukocyte samples in a single day. This could, if not carefully controlled, lead to inadvertent mislabeling. In order to minimize the potential for errors of this nature, we have instituted procedures which:

1. Require that the syringe used to draw the patient's blood be labeled with the patient's name and the labeling procedure that was requested.
2. Require unique color-coded labels along with the patient's name to be affixed to the drawing syringe, a wrist band generated by the radiopharmacy, pertinent forms, components employed in the labeling process and the final product syringe.

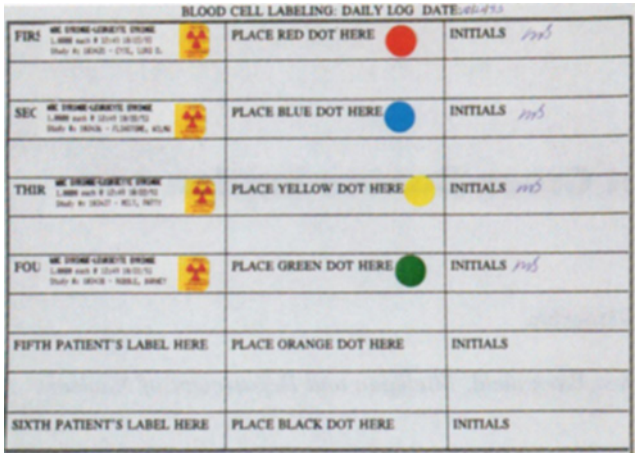

FIGURE 1. Daily log sheet.

3. At each step (drawing, labeling and injecting), two individuals will be required to verify the label on the container against the patient identity.

MATERIALS AND METHODS

Prior to radiolabeling, a request for the patient's blood-drawing syringe is entered as a dose into the computer. Filling the dose generates four computer-printed labels. One patient label is affixed to the first available slot of a daily log sheet. The log is initialed and the color code for that slot is acknowledged by affixing the assigned colored dot (Fig. 1). A patient label with the assigned colored dot is affixed to a blood-drawing syringe, a hospital ID bracelet and a request form.

The technologist who will draw the patient's blood confirms the patient's identity on all three components and initials the colored dot on the request form (Fig. 2). The technologist confirms the patient's identity and secures the labeled band on the patient's wrist (Fig. 3). This step has a twofold purpose: to enhance technologist assurance of patient identity upon reinjection and to enhance patient assurance that measures are being taken to prevent misadministration of a blood product. The blood is then drawn and returned to the pharmacy.

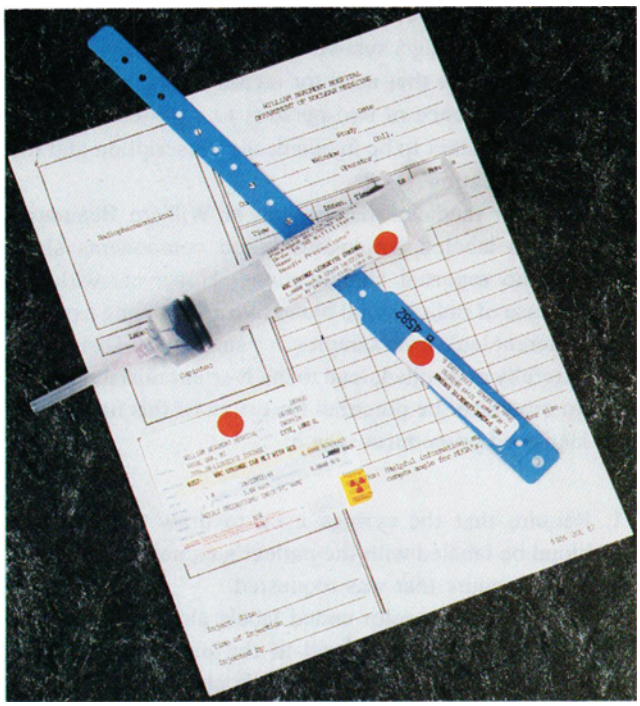

FIGURE 2. The request form, ID bracelet and blood-drawing syringe with patient label and color-coded dot.

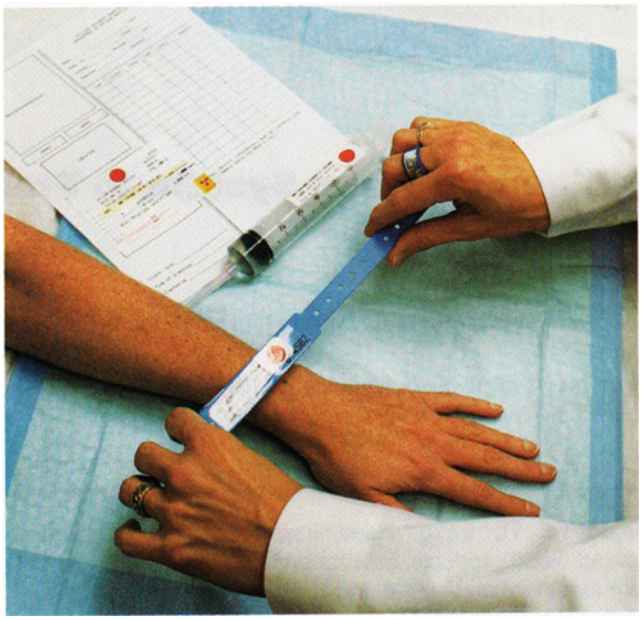

FIGURE 3. The technologist confirms the patient's identity and secures labeled wrist band.

Radiolabeling

Corresponding patient labels and colored dots are affixed to all components used in preparation of the final product (syringe, tubes, etc.). A color-coded rack which corresponds to the color-coded label holds all components throughout the labeling procedure (Fig. 4). The cells are then labeled ac-

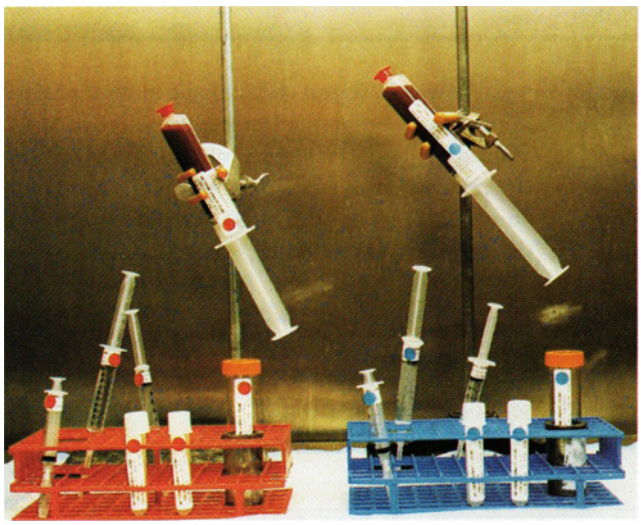

FIGURE 4. Corresponding patient labels and colored dots are affixed to all components used in the preparation of the final product.

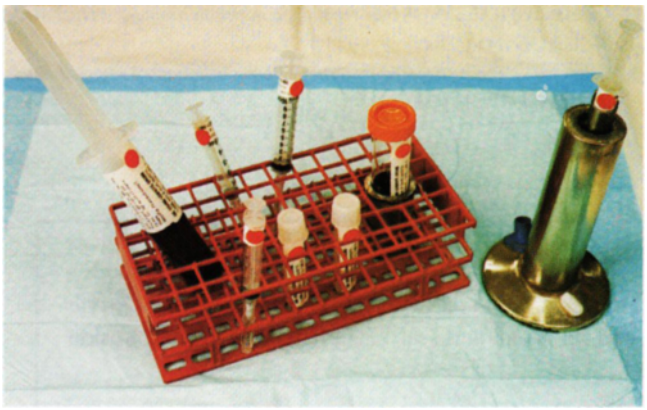

FIGURE 5. All components used for labeling, as well as the syringe containing the final dose, must remain together for double-checking.

cording to the appropriate protocol (i.e., ^{111}In-WBCs, ^{99m}Tc-WBCs or ^{51}Cr-RBCs).

Upon completion of the labeling procedure, the same colored dots along with a computer label with the patient's name and the radiopharmaceutical name are placed on the final syringe. All components used for labeling, as well as the syringe containing the dose, must remain together for double-checking (Fig. 5).

After the product has been entered into the computer, the dose syringe and all components are checked by a second individual. The individual confirms that all components are accounted for and the patient's name and color code all match. Upon confirmation, the two individuals must initial a label affixed to the microscopic photograph for leukocytes and a product label for all other products (e.g., ^{51}Cr, RBCs). If a confirmation cannot be made, the final product must be discarded (Fig. 6).

Postradiolabeling

The technologist dosing the patient must match the labeled color-coded hospital ID bracelet worn by the patient, with the label-coded product about to be injected. The optimal situation would be to have the technologist who draws the patient's blood also reinject the final product. This incorporates recognition with verification (Fig. 7).

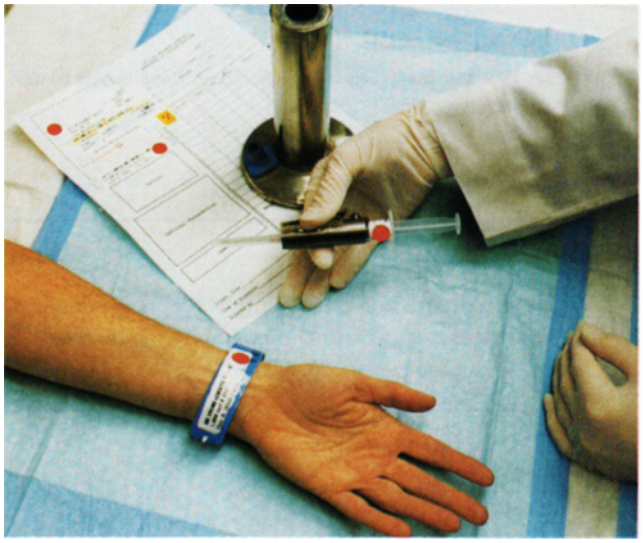

FIGURE 7. The technologist must match the labeled ID bracelet worn by the patient with the label-coded product about to be injected.

CONCLUSION

We believe we have developed a blood-labeling system that reduces the risk of cross-contamination or misadministration in our nuclear medicine department. Since using our color-coding system, we have performed 429 labeled blood studies with no cases of cross-contamination or misadministration. In addition, by using this system, we hope to gain patient confidence in what is to be reinjected especially with studies having both in vivo and in vitro segments. Our system does not significantly lengthen the blood labeling procedure time (10 min), nor does it add any substantial expense ($0.50/patient).

ACKNOWLEDGMENTS

The authors thank the staff of the William Beaumont Hospital Radiopharmacy for all their cooperation and help. Special thanks to Patricia Hamilton, CNMT, Michele Beauvais, RPh, BCNP and Wilma Shea.

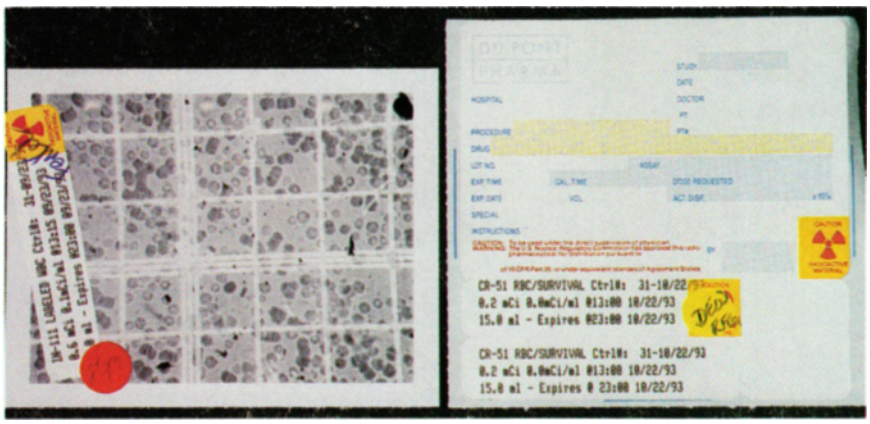

FIGURE 6. Two individuals confirm that all components are accounted for and the patient's name and color code all match. The labels affixed to either the microscope photograph for leukocytes or product label for all other blood products are then initialed.

REFERENCES

1. CDC cites HIV risk from nuclear medicine blood handling procedures. *ACNP Scanner* 1993;19:6.
2. Rojas-Burke J. Health officials reacting to infection mishaps. *J Nucl Med* 1992;33:13N–14N, 27N.
3. Taliaferro C. Preventing errors in radionuclide injections [Letter]. *J Nucl Med Technol* 1991;19:50.

CORRECTION

Due to a production error in the September issue of *JNMT*, Figure 4E in the article, "Technical Aspects of Prone Dependent-Breast Scintimammography" by Linda Diggles, Ismael Mena and Iraj Khalkhali, was printed upside down. We apologize for any confusion this may have caused.