HOW DO ANESTHESIA PROVIDERS ASSURE THE IDENTITY OF PATIENTS RECEIVING BLOOD TRANSFUSION?

1997

SHEPPARD

Thesis Approval Form

How do Anesthesia Providers Assure the Identity of Patients Receiving Blood Transfusion?

David A. Sheppard, LT, NC, USN

APPROVED:

W. Patrick Monaghan 21 July 97

W. Patrick Monaghan, CLS, SBB, Ph.D. Date
Chair

21 July 97

John P. McDonough, CRNA, Ed.D. Date
Member

Kenneth P. Miller 21 July 97

Kenneth P. Miller, Ph.D, RN, FAAN. Date
Member

APPROVED:

Faye G. Abdellah 9-10-97

Faye G. Abdellah, RN, Sc.D., Ed.D., FAAN
Dean, Graduate School of Nursing Date

CURRICULUM VITAE

David A. Sheppard

EDUCATION: Master of Science in Nursing Anesthesia, Uniformed Services University of the Health Sciences, Graduate School of Nursing, Bethesda, MD. June 1995-Sept 1997.

Bachelor of Science in Nursing, Magna Cum Laude, The University of Texas Health Science Center-Houston School of Nursing, Houston, TX., August 1991

Associate of Arts, Del Mar College, Corpus Christi, TX., May 1989.

CERTIFICATIONS: CCRN August 1994
Advanced Care Life Support

PUBLICATIONS: "How do Anesthesia Providers Assure the Identity of Patients Receiving Blood Transfusion?" The American Association of Nurse Anesthetist Journal,65(4), 391-2. August 1997.

"The Spirit of Nursing." Monday Morning newspaper at The University of Texas Health Science Center-Houston. March 14, 1991.

"National Nurse's Week" Cover page, Texas Medical Center newspaper. May 06 -12, 1991.

PRESENTATIONS: "How do Anesthesia Providers Assure the Identity of Patients Receiving Blood Transfusion?" 64th Annual Meeting of the AANA in San Francisco, CA August 13, 1997.

Accomplishments: Distinguished Clinical Performance Award Nurse Anesthesia Program, May 15, 1997. The Uniformed Services University of the Health Sciences.

Harris County Medical Society Clinical Excellence Award. Houston, TX. May 1992.

Sigma Theta Tau. 1991.

The National Dean's List. 1990-1991.

Who's Who Among Students in American Universities & Colleges. 1990-1991.

Fondren Foundation Award for Clinical Excellence. 1991.

President, Texas Nursing Student Association at The University of Texas-Houston. 1991.

Vice-President, Texas Nursing Student Association at The University of Texas-Houston. 1990-1991.

State Delegate, Texas Student Nursing Association. 1991.

U.S. Army Nurse Corps "Spirit of Nursing Award" at The University of Texas-Houston. 1990.

Experience: **Student Registered Nurse Anesthetist**, The Uniformed Services University of the Health Sciences, Bethesda, MD. June 1995 - Sept 1997.

Staff Professional Nurse, Naval Medical Center Portsmouth, VA, Intensive Care Unit, Nov.1992 - May 1995.

Professional Transport Nurse, Naval Medical Center Portsmouth, VA, Critical Care Transport Team, Jan 1993 - May 1995.

Instructor, Naval Medical Center Portsmouth, VA, NSHS Sponsored Critical Care Course for Professional Nurses, Oct 1993 - May 1995.

Board Member, Naval Medical Center Portsmouth, VA, Quality of Life Quality Management Board for TQL, April 1994 - May 1995.

Staff Professional Nurse, Naval Medical Center Portsmouth, VA, Pediatric Surgery Ward, Nov 1991 - Nov 1992.

Staff Professional Nurse, Children's Hospital of The King's Daughters, Norfolk, VA, Neonatal Intensive Care Unit-Level III, Dec 1991 - May 1995.

Student, U. S. Navy Officer Indoctrination School, NETC, Newport, RI, Sep 1991- Nov 1991.
Professional Nursing Student and Officer Candidate, U. S. Navy nurse Corps Bachelors Degree Completion Program (BDCP), Navy Recruiting Command, Houston, TX, June 1990 - August 1991.

Professional Nursing Student Extern, Hermann Hospital Level I Trauma Center, Houston, TX, May 1991 - August 1991.

Medical Technologist, Humana Hospital-Southmore, Pasadena, TX, 1989 - 1991.

Medical Technologist, Hermann Hospital, Houston, TX, July 1989 - Jan 1990.

Medical Technologist, Humana Hospital-Corpus Christi, TX, 1977 - 1989.

Medical Technologist, Victoria Regional Medical Center, Victoria, TX, 1987 -1989.

Medical Technologist, AMI-Physicians & Surgeons Hospital, Alice, TX, 1980 - 1987.

Laboratory Director, Weber Road Family Clinic, Corpus Christi, TX, 1980 - 1986.

Professional Associations: American Association of Nurse Anesthetist
U.S. Navy Nurse Association
American Association of Critical Care Nurses
Sigma Theta Tau

DEPARTMENT OF DEFENSE
DISCLAIMER STATEMENT

"This work was supported by the Uniformed Services University of the Health Sciences Protocol No. N06118-01. The opinions or assertions contained herin are the private opinions of the author and are not to be construed as official or reflecting the views of the Department of Defense or the Uniformed Services University of the Health Sciences."

COPYRIGHT STATEMENT

The author hereby certifies that the use of any copyrighted material in the thesis entitled:

"How do Anesthesia Providers Assure the Identity of Patients Receiving Blood Transfusion?"

beyond brief excerpts is with the permission of the copyright owner, and will save and hold harmless the Uniformed Services University of the Health Sciences from any damage which may arise from such copyright violations.

ABSTRACT

The purpose of this study is to document how anesthesia providers identify patients for blood transfusion. Accurate patient identification is of paramount importance in the assurance of safe blood administration. For the last 20 years, the Food & Drug Administration (FDA) reports of transfusion-related fatalities have shown that the surgical patient is at most risk for a hemolytic transfusion reaction. In the first three years of required FDA reporting of transfusion-related fatalities in the United States, 59% occurred in the surgical suite. In addition, 90% of the transfusion-related fatalities were due to clerical errors in which positive patient identification would have prevented most of the fatalities. A questionnaire was given to 71 nurse and physician anesthesia providers. Demographic data was collected to determine years of professional experience and what type of education and training the anesthesia providers has had in patient identification procedures. Descriptive statistical analysis of the data was performed. The conceptual framework of the study was based on a clinical decision-making model.

The respondents consisted of 44% anesthesiologist, 44% CRNAs, and 12% SRNAs. Overall, 20% of the anesthesia providers indicated they had no formal training in patient identification procedures. Thirty-seven percent of the anesthesia providers were not sure if their hospital had written policies and procedures for patient identification. Sixty-six percent of the anesthesia providers positively identified a patient for a blood transfusion by checking the wristband and only 41% consistently verified patient identity with the wristband. Once the wristband had been removed, 54% of the anesthesia providers verified patient identity for a blood transfusion by comparing the blood unit to the patient's chart. Forty-eight percent verified the blood unit with the previously removed wristband and approximately 8% failed to verify any proper identity of the patient once the wristband had been removed.

HOW DO ANESTHESIA PROVIDERS ASSURE THE IDENTITY OF PATIENTS RECEIVING BLOOD TRANSFUSION

by

David Allen Sheppard, BSN, RN
Lieutenant, NC, USN

THESIS

Presented to the Graduate School of Nursing Faculty of

The Uniformed Services University of the Health Sciences

in Partial Fulfillment

of the Requirements

for the Degree of

MASTER OF SCIENCE DEGREE

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES

September 1997

DEDICATION

I would like to dedicate this research thesis to the most important thing in my life, my family! It is all of you in whom I draw my internal strength and energy to project me forward even when sometimes I think that I can't go another step. To my dearest children, Britney, Ashley, and Christopher, I could never thank you all enough for excusing the time away from you to allow Dad to complete this degree. You have all been more patient, understanding, and supportive than any parent could have ever expected from their children.

I want to also thank, Karen, one of the best things that has come into my life, for the endless love, support, faith, and patience throughout this very challenging time of my life. I could never thank you enough for restoring my faith in love and trust.

To my classmates, your never ending emotional support and understanding to me during one of the most difficult times of my life will never be forgotten. Special thanks to David Olsen and Adrienne Grant Burnette, two of my dearest friends, of their endless support and guidance.

Lastly, my thanks to God, for the opportunity to utilize the talents and skills that he has blessed me to further his works.

ACKNOWLEDGEMENT

This thesis would not have been possible without the support, guidance, and assistance of many people. I am especially grateful to Dr. Patrick Monaghan, chairperson, Dr. John McDonough and Dr. Ken Miller, members of my thesis advisory committee for their undying patience, experience, and focus.

I would also like to thank the United States Navy Medical Department, especially RADM Joan Engle, NC USN, for their vision and the opportunity granted to me to attend this great institution, The Uniformed Services University of the Health Sciences.

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: THE RESEARCH PROBLEM

Introduction

Background of the Problem

Blood transfusion, like improved anesthesia, has long been recognized to have made most major surgical procedures safe and major thoracic surgery more accessible ("Blood Transfusion Accidents", 1953). The benefits of blood transfusion are numerous and well documented in both peace and in war. However, as with any benefit, there are associated risks with blood transfusion. Every step needs to be taken to minimize the chance of fatality or untoward patient reaction, when attempting to save a life with blood products. The request for blood products must always have the benefits out weigh the risks. The worst risk inherent in a blood product transfusion is death as a result of a fatal transfusion reaction.

The three phases at which a patient about to be transfused is most likely to have a significant error, which places them at risk, are in the prescribing of the transfusion, in the grouping and matching, and in the actual transfusion ("Blood Transfusion Accidents", 1953). Guy in 1981 noted that the most serious errors that occur with a transfusion service are clerical rather than technical. Technical errors may lead to confusion and sometimes inconvenience and on occasion can be severe enough to result in a transfusion fatality. But, serious injury or death to a patient most often occurs due to an identification error. Dharan in 1977 classified clerical errors into three categories: wrong patient, wrong specimen, and wrong entry on reports.

Camp and Monaghan (1981) noted that 90% of the fatal, hemolytic transfusion reactions were clerical error--human clerical error! In 1980, Myhre reviewed FDA reports of fatal blood transfusion reactions from April 3, 1976 to December 31, 1979 and noted that two thirds of the fatalities resulted from clerical error and could have been prevented by proper patient identification procedures. Misidentification is undoubtedly the most striking and frequent error. Honig and Bove in 1980 reviewed FDA reports from 1976 through 1978 and noted that of all hemolytic transfusion reactions, it was a maxim that the surgical patient is most at risk. Their study of the data demonstrated that the incidence of blood transfusion reactions in the surgical suites were greater than that in any other hospital location. The open-heart surgery cases appeared in particular frequency. Cardiovascular surgery accounted for over 20 percent of all blood used during that time frame.

Most protocols for identifying a patient for transfusion occur at the bedside. The anesthesia provider has a unique problem in that the "bed" constantly has a new patient in it and most all of the patients are dressed in the identical hospital gown. Many are incapable of speaking and the standard patient identification wristband may not be readily accessible. This could be due to the drapes or the wristband may have actually been cut off while the patient was being prepared for anesthesia and/or surgery.

It is appropriate to document and analyze the critical points in the patient identification process of blood transfusions. Nurses are integral to these processes and anesthesia providers, in particular, account for numerous transfusions which are often performed under difficult and/or austere conditions.

Rationale and Significance of the Problem

As stated above, numerous studies have shown that most of the untoward reactions to blood product administration are due to clerical errors (Honig & Bove, 1980; Myhre, 1980; Schmidt, 1980; Camp & Monaghan, 1981; Guy, 1981; Myhre, Bove, & Schmidt, 1981; Murphy & McClelland, 1989; Sazama, 1990; Renner, Howanitz, & Bachner, 1993; Beale et al., 1993). The single most frequent type of error, failure to adequately identify the recipient prior to starting transfusion was noted in the Review of Bureau of Biologics Reports of transfusion-associated fatalities from 1976 – 1978 (Honig & Bove, 1980). Myhre in 1980 reviewed one hundred thirteen fatalities that were reported to the FDA as a sequela of the transfusion of blood products from 1976 to 1979 and discovered that 65% of the reactions were directly related to the misidentification of the patient. In 1980, Hong and Bove noted that in the first three years of blood product fatality reporting to FDA, the predominant site, approximately 59%, of error occurred in the surgical suite. Schmidt in 1980 also noted that the most common site of physician error was the operating room, with the anesthesiologist implicated most often.

As noted many times so far, better understanding of the causes of untoward reaction to blood transfusion has been gained by the review of FDA reports. However, the problem, misidentification of patients to be transfused with blood products, still exists. The results of this study will identify some of the critical points in the patient identification procedure by anesthesia providers. This will provide some insight into where the need to focus the education and training of anesthesia providers in the accurate

identification of patients who are to be transfused with blood. A more comprehensive understanding of the process should decrease the incident of untoward blood transfusion reactions by anesthesia providers and allow for a much safer blood transfusion environment.

Statement of the problem

Accurate patient identification is of paramount importance in the assurance of safe blood product administration. The surgical patient is most at risk for a hemolytic reaction. As noted earlier, Myhre in 1980 reported that of one hundred thirteen fatalities reported to the FDA from 1976 to 1979, 65% (N=77) were due to misidentification of the patient. It is the purpose of this study to attempt to document how anesthesia providers actually identify patients for blood transfusion.

Nursing and military relevance

Blood products are almost always transfused by nurses and Sazama noted in 1990 that accreditation requirements should consider the assignment of the responsibility for correct blood administration to the nursing services section. In the military, especially in the operational theater, blood transfusion has proven to be the major life saving medical procedure (Whelan, 1975; Monaghan, 1983). The treatment of mass casualties in a combat zone, where over 32,000 units of blood were transfused to 2,890 severly injured in S.Vietnam, exhibit that established policies and procedures enabled efficient and safe management of blood transfusion (Monaghan, Levan, & Camp, 1977). A greater number of CRNAs are usually deployed to an operational theater and are therefore most likely to be responsible for large volumes of blood transfusions. Almost all of these transfusions

will occur in the patient high risk perioperative area. Proven and reliable procedures for patient identification and blood product transfusion techniques need to be utilized especially in these unique operational environments (Monaghan & Peckham, 1976; Thornhill, Monaghan, & Alegre, 1981).

Definitions

Autologous blood transfusion. Transfusion of blood that has either been donated by the patient in advance of surgery or collected from the surgical site during the procedure. Use of the patient's own blood, rather than blood from a donor.

Allogeneic blood. Having a different genetic constitution but belonging to the same species. Donor ABO type specific blood is one frequent kind of allogeneic blood transfusion.

Blood transfusion. The collection and subsequent infusion of any blood product into a patient whether it be red blood cells, plasma, platelets, coagulation products, or white blood cells.

FDA. Food and Drug Administration. The Center of Biologics for Evaluation and Research regulates blood testing, blood banking, and untoward reactions to blood transfusions.

Anesthesiologist. A physician specializing in anesthesiology.

Anesthetist. One who administers anesthetics, especially for general anesthesia. May be a specially trained physician or nurse.

CRNA. Certified Registered Nurse Anesthetist. A registered nurse that administers anesthesia to patients in the operating and/or delivery rooms. The knowledge

and skill required to provide this service are attained through an organized program of study recognized by the American Association of Nurse Anesthetists.

Hemolytic blood reaction. The breakdown or destruction of red blood cells; usually occurs as a result of an antigen-antibody reaction.

Blood transfusion reaction/Untoward reaction. A variety of reactions that can occur as a result of the transfusion of a blood product. The most serious being the transfusion of incompatible blood that causes massive intravascular clumping and lysis of red cells. More frequently and less serious reactions can present with symptoms such as urticaria, edema, wheezing, pyrexia, face flushing, lumbar pain, vomiting, and shock.

Summary

Transfusion of blood products has made major surgical procedures easier and safer. However, there continue to be many associated risks with the transfusion of blood products. The worst risks being death as a result of a preventable fatal blood transfusion reaction. Many studies have been performed analyzing the transfusion-related fatalities that have been reported to the FDA over the last twenty years. In each study, it was noted that the most serious errors associated with untoward transfusion reactions were clerical. Most of the clerical errors were due to the breech of proper patient identification prior to the commencing of a blood product transfusion.

Anesthesia providers are particularly vulnerable for encountering patients who are susceptible to transfusion reactions. This potentially risky environment for untoward transfusion reactions is most often due to the lack of proper patient identification. This may often be due to the fact that the patient's wristband may have been previously

removed for venous access or is inaccessible due to surgical drapes. Better understanding of the causes of untoward reactions to blood product administration has been realized by the review of reports of fatal transfusion reactions reported to the FDA. However, there needs to be more insight into where education and training can be performed in particular with anesthesia providers in order to decrease the incidence of untoward blood transfusion reactions and make for a safer transfusion environment for the anesthetized patient.

CHAPTER TWO: REVIEW OF LITERATURE

Introduction

It has been well documented that the availability of transfusable blood products has made major surgical procedures more accessible and safe ("Blood Transfusion Accidents", 1953). Since WWII blood transfusion has proven to be the major life saving medical procedure within the military operational theater (Whelan, 1975; Monaghan, 1983). In 1953, the British Medical Journal stated that in the giving of the transfusion the matched blood should be handled as little as possible and used with the minimum of delay. In easily understood terms, the authors stated that there should be a simple yet rigid system of check, check, and counter-check because accidents can easily occur ("Blood Transfusion Accidents", 1953).

In England in the 1950's, it was suggested that blood should only be removed immediately before use, and only by a member of the medical staff, preferably by the houseman or anaesthetist who is to set up the transfusion ("Blood Transfusion Accidents", 1953). Anaesthetists in England were all physicians due to the fact that they never trained nurses to provide anesthesia (Bankert, 1993). The journal went on to say that, "neither the removal of blood from the refrigerator nor the administration should be allowed to be a duty of the nursing staff'("Blood Transfusion Accidents", 1953). According to the British at that time, a nurse should only be a witness on the ward or in the operating room Theater when blood is to be given. At the time, the true incidence of death resulting from accidents in blood transfusion was not known in England, but one large hospital in the London area had reported only one death in a period of six years, in

which 13,000 units were transfused ("Blood Transfusion Accidents", 1953).

Medical and nursing practice and procedures have definitely changed since the 1950's. Today, blood products are virtually always transfused by nurses (Sazama, 1990). In 1990, Sazama reported that according to the Accreditation by the Joint Commission on Accreditation of Healthcare Organizations, the medical staff is to take responsibility for the quarterly review of blood usage, to include development or approval of policies and procedures relating to the distribution, handling, use and administration of blood and blood components. According to the report, there are no explicit responsibilities assigned to nursing services for the administration of blood products. There is a suggestion that the accreditation requirements should assign the responsibility for correct blood administration to the nursing services section.

In November 1975, the Bureau of Biologics published Good Manufacturing Practices for blood banks and transfusion services. These regulations, for the first time, required reporting of all fatal complications throughout the United States of blood transfusion or collections to the FDA (Honig & Bove, 1980).

In 1979, Honig and Bove requested copies of all transfusion-associated fatalities that were reported to the FDA for years 1976, 1977, & 1978 under the Freedom of Information Act. They analyzed the acute hemolytic reactions to identify the serologic and clinical natures of the reactions to document the types of error and reasons for their occurrence. There were a total of 70 transfusion-associated fatalities reported to the FDA during this three-year period. There were 44(63%) acute hemolytic reactions out of the 70 reported incidents. Thirty-eight of the 44 cases (86%) were due to transfusion of

ABO-incompatible blood. The time interval between transfusion and death in 27 cases was 24 hours or less, greater than 24 hours in 11 cases, and unclear in six cases. Out of the 44 reports, three cases had no preventable error and in four cases, the source of error was unclear, leaving only 37 cases for analysis. Clerical error occurred in 33/37(89%) of the cases.

Seven of thirty-seven (19%) of these clerical errors occurred prior to the cross match sample being received by the blood bank. These types of errors were: the sample being drawn on the wrong patient, misidentification of the sample clot tube label or requisition form, or wrong blood release form. Thirteen of the thirty-seven clerical errors (35%) occurred in the blood bank. These blood bank errors were due to confusion of samples or records, wrong unit released, or serologic mistakes.

The largest number of errors was associated with blood administration. The most common error was cross match-compatible blood transported to the proper location, but transfused into the wrong patient. In 17/37(46%) of reports, the blood was given to the wrong patient. Ten of the seventeen patients (59%) that received the wrong blood due to clerical error occurred in the surgical suite. In 12/37(32%) of the cases there was one or more other people who repeated or aided in furthering the initial error.

Eight of the seventeen perioperative fatalities (47%) occurred in the cardiovascular suite. Honig and Bove estimated that in the three-year period reported, 27 million units were given with 64 transfusion-associated fatalities documented and reported. This gave an estimated mortality rate of 1 per 422,000 units transfused. Honig and Bove also felt that this number is underreported due to the interpretation of what

constitutes "transfusion related."

To summarize the study performed by Honig and Bove, clerical error, accounting for 33 of 37 incidents, were the major cause of fatal hemolytic reactions. The single most frequent type of error (17 of 37), was the failure to adequately identify the recipient prior to starting a transfusion. The surgical patient was at most risk for a hemolytic reaction with an incidence of 59%(22/37) of the 33/37(89%) misidentified for transfusion.

Myhre in 1980 examined all of the reports of transfusion-associated fatalities from April 3, 1976 to Dec 31, 1979 that were reported to the FDA. In this study, there were one hundred thirteen fatalities reported during that time period. Myhre reported that thirty-three fatalities were due to post-transfusion hepatitis. Of the remaining 77 cases, 47 cases (61%) were due to clerical errors, eight cases (7%) consisted of technical errors that occurred in the laboratory. Twenty-two cases (19%) were due to miscellaneous problems, most of which were deemed unpreventable.

Myhre also noted that in about half of the cases which resulted in operating room fatalities, the blood had been stored in the free-standing operating room refrigerators rather than in the blood bank. This demonstrated that blood that was stored in the operating room was being dispensed with little, if any, control and it therefore presented a very dangerous scenario. Another interesting finding from Myhres' study was that the patient with group O blood was more at risk for a transfusion reaction. Group O is found in only 30% to 40% of the population but accounted for 77% of the fatalities in that reporting period. In view of the high incidence, Myhre suggested that the group O patient should be checked and observed with increased scrutiny.

Myhre concluded that more than half of the fatal reactions could have been easily prevented. The transfusion reactions were primarily due to mistakes in patient identification rather than to rare or unusual blood-group antibody problems. He noted that identification, labeling, and drawing of the correct sample from the right patient, filling out all the requisitions properly, and finally checking that the patient received the specific unit of blood would have prevented most of the reactions. The person administering the blood unit should be certain that both the blood and the intended recipient are correctly identified.

In 1980, Schmidt reviewed the reports made to the FDA on fatal transfusion reactions from 1976 to 1978 with particular reference to surgical and intensive care facilities. The total number of reports in Schmidts' study was 69 cases at that time. Of those 69 reported cases, 22 cases (32%) were due to donor-patient red cell incompatibility. In all 22 cases, it was a clerical identity error and never a technical failure of the laboratory to detect a weak blood group or hidden antigen. Five of the clerical errors (23%) occurred in the laboratory leaving seventeen clerical errors (77%) being due to the correct blood being given to the wrong patient. Twelve of the seventeen incidents (71%) occurred in the surgical suite or intensive care unit.

In 1981, Camp and Monaghan performed an analysis of 126 fatal blood transfusion reactions that occurred between 1976 and 1980 that were reported to the FDA. They noted that the patient identification wrist band is an excellent idea however, professional staff do not always utilize the information. In addition, professional staff do not always collate adequately the information on the blood transfusion request form, the

blood bag label, and the wrist band of the patient to be transfused. They also noted that the cause of 90% of the fatal, hemolytic transfusion reactions were clerical error.

In the analysis of errors that resulted in fatalities, Camp and Monaghan found that 11/64(17%) were due to errors made by the anesthesiologist. Thirty-four percent (22/64) of the errors were made by nursing personnel and forty-eight percent (31/64) were made by laboratory personnel. The data analysis of where the transfusions occurred revealed that 27%(25/92) were transfused in the operating room, 9%(8/92) in the emergency room, 49%(45/92) on the wards, and 15%(14/92) in the intensive care unit. According to Camp and Monaghan, the key to resolution of these problems appears to involve improved utilization of the patient wrist band information with an electronic objective reading device.

Myhre, Bove, and Schmidt in 1981, combined the data from all of their analysis of FDA reports to make some overall conclusions of a needless cause of surgical death. They noted that the principles involved in the safe administration of transfusions are so well known to anesthesiologist that they scarcely need to be repeated. However, even today the statistics on deaths associated with transfusions in surgical patients are so dismal that for once, in medicine, repetition of the obvious is indeed indicated. Their reviews have shown again what should by now be common knowledge--that misidentification of blood containers or recipients are the overwhelming cause of the fatalities directly associated with transfusion. From the reports Myhre analyzed, he noted that the fatality rate involving a direct complication in a unit of blood was approximately 1 in 500,000 transfusions. As stated earlier, two thirds of the fatalities resulted from

clerical error and could have been prevented by proper identification procedure. In each of their reviews, there could be no doubt about the striking importance of misidentification. Although reached independently, their conclusions were identical--misidentification is the culprit and the surgical suite is the major danger area.

In 1989, Murphy and McClelland performed a 24-month study at a large teaching hospital in Edinburgh, UK to analyze transfusion-related fatalities due to failure to practice safe blood transfusion procedures. The study for analysis was made of reported incidents that occurred in 1986 and 1987 in which patients were transfused with blood that had been cross matched for a different person. They noted that the efficiency of reporting is not known. During the 24-month period studied, 30,456 units of red cell concentrates and whole blood were issued by the Blood Bank for transfusion. Two ABO mismatched transfusions were reported and on another 3 occasions, patients received uncrossmatched blood that fortuitously was ABO-compatible. In every one of the incidents, inadequate checking procedures by ward and operating room staff was the major contributing factor. Of the five incidents, two occurred in the operating room and the other three occurred on the wards.

Murphy and McClelland noted that most ABO-incompatible transfusions are the result of clerical errors; however, most clerical errors that result in the wrong blood being given to a patient will not result necessarily in a clinically unfavorable outcome. This is because in about two-thirds of the cases, the blood will be ABO compatible, due to the ABO group distribution throughout the population. This awareness sheds a new light on what might be the actual incidence of transfusing blood to the wrong patient. According

to the FDA reports surveyed by Honig & Bove in 1980, they noted that one would expect only approximately 33% of wrong patient transfusions to have been detected. They reported an estimated mortality rate from transfusion of uncrossmatched blood of approximately 1 in 422,000 transfusions. But if we consider that 33% of the transfusions did not result in a clinically untoward reaction even though the transfusion was given to the wrong patient, it would not have been noticed and/or not reported to the FDA. This suggests that a more accurate incidence of wrong patient transfusion rate could be as high as 1 in 12,700 transfusions.

Murphy and McClelland's study showed that a blood transfusion practice in use in a large teaching hospital and considered safe does not in practice avoid serious errors. Their findings indicated that the test of the safety of any transfusion practice must be how effectively it prevents the transfusion of uncrossmatched blood. They noted that a time-consuming, unwieldy, or seemingly redundant check is occasionally omitted by clinical staff and will rarely result in the transfusion of uncrossmatched blood. They also noted that deviations by clinical staff from safe transfusion practice are far more common than the number of observed errors indicates.

In 1981, Guy reported that wristband identification, if correct and complete, is the best patient identification available. Unfortunately, she reports that anesthesiologists and other physicians often cut the wristband to remove it from the patient if it interferes with venipuncture, and then attach the band to the patient's bed or chart. Guy notes that usually human error is responsible due to failure to observe established safety regulations pertaining to the matching of information on the patient's wristband with that on the cross

match specimen label or the tag attached to the blood bag. Guy reports that the transfusionist is required to sign the transfusion record to confirm that patient identification information has been matched item for item, but such checking is occasionally not done.

Guy notes that technology is not always the answer to the problem. Computers are used to order tests, print labels, transmit results, and store information that may help to eliminate some clerical errors, but output is only as good as the input. She summarizes by stating that accurate identification is the responsibility of each person involved in patient care and must evolve as teamwork.

Sazama in 1990 summarized 355 reports of transfusion-associated deaths reported to the FDA for the first ten years of required reporting. This period was from 1976 to 1985. The purpose of this study was to analyze and compare preceding reports and gain insight into preventive measures that might be implemented further to reduce the number of transfusion-associated deaths. Sazama noted that the most common cause of death due to transfusion is acute hemolysis, which accounted for 158 deaths of the 256 reported transfusion-associated deaths (62%). Of the 158 deaths due to acute hemolysis, 131 were due to ABO incompatibility (83%). An interesting finding was that eighty-five percent of ABO deaths involved a blood group O recipient who received a non-group O transfusion.

Sazama also reports that the actual number of deaths that have been caused by mistakes in the administration of otherwise safe and effective blood is generally unknown and probably unknowable.

Sazama compared her ten year summary to Honig and Bove's first 3 year FDA

reporting and found that the single most remarkable change occurred in errors classified as "blood given to wrong person." This category represented slightly more than 38 percent (17/44) of errors in the first 3 years, but these errors increased in frequency to 49 percent (77/158), over the 10-year period. Of great interest is that the predominant site of error during the first 3 years of reporting was the surgical suite10/17 errors (59%), but 52/77(67.5%) of the errors during the last 7 years of the 10-year reporting period occurred elsewhere. Fifty-one of the 77 administration errors (66%) were due to nurses singly and eleven errors were with physician involvement (14%). Physician error alone accounted for 15/77 deaths (19%). The most common site of physician error was the operating room, with the anesthesiologist implicated most often, a finding that is consistent with an earlier report by Schmidt (1980).

Sazama noted the nature of the administration error in these deaths was a breach in identification process or, more frequently a failure to train the transfusionist in proper identification procedures. She also notes that the removal of the hospital identification band during the patient's surgery may have been responsible for some of these errors. Sazama's findings suggest there has been a shift in the nature of the errors leading to death. Although it may be tempting to attribute all of these deaths to "clerical error" (a failure to properly observe and record information), it appears that, in many instances, there was instead a management system error. This type of error includes the absence of proper written procedures and/or training of persons held responsible for the deaths, as well as a failure to properly assign responsibility for certain aspects of transfusion. Sazama summarized by noting that failure to follow the necessary procedures for

transfusing blood products or a complete lack of training or knowledge of the necessary procedures contributed significantly to the deaths reported throughout those 10 years.

The patient identification wristband is an excellent method of patient identification as noted earlier by Guy. However, the wristband is not exempt from human clerical error. In 1993, Renner, Howanitz, and Bachner performed a College of American Pathologists' Q-probe study of quality issues in transfusion practice. They compared wristband identification errors for 712 hospitals. Phlebotomists checked patient wristbands on 2,463,727 occasions, finding 67,289 errors. In 33,308 instances, patient wristbands were missing entirely. Absent wristbands represented 49.5% of errors; multiple wristbands with different information, 8.3%; wristbands with incomplete data, 7.5%; erroneous data, 8.6%; illegible data, 5.7%; and patients wearing wristbands with another patient's identifying information, 0.5%.

Renner, Howanitz, and Bachner performed the first report on interinstitutional comparison of wristband identification errors to better understand the nature of clerical errors leading to incompatible transfusions. The purpose of this study was to measure the influence that several hospital policies and procedures regarding phlebotomy, patient identification, and wristband monitoring had on error rates and to validate a protocol for measuring intra institutional error rates that participants could continue to use to monitor their improvement.

In their study, it was noted that many participants allow alternate placement of identification bands. Their data showed that 72.7% of surveyed hospitals allowed identification bands around a patient's ankle. Almost a third (30.4%) permit the

identification to be placed on the patient's bed, chart, or wall of the patient's room. Only 7.4% of participants allow the identification band to be pinned to the patient's clothes, 5.6% taped to his/her body or placed at other locations (2.5%). They found that the designation of an alternate site for an identification band was an important factor associated with low rates of identification errors. They also concluded that, although placement of identification at sites other than the wrist is seldom necessary, the formal pre-designation of an alternative site may prevent confusion and error.

Conceptual Framework

Problem solving involves the identification of the types of problems and the kind of data that is needed to solve it. Decision making, on the other hand, is when there are choices among possible alternatives that are made. Although these two activities are different, they are highly interdependent. A problem has to be solved before a decision can be made, and decisions must be made in the process of problem solving. However, it is the decision that makes the final outcome since the result of the decision is action. Corliss in 1995 combined these two concepts to create a model of clinical decision making. Clinical decision making is a very dynamic system that is composed of interdependent elements. In the Corliss model of clinical decision making, there are four major components to the model. One of the components is the clinician's knowledge base and the other three are processes: taking a history, clinical testing, and treating or managing the patient. Knowledge is what ultimately enables a clinician to successfully solve problems and make correct decisions. To solve a patient problem, a clinician must be able to perform tasks that require a combination of both manipulative and

observational skills. Corliss noted that there are three elements that make up the knowledge base component: structure of knowledge in memory, procedural skills, and facts & rules.

This thesis functions within the conceptual framework of Corliss's clinical decision making model. The data obtained will examine how anesthesia providers have been educated in the procedural skills and facts and rules involved in the proper identification of patients receiving blood transfusion. It is the knowledge of the proper patient identification procedures for blood transfusion that allows the anesthesia provider to make the safe clinical decision to transfuse blood into a specific patient and have an acceptable patient outcome.

Summary

As noted above, most of all the studies performed concerning transfusion-associated fatalities are focused on the FDA reports of fatalities that have already occurred. Although most clinicians feel that these cases are significantly underreported, study after study has revealed the same thing--the most common transfusion-associated fatality is due to human clerical error and occurs with high frequency in the operating room by anesthesia providers. Analysis of these reports has been vital in better understanding of several causes of death following transfusion but it never seems to get to the real root of the problem.

Since there is a documented high frequency of human clerical errors and/or a management system error in the operating room involving anesthesia providers, what is the cause and what intervention needs to be made to decrease the frequency? Sazama

noted that there is an unquestioned need for better training and targeted reeducation of transfusionist. One could easily deduce that there is unquestioned need for better training but to target reeducation of transfusionists or anesthesia providers is assuming that they have all previously received formal education and training. This assumption and has never been formally documented. It would be very interesting to see how many anesthesia providers have received formal education in the administration of blood products and when and how their training was performed. Perhaps the best place to intervene in decreasing the frequency of transfusion-associated fatalities by anesthesia providers in the operating room is initial education not just reeducation.

CHAPTER THREE: METHODOLOGY

Introduction

The design of this study was descriptive. The data was collected by utilizing a questionnaire. The data collected was used to determine if anesthesia providers have previously received any formal education in the identification procedures of patients for a blood transfusion. The collected data delineated how anesthesia providers assured the identity of patients receiving blood transfusions especially once the identification wristband had been removed. Furthermore, the data described what specific responsibility the providers feel they have in the actual process of patient identification.

Sample

The study population came from nurse and physician anesthesia providers at various military and civilian facilities. The total study sample consisted of 71 subjects, N=71.

Selection Criteria

The anesthesia providers studied consisted of student registered nurse anesthetists, certified registered nurse anesthetists, physician anesthesia residents, or physician anesthesiologists. All of the anesthesia providers had currently been practicing clinical anesthesia in the environment where blood products were being administered.

Research Tool Validity

The questionnaire was given to three experts in the field of anesthesia and one prominent clinical consultant for blood banking. All three experts were the Chief of the anesthesia departments at their perspective facility and one is the assistant chair of the

research department at a large medical university. All agreed that the research tool would elicit data necessary to answer the research question.

Instrumentation

Utilizing a questionnaire collected the data. Data was encoded numerically or ranked to facilitate computer data entry during the analysis phase of the study.

Research Design

The study was a descriptive design to examine and describe how anesthesia providers assure the identity of patients receiving a blood transfusion.

Statistical Analysis

Descriptive statistics with frequency analysis were performed of the data that was collected by the questionnaire.

Limitations

The study sample is a small sample of convenience limited to civilian and military anesthesia providers in one geographical area. Therefore, the results of the study may not have universal application. Randomization of the subjects was limited to the facilities where the researcher is clinically affiliated in a particular geographic area. Finally, it is unpredictable to know how many anesthesia providers were willing to participate in this study.

Summary

This study was conducted using a questionnaire to determine how anesthesia providers assure the identity of patients receiving a blood transfusion. The study consisted of a relatively homogeneous group of military and civilian anesthesia provider

sample. The sample is derived from one geographical area so generalizations will be limited, but larger studies can be modeled after this small study.

CHAPTER FOUR: RESULTS

Introduction

This chapter presents the results of the data analysis of the questionnaire on how anesthesia providers actually identify patients for blood transfusion. The first section provides general data describing the sample. The second section presents data answering the research questions that are restated immediately below.

Data Describing the Sample

Descriptive information is provided from the anesthesia providers that were questioned. The questionnaire was handed out to the providers and the completed questionnaire was subsequently returned to the researcher. The total sample was 71. Thirty-eight percent (27/71) were military anesthesia providers and 62%(44/71) were civilian anesthesia providers. (see Figure 1) SRNA's consisted of 12.7%(9/71) of the sample while 43.7%(31/71) were CRNA's, and 43.7%(31/71) were Anesthesiologists. (see Figure 2)

The sample had a wide range of (6 months to >30 years) of professional experience. The mode of the distribution of years experience occurred at 16 years to 20 years consisting of 28.2%(20/71) of the sample. It was also noted that 50%(10/20) of that group were CRNAs and seven were Anesthesiologist. The next largest frequency occurred at the 4 to 8 years experience range which consisted of 21.1%(15/71) of the sample. Fourteen out of the fifteen subjects in this group were Anesthesiologists. The rest of the sample was evenly distributed between six months to greater than thirty years of professional experience. (see Figure 3)

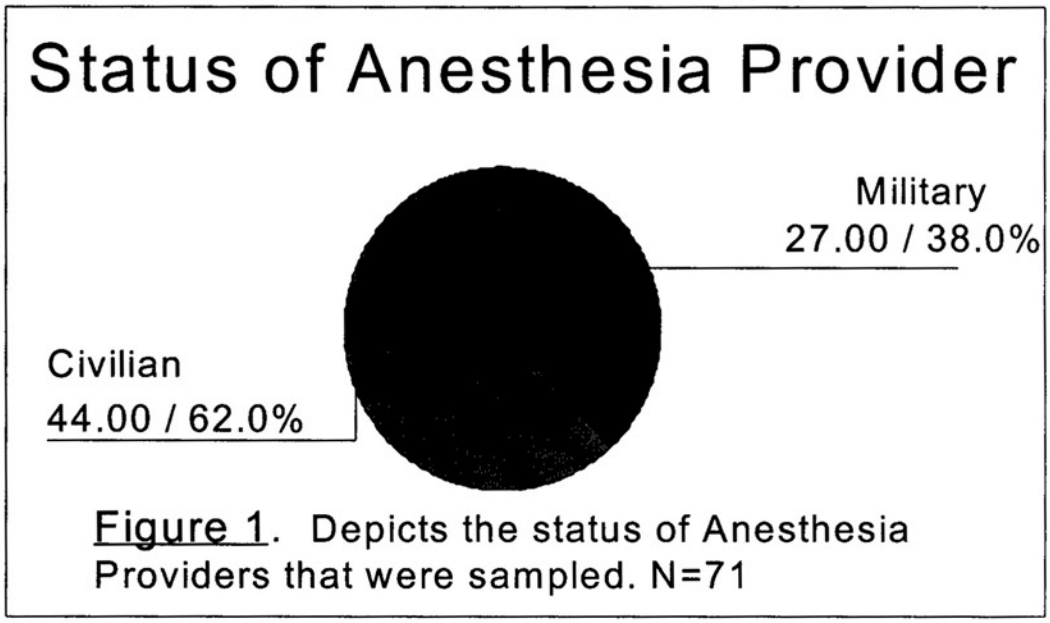

Figure 1. Depicts the status of Anesthesia Providers that were sampled. N=71

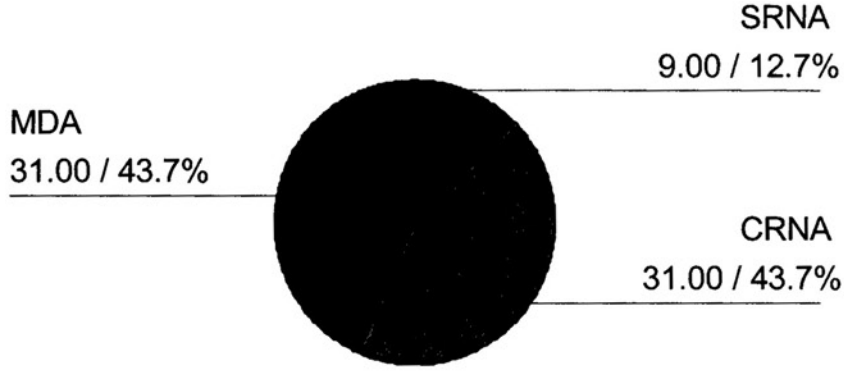

Figure 2. Depicts the Percentage of Types of Anesthesia Providers that were Sampled. N=71

Note. MDA=Anesthesiologist; SRNA=Student Registered Nurse Anestetist;CRNA=Certified Registered Nurse Anesthetist.

Figure 3. Depicts the Years of Professional Experience of the Anesthesia Providers. N=71

Answers to the Research Questions

To determine the type of education and training the anesthesia providers have had in patient identification for a blood transfusion, the sample was asked: How were you trained to identify patients for blood transfusion? Almost twenty percent, 19.7%(14/71), stated that they had no formal training/class in the procedure for identifying a patient for blood transfusion. Over twenty-five percent, 26.8%(19/71), stated that they have had no formal training/class prior to their anesthesia program. Another quarter of the sample, 26.8%(19/71), stated that they had received formal training/class in their anesthesia training. The majority of the anesthesia providers sampled, 66.2%(47/71), stated that they had been trained to identify patients for blood transfusion in the clinical area by their peers on the job. Over one-third of the sample, 31%(22/71), stated that they had received training in identifying patients for blood transfusion when they received orientation and training at a medical treatment facility (MTF). Almost twenty percent, 19.7%(14/71), stated that not all MTF's where they have practiced required this type of training during orientation. Interestingly, only 12.7%(9/71) stated that training during orientation to a MTF was required at all facilities that they have practiced. (see Table 1)

Table 1

Frequency of How the Anesthesia Providers Were Trained

	SRNA	CRNA	MDA	Overall
No Formal Class	---	26%	19%	20%
Formal Class Prior To Program	44%	42%	6%	27%
Formal Class In Program	44%	29%	19%	27%
Clinical Area By Peers	67%	65%	68%	66%
Orientation at MTF's	55%	35%	19%	31%
Required At All MTF's	33%	13%	6%	13%
Not Required At All MTF's	22%	26%	13%	20%

Note. Percent(%) equals valid percent for each variable. Participants were allowed to select more than one variable.

To determine if the sampled anesthesia providers were familiar with the written policy and procedure for patient identification at the facility where they were currently practicing, they were asked if they were aware of such a written procedure. The majority of the sample, almost two-thirds, 63.4%(45/71), stated that the facility where they currently practice has a written procedure for the identification of patients for blood transfusion. The remaining one-third of the sample, 36.6%(26/71), stated that they were not sure if a written procedure existed. Interesting to note, only 35.2%(25/71) stated that they were required to read and acknowledge their understanding of the patient identification procedure.

To better understand the utilization of the patient's identification wristband, the sampled anesthesia providers were asked if they positively identified a patient for a blood transfusion by checking the wristband attached to the patient's wrist. Overall, 66.2%(47/71) of the sample stated that they did verify a patient's identification utilizing the wristband. (see Table 2)

The remaining sample, 33.8%(24/71), did not verify patient identity by utilizing the wristband. There were two main stated reasons by this group of anesthesia providers for not verifying patient identification with the wristband. The first stated reason by 54%(13/24) of that group was that they did not feel it was important since the patient had already been identified for the surgery. The other stated reason for not verifying with the wristband was that 50%(12/24) said that the wristband has usually been previously removed from the wrist or was inaccessible.

Table 2

Percent of the Anesthesia Providers Who Positively Identify a Patient for a Blood Transfusion by Checking the Attached Patient's Wristband.

	SRNA	CRNA	MDA	OVERALL
YES	67%	71%	61%	66%
NO	33%	29%	39%	34%

Note. Percent(%) equals valid percent for each variable (N=71).

To assess the consistency of patient identification by utilizing the wristband, the anesthesia providers were asked what percent of the time did they verify patient identity utilizing the wristband and what percent of the time did they check the wristband with additional transfused units. It was very interesting to note that only 40.8%(29/71) stated that they verified patient identity utilizing the wristband 100% of the time. Only 12.7%(9/71) verified patient identity 100% of the time with each additional transfused unit of blood. (see Table 3)

Table 3

Frequency of 100% Wristband Check by all Anesthesia Providers

Wristband Check Sequence	100% Check	
	Freq	Percent
Initially	29	40.8%
With each additional unit	9	12.7%

Note. Freq: Frequency of responses (N=71). Percent(%) equals valid percent for each variable.

To determine the alternative sites where the patient's wristband is placed if the anesthesia providers have to remove it for vascular access, the providers were asked where they placed the wristband once it was removed. The majority of the anesthesia providers, 40.8%(29/71) stated that they taped the removed wristband to the patient's chart. Over one-forth, 26.8%(19/71) stated that they taped the removed wristband to the patient's head. There were other alternative sites reported but with much less frequency. (see Table 4)

In an effort to reevaluate the anesthesia providers knowledge and understanding of their facility's written procedure for patient identification, they were asked if the alternative site was an approved site as dictated by written policy and procedure. Eighty percent(57/71) stated that they were not sure if the alternative site was an approved site as dictated by written policy and procedure.

Table 4

Site Placement of Patients Wristband by Anesthesia Providers

New Placement Site	Overall
Tape to the chart	40.8%
Tape to the patient's head	26.8%
Give to the operating room nurse	18.3%
Retape to the patient's arm	9.9%
Tape to the operating room table	2.8%
No certain place	1.4%

Note. Percent(%) equals valid percent for each variable. Participants were allowed to select more than one placement site.

Since 66.2%(47/71) of the respondents stated that they verified patient identification by checking the wristband. When the anesthesia providers were asked how they would verify patient identity if the wristband had been removed, the majority of the respondents, 53.5%(38/71), stated that they compared the blood unit to the patient's chart. Almost 48%(34/71) stated that they compared the blood unit to the cut wristband while 25%(18/71) verify patient identity with the operating room nurse verbally. (see Table 5)

Table 5

How the Anesthesia Providers Positively Identify a Patient for a Blood Transfusion if the Wristband has been Removed

Intervention	Overall
Compare the blood unit to the patient's chart	53.5%
Compare the blood unit to the cut wristband	47.9%
Verify patient identity with the OR nurse	25.4%
Identify the patient prior to entering the room	8.5%
I do not	5.6%
Ask the surgeon to identify the patient	4.2%
Assume the blood is correct for that patient	2.8%

Note. Percent(%) equals valid percent for each variable. Participants were allowed to select more than one intervention.

To elicit the level of responsibility that the anesthesia providers felt for the identification of a patient for a blood transfusion, the providers were asked if they felt personally responsible for the full identification of a patient for a blood transfusion. It is interesting to note that 100%(9/9) of the SRNAs and 100%(31/31) of the CRNAs felt personally responsible for the full identification of a patient for a blood transfusion compared to 87%(27/31) of the Anesthesiologists. (see Table 6)

The anesthesia providers were then asked who they felt was responsible for the full identification of a patient for a blood transfusion. The majority of the respondents, 94.4%(67/71) again felt responsible as the transfusionist. Some of the anesthesia providers felt that the responsibility was shared with other members of the surgical team. Fourteen- percent (10/71) felt that the operating room nurse had shared responsibility and 6%(4/71) felt the surgeon also had shared responsibility for the full identification of a

patient for a blood transfusion. (see Table 7)

Table 6

Percent of Anesthesia Providers, by Classification, Who Feel Personally Responsible for the Full Identification of a Patient for a Blood Transfusion

Answer	SRNA	CRNA	MDA
YES	100%	100%	87%

Note. Percent(%) equals valid percent for the variable (N=71).

Table 7

Anesthesia Provider's Perception of Who is Responsible for the Full Identification of a Patient for a Blood Transfusion

Selection	Overall
Transfusionist	94.4%
Operating Room Nurse	14.1%
Surgeon	5.6%
Preop Holding Area Nurse	4.2%

Note. Percent(%) equals valid percent for each variable. Participants were allowed to select more than one variable.

Summary

In summary, the questionnaire provided demographic data of some of the anesthesia providers at multiple facilities in the Washington D.C. area. The data collected also answered the research question of how anesthesia providers identify patients for blood transfusion.

The sample population, N=71, consisted of 43.7%(31/71) anesthesiologists, 43.7%(31/71) nurse anesthetists, and 12.7%(9/71) student nurse anesthetists. Thirty-eight percent (27/71) of the providers were military and 62%(44/71) were civilian. The years of professional experience ranged from six months to greater than thirty years. However, it is noted that almost one-half of the providers fell into one of two ranges, 21.1%(15/71) have had four to eight years of experience and 28.2%(20/71) have had sixteen to twenty years of experience. Almost twenty percent (14/71) of the sample have had no formal training in identifying a patient for blood transfusion. Only 26.8%(19/71) said that they had received training in their anesthesia program while 66.2%(47/71) stated that they were trained in the clinical area by peers.

Thirty-seven percent (26/71) of the sample were not sure if the facility where they practice had a written procedure for the identification of a patient for a blood transfusion. Thirty-four percent (24/71) stated that they did not positively identify a patient for a blood transfusion by checking the wristband attached to the patient's wrist. Seventy-two percent (51/71) stated that they do not recheck the wristband with each unit transfused.

If the wristband has been removed from the patient's wrist, 40.8%(29/71) stated

that they tape the cut wristband to the patient's chart while 26.8%(19/71) tape it to the patient's head. Eighty percent (57/71) of the respondents are not sure if the alternative site is an approved site at the facility where they practice. Once the wristband has been removed from the patient's wrist, 53.5%(38/71) stated that they positively identify the patient by comparing the unit of blood to the patient's chart while 47.9%(34/71) compare the blood unit to the cut wristband. Three percent (2/71) assume the blood is correct for the patient and 5.6%(4/71) stated that they do not positively identify the patient for a blood transfusion if the wristband has been removed.

Ninety-four percent (67/71) of the sample felt responsible for the full identification of a patient for a blood transfusion. Six percent (4/71) felt that it was also the surgeons responsibility and 14.1%(10/71) felt it was also the operating room nurses responsibility.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

Overview of the Study

The purpose of this study was to document how anesthesia providers actually identify patients for blood transfusion. This study further contributes to the literature regarding patient identification procedures and blood product administration procedures. Through literature and historical review, this study also documents that certified registered nurse anesthetist transfuse blood and feel responsible for the full identification of the patient. This further documents the roll of the CRNA scope of practice and service.

Through hand delivery of a questionnaire to seventy-one anesthesia providers, data was collected on how the providers actually identify patients for blood product administration. Data was also collected on how the providers were educated in the procedure of identifying patients for blood product administration. The sample surveyed consisted of 43.7%(31/71) CRNA's, 43.7%(31/71) anesthesiologists, and 12.7%(9/71) SRNA's with 38%(27/71) military providers and 62%(44/71) civilian providers.

The years of professional experience were ranked into two to four year increments. It is interesting to note that the largest frequency, 28.2%(20/71), have had 16 to 20 years of professional experience followed by 21.1%(15/71) who have had 4 to 8 years. The rest of the providers were evenly distributed between the range of 6 months to 30 years.

The data revealed that 19.7%(14/71) of the sample questioned stated that they have had no formal training/class in the procedure for identifying a patient for blood transfusion. Only a mere 26.8%(19/71) received formal training while in their anesthesia

training program. The majority, 66.2%(47/71), have been educated to identify patients for blood transfusion in the clinical arena by peers. Another interesting fact is that 36.6%(26/71) were not sure if a written policy and procedure for identifying a patient for blood transfusion even existed.

The generally accepted standards of practice and care throughout the United States is that all patients being transfused with blood products must be positively identified. Most commonly this is accomplished with a wristband prior to starting the actual transfusion. In the sample surveyed, 33.8% stated that they did not fully identify a patient for a blood transfusion by checking the wristband. This would appear to be a direct violation of the stated standards whether it is by choice or the lack of knowledge and education.

The data also revealed that of the anesthesia providers who did identify a patient for a blood transfusion with the wristband, 71.8%(51/71) stated that they did not recheck the wristband with each additional unit transfused. This specific piece of data creates an interesting question. If 66.2%(47/71) of the sample stated that they identified a patient for blood transfusion by checking the wristband but 71.8%(51/71) of that same sample do not recheck the wristband with additional units, what is the true percent of providers who actually check the wristband of every patient transfused? Of the 66.2%(47/71) of the providers who checked wristbands prior to starting blood transfusions, only 12.7%(9/71) stated that they rechecked the wristband 100% of the time with additional units. This means that only 9 out of the 71 anesthesia providers surveyed stated that they checked the wristband prior to starting a blood transfusion 100% of the time.

The last area of data collection focused on the responsibility for the identification of a patient for blood transfusion. Of the 71 providers surveyed, 94.4%(67/71) felt that they were personally responsible for the full identification of the patient that they were about to transfuse. Some of the providers, 5.6%(4/71), felt that it was a shared responsibility with the surgeon while 14.1%(10/71) felt the responsibility was shared with the operating room nurse. It was interesting to note that 4.2%(3/71) felt that the preoperative holding nurse was responsible for the full identification of a patient for a blood transfusion.

Conclusions

Based on the sample population, over one-third of the anesthesia providers admitted that they do not check the wristband of a patient prior to starting a blood transfusion and only 12.7%(9/71) stated that they check the wristband with each unit to be transfused 100% of the time. Almost 20%(14/71) of the anesthesia providers surveyed have never had formal training in the proper procedure for the identification of a patient to be transfused with blood products. With only 66%(47/71) of the providers being trained in the clinical area on how to properly identify a patient for blood transfusion, the quality and accuracy of the training needs to be reviewed. At least 20% of the providers surveyed stated that they were untrained in the procedure of patient identification and yet they are teaching and socializing new health care providers into the practice of anesthesia. The lack of knowledge and education in the proper procedures for the identification of a patient to be transfused continues to be perpetuated.

Studies cited earlier have shown that the incidence of fatal blood transfusion reactions in the surgical suites were greater than that in any other hospital location. This puts the surgical patient at most risk for an untoward reaction from a blood transfusion. These same studies have also shown that as high as 90% of the untoward reactions from blood transfusions were due to clerical errors, predominately where the lack of proper patient identification was the number one reason.

The data collected in this study indicated that more than 33%(24/71) of the anesthesia providers may not adequately identify patients prior to starting a blood transfusion. This may in part explain the high frequency of transfusion-related fatalities occurring in the surgical suites.

Clinical decision-making model provides insight into how clinical decisions are made. Knowledge and positive definitive outcomes are what ultimately enables a clinician to successfully solve problems and make correct decisions. It is the knowledge of the proper patient identification procedure for blood transfusion that allows the anesthesia provider to make the safe clinical decision to transfuse blood into a specific patient and assure an acceptable patient outcome. With proper education, the procedural skills along with effective policies and procedures can be changed to allow the anesthesia provider a new knowledge base to make a better clinical decision when transfusing a patient.

In conclusion, anesthesia providers are very well educated and are strong patient advocates by virtue of their years of training. However, this study exhibits that a significant percentage of clinicians lack knowledge and/or training in the proper

procedure for patient identification. This ironically, places the patient they so vigilantly protect at grave risk for a potentially fatal blood transfusion reaction. This data also revealed that all three categories of anesthesia providers were relatively consistent in the performance of proper patient identification for blood transfusion. Because of the environment in which the anesthesia provider practices, the standard hospital procedure for patient identification for blood transfusion may not be adequate for the surgical patient. The wristband may have been removed for venous access or is inaccessible due to surgical drapes. Although this is not the situation on the hospital ward where access to the wristband is not usually a problem, it does indicate that fully delineated procedures for this life saving practice be written for the perioperative environment. Policy and procedures for the anesthesia provider to identify a patient for blood transfusion needs to take into account the surgical environment and all of its unique aspects.

Recommendations

The procedure of patient identification for a blood transfusion by anesthesia providers needs to emphasize the unique aspects of the surgical environment. These policies and procedures need to be realistic in nature and ones that are easy to remember and to practice by all anesthesia providers. Once such policies and procedures have been created, it should be mandatory that all anesthesia providers. attend formal education and training classes. Upon successful completion of initial education and training, renewal classes or competency evaluations at least yearly would be beneficial.

Future studies should further evaluate the progress of education and training of the anesthesia provider involving proper patient identification in the perioperative

environment. This will help document the results of proper education and training of anesthesia providers in the procedure of patient identification in both routine and austere anesthesia practice environments. Education is a continuous process and anesthesia providers must continue to educate and reeducate themselves so that they not only meet the anesthesia needs of their patients but also assure a safe blood transfusion environment.

REFERENCES

Bankert, M. (1993). Watchful care--A history of America's nurse anesthetists. New York: Continuum.

Baele, P.L., De Bruyere, M., Deneys, V., Dupont, E., Flament, J., Lambermont, M., Latinne, D., Steensens, L., van Camp, B., Waterloos, H. (1994). Bedside transfusion errors. Vox Sang, 66, 117-121.

Blood Transfusion Accidents. (1953). British Medical Journal, 2, 390-391.

Camp, F. R., & Monaghan, W. P. (1981). Fatal blood transfusion reactions. The American Journal of Forensic Medicine and Pathology, 2 (2), 143-150.

Corliss, D.A. (1995). A comprehensive model of clinical decision making. Journal of The American Optometric Association, 66 (6), 362-371.

Dharan, M. Total quality control in the clinical laboratory. St. Louis: C.V. Mosby Company. 1977.

Guy, L. R. (1981). Transfusion patient identification and related problems. Laboratory Medicine, 12 (9), 542-545.

Honig, C. L. & Bove, J. R. (1980). Transfusion-associated fatalities: Review of bureau of biologics reports 1976-1978. Transfusion, 20 (6), 653-661.

Monaghan, W.P. (1983). Military blood bank support for triage. Military Medicine, 148 (8), 660-662.

Monaghan, W.P., Levan, D.R. & Camp, F.R. (1977). Military Blood Banking: Blood Transfusion Aboard a Naval Hospital Ship Receiving Multiple Casualties in a

Combat Zone, a Controlled Medical Environment. Transfusion, 17 (5), 473-478.

Monaghan, W.P., & Peckham, R.L. (1976). Blood Bank: The Pink Tag System Revised. U.S.Navy Medicine, 67, 22-24.

Murphy, W. G. & McClelland, D. B. L. (1989). Deceptively low morbidity from failure to practice safe blood transfusion: An analysis of serious blood transfusion errors. Vox Sang, 57, 59-62.

Myhre, B. A. (1980). Fatalities from blood transfusion. JAMA, 244 (12), 1333-1335.

Myhre, B. A., Bove, J. R., & Schmidt, P. J. (1981). Wrong blood--A needless cause of surgical deaths. Anesthesia and Analgesia, 60 (11), 777-778.

Renner, S. W., Howanitz, P. J., & Bachner, P. (1993). Wristband identification error reporting in 712 hospitals. Arch Pathol Lab Med, 117, 573-577.

Sazama, K. (1990). Reports of 355 transfusion-associated deaths: 1976 through 1985. Transfusion, 30 (7), 583-590.

Schmidt, P. J. (1980). Transfusion mortality; with special reference to surgical and intensive care facilities. J Fla Med Assoc, 67,(2) 151-153.

Thornhill, G.L., Monaghan, W.P., & Alegre, E.R. (1981). Blood Transfusion and Identification Packet for Mass Casualty Use. Military Medicine, 146 (4), 272-273.

Whelan, T. J. (Ed.). (1975). Emergency War Surgery, Washington, D.C.: Government Printing Office.

APPENDIX A

Questionnaire

Questionnaire

Please circle all that apply.

1. What type of anesthesia provider are you?

A) SRNA
B) CRNA
C) Anesthesia resident
D) Anesthesiologist
E) Military
F) Civilian

2. How many years of professional experience do you have in clinical patient care? (Clinical experience prior to and including anesthesia training and practice)

A) Less than 6 months
B) 6 months to 1 year
C) 1 year to 2 years
D) 2 years to 4 years
E) 4 years to 8 years
F) 8 years to 12 years
G)12 years to 16 years
H)16 years to 20 years
I) 20 years to 25 years
J) 25 years to 30 years
K) >30 years

3. How were you trained to identify patients for blood transfusion? (More than one my apply)

A) No formal training/class
B) Formal training/class prior to anesthesia training
C) Formal training/class in anesthesia training
D) In the clinical area by peers (on the job)
E) Orientation class to a medical treatment facility
    1) Required at all facilities you have practiced
    2) Not required at all facilities you have practiced
F) Other (please describe)_____

4. Does the facility where you currently practice have a written procedure for the identification of patients for blood transfusion?

A) Yes
B) No
C) Not sure

5. If they do, were you required to read them and acknowledge your understanding?

A) Yes
B) No
C) Not sure

6. Do you identify item by item the patient's full name and unique medical history number with which of the below listed answers? (more than one may apply)

A) blood transfusion form
B) blood bag label
C) wristband
D) patient's chart

7. Do you currently positively identify a patient for a blood transfusion by checking the wristband attached to their wrist?

A) No
B) Yes

8. If you answered NO to question # 7 is it because (more than one may apply)

A) You don't feel it is important since the patient was already identified for the surgery.
B) It takes too much time
C) You don't see it as a necessary step in transfusion
D) The wristband has usually been previously removed from the wrist or is inaccessible.

9. If you answered YES to question #7, do you check the wristband

A) 100% of the time
B) 75% of the time
C) 50% of the time
D) 25% of the time

10. If you check the wristband to identify the patient for a blood transfusion, do you recheck the wristband with EACH unit transfused?

A) No
B) Yes
1) 100% of the time
2) 75% of the time
3) 50% of the time
4) 25 % of the time

11. If you remove the wristband from the patient's extremity, where do you place it?

A) No certain place
B) In the trash
C) Taped to the chart
D) Taped to the gurney
E) Taped to the operating room table
F) Taped to the patient's head
G) Taped to the wall of the operating room
H) Other (be specific)_____

12. Once you have removed the wristband and placed it at another site, is the new site an approved site as dictated by your facility's transfusion policy and procedure?

A) Yes
B) No
C) Not sure

13. If the wristband has been removed from the patient, how do you positively identify the patient for a blood transfusion?

A) Assume the blood given to you is correct for that patient
B) Compare blood unit to the patient's chart
C) Compare blood unit to the cut wristband
D) Ask the surgeon for identification of the patient
E) Verify patient identification with the OR nurse verbally
F) I don't
G)

Other_____

14. Do you feel personally responsible for the FULL identification of a patient for a blood transfusion?

A) Yes
B) No

15. Who do you feel is responsible for the FULL identification of a patient for a blood transfusion?

A) The surgeon
B) The operating room nurse
C) The transfusionist
D) The preop holding area nurse
E) Other_____

APPENDIX B

IRB Approval

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814-4799

May 5, 1997

MEMORANDUM FOR DAVID SHEPPARD, DEPARTMENT OF
GRADUATE SCHOOL OF NURSING

SUBJECT: IRB Approval of Protocol T06128-01 for Human Subject Use

Your research protocol entitled *"**How do Anesthesia Providers Assure the Identity of Patients Receiving Blood Transfusion?,**"* was reviewed and approved for execution on 3/15/97 as an **exempt** human subject use study under the provisions of 32 CFR 219.101(b)(4). Survey to obtain nonsensitive information in which there will be no identifiers linking the responses of the target group to the respondents.

Please notify this office of any amendments you wish to propose and of any untoward incidents which may occur in the conduct of this project. If you have any questions regarding human volunteers, please call me at 301-295-3303.

Michael J. McCreery, Ph.D.
LTC, MS, USA
Director, Research Programs and
Executive Secretary, IRB

Cc:
Chairperson, IRB
Director, Grants Administration
Vice President for Research