ASSESSMENT OF BACTERIAL CONTAMINANTS IN WHOLE BLOOD AND PACKED RED CELLS AT THE KENYATTA NATIONAL HOSPITAL, BLOOD TRANSFUSION UNIT

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ABSTRACT

Background
Transfusion of blood and blood products is a common inpatient management. Blood for transfusion should be sterile but can get contaminated during collection, product preparation or during storage when small numbers of bacteria in the blood product proliferate. Bacterial contamination of blood products is the most frequent cause of transfusion transmitted infections. Kenyatta National Hospital, the major referral hospital in the country has a high need for whole blood and packed red cells for the management of patients. Clinical consequences of transfusing bacterially contaminated blood components range from minimal or no reaction to fatal septic shock and death. Bacteriologic surveillance is done as part of haemovigilance in some countries. It usually involves culturing of various blood products as part of quality assurance.

Study Objective
To assess whole blood and packed red cells for bacterial contaminants and to describe the antimicrobial sensitivity of organisms isolated.

Study Design
This was a laboratory based, cross-sectional, descriptive study.

Study area
The study was conducted at Blood Transfusion Unit (BTU), Kenyatta National Hospital (KNH) and the Department of Microbiology laboratory at the College of Health Sciences, University of Nairobi.

Study material
The study was conducted on 193 units of blood; (155 whole blood and 38 packed red cells), on the third day of storage after donation between April 2010 and November 2010.

Materials and Methods
Blood was sampled from donor units on the third day of storage and cultured for 7 days in Brain Heart Infusion, subcultured on Blood agar, Chocolate Blood agar and MacConkey agar on day 2 and day 7. Bacteria isolated was determined by Gram stain, biochemical tests and Analytical Profile Index (API 20NE) identification systems. Antibiotic sensitivity was done by disk diffusion method on Muller-Hinton agar. Data analysis was aided by computer software (SPSS version 17); Chi-square test and Fisher’s exact test were used to determine association between appropriate categorical variables. A p-value of < 0.05 was considered to yield a statistical significant result.

Results
A total of 193 units were sampled; 155 whole blood and 38 packed red cells. An overall bacterial contamination rate of 22 (11.4%); 95% confidence interval, 9.6%-15.9% was reported. The contamination was higher in packed red blood cells 15.8% (95% confidence interval, 4.2%-27.4%) compared to whole blood 10.3% (95% confidence interval, 5.5%-15.1%). However, this was not statistically significant (p value = 0.342). Majority 20 (87%) of the organisms isolated were Gram-negative bacilli. Organisms isolated included Weeksella virosa, Moraxella species, Myroides species, Acinetobacter and Staphylococcus aureus. Antimicrobial sensitivity was
variable for the organisms. All the Staphylococcus aureus were sensitive to Cefuroxime, Cephalexin, Cefaclor and Oxacillin and had 2 (66%) resistance to Amoxicillin and Augmentin. All the Gram negative bacilli demonstrated resistance to Ceftriaxone, Ceftazidime and Piperacillin and sensitivity to Imipenem.

Conclusion
The prevalence of bacterial contaminants in whole blood and packed red cells at Kenyatta National Hospital is high at 11.4%. Majority of the bacteria isolated were Gram negative bacilli which may have come from the donor or contaminated laboratory environment. The organisms showed high resistance to commonly used antimicrobials.

Recommendations
An infection control policy that includes surveillance of bacterial contaminants in blood products should be adopted as part of quality assurance for the national blood transfusion programme. Further larger studies that include institutions in different regions of the country should be undertaken to assess the situation of bacterial contamination of blood products.

Review of standard operating procedures on skin disinfection of donors is recommended. The use of 70% alcohol with 2% chlorhexidine gluconate or tincture of iodine as recommended by the World Health Organization should be considered.

Skin surface culture after disinfection is recommended as part of quality control of donor arm cleansing technique.

Monitoring microbiological contamination rates on laboratory surfaces and equipment in Kenyatta National Hospital Blood Transfusion Unit should be considered.