A Prospective Study to Determine the Frequency of Bacterial Contamination of Platelets

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Abstract Bacterial contamination of transfusion products is a long standing problem which includes donor bacteraemia, contamination during the whole blood collection procedure, contamination of the collection pack and contamination during the blood processing procedure. The purpose of this study is to know the incidence of bacterial contamination of platelets and how to overcome it. During January 2009 to December 2010, 5,000 units of platelets concentrate were collected and 5 ml of platelet concentrate was sent for sterility test. A total of 8 units were reported as bacterially contaminated. Bacterial contamination can be reduced by better skin disinfection, collection of blood with a diversion pouch set, testing for bacteria and potentially the use of safe & effective pathogen reduction technologies and when available

Keywords Bacterial contamination · Platelets · Sterility test

Introduction

Though the incidence of transfusion transmitted viral diseases have come down, bacterial contamination of transfusion products is a long standing problem [1]. The incidence of contamination rate for platelets is 16.6/1,00,000 donation and a recent estimate of one death in 7,81,936 [2].

Possible mechanism of the bacterial contamination of blood components include donor bacteraemia, contamination during the whole blood collection procedure, contamination

of the collection pack and contamination during the blood processing procedure [3]. Most common cause of contamination is the introduction of skin flora from the donor during venipuncture [4]. The majority of organisms present in the culture studies and case reports of platelet associated sepsis is usually normal skin flora as it may be virtually impossible to totally decontaminate human skin. The incidence ranges from 2 to 6 % after cleansing of the skin. [5].

The purpose of this study is to know the incidence of bacterial contamination of platelets and how to overcome it.

Materials and Methods

This study was conducted in a Medical College Hospital Blood Bank in blood component separation unit from January 2009 to December 2010.

After meeting the minimum criteria i.e. Hb % > 12 g% weight > 60kg with no history of hepatitis, chronic inflammation or high risk behavior to eliminate professional donors. Whole blood was collected after disinfecting the phlebotomy area using tincture—iodine, 70 % isopropyl alcohol and dry swabs. Whole blood was processed and separated into packed red cells, platelet concentrate and plasma within 4 h of collection. Approximately 5 ml of the platelet concentrate was collected in a sterile bottle and sent to the Dept of Microbiology for culture. If the platelet units were positive for growth, then they were discarded. If the platelets were already issued to the patient then the results were intimated to the treating doctor.

During January 2009 to December 2010, 5,000 units of platelets concentrate were collected and 5 ml of platelet concentrate was sent for sterility test. A total of 8 units were reported as bacterially contaminated. Only 2 units

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Table 1 Shows the prevalence of bacterial contamination of whole blood-derived platelets in various studies

Sl No.	Reference	Positive per number of units tested
1.	Morrow et al.	6 per 74, 598
2.	Barrett et al.	1 per 4,272
3.	Ypmtovian et al.	6 per 15,705
4.	Chin et al.	10 per 21,503
5.	Blajchman et al.	16 per 31,610
6.	Leiby et al.	4 per 4,995
7.	Blajchman et al.	7 per 10,65

were transfused and 6 units were not transfused. The contamination rate was 6.25 %.

In this study, 6 units of the platelet concentrate cultured were positive for gram positive organisms. 2 units were gram negative.

Discussion

The contamination of platelets with bacteria occurs relatively frequently [1]. However, the available prevalence data vary considerably from one study to the next as shown in Table 1. In the present study 8 units were reported as bacterially contaminated. Possible mechanisms of the bacterial contamination of blood components include donor bacteremia, contamination during the whole blood collection procedure, contamination of the collection pack and contamination during the blood processing procedure [1]. We isolated gram positive bacteria, primarily coagulase negative staphylococci from contaminated platelets where these units are collected in the camps and indicates contamination from the donors skin flora which is concurrent with the published literature [6, 7].

Only 2 units were transfused of these 1 units was coagulase negative staphylococci which led to severe sepsis after transfusion of other unit who received was asymptomatic because the platelets units contaminated with bacteria below the concurrent detection limits of culture will produce any clinical impact [8]. The rate of bacterial contamination of platelet in this study is 1 in 825 units. A confirmed rate of bacterial contaminates of platelets has been recently estimated as approximately 1 in 6,015 collected units with one death as a consequence of infusion of bacterially contaminated platelets [2]. False negative can occur, mostly in units cultured early and

stored for longer than 3 days. Sample diversion of the first 50 ml of blood at the time of collection has been shown to notoriously decreased bacterial contamination [9]. Several blood bag manufactures have developed plastic software to accommodate such an option [10].

Bacterial contamination of transfusion products, especially platelets is significant clinical problem with multiple causes. The bacterial contamination can be decreased by dealing effectively with this problem will involve continued and enhanced education of phlebotomy, technical, nursing and medical staff with regard to sources of contamination and the importance of the problem. Blood collection centers must implement practices that may decrease by bacterial contamination including better skin disinfection, collection of blood with a diversion pouch set, testing for bacteria and potentially the use of safe & effective pathogen reduction technologies and when available.

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