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Short communication

# Hygiene monitoring in a hospital immunohaematological laboratory<sup>☆</sup>

## *Surveillance de l'hygiène dans un laboratoire immunohématologique d'un hôpital*

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### Abstract

*Purpose of the study.* – Not only in blood donation services, but also in the immunohaematological laboratory of a hospital including the depository for blood products a hygiene plan must be drawn up and its realization has to be documented.

*Material and methods.* – From 2011 to 2014, some equipment in the depository and in the immunohematological laboratory was microbiologically monitored once a year. The examinations were done by direct contact cultures taken from several places of each device.

*Results.* – Most of the devices showed inconspicuous numbers of environmental microorganisms. Sometimes the refrigerators for fresh frozen plasma and a transport container for blood products revealed moderately, the incubator in the laboratory and a transport container for patient blood samples inadequately increased bacterial contamination.

*Conclusion.* – Microbiological examinations can detect critical points in the immunohaematological laboratory of a hospital. By communicating these results, the staff can be motivated to observe the regulations of the hygiene plan.

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*Keywords:* Hygiene; Immunohaematological laboratory; Environmental monitoring

### Résumé

*But de l'étude.* – Ne pas seulement le service du donateur du sang, mais aussi le laboratoire immunohématologique d'un hôpital avec le dépôt sanguinaire est obligé d'établir un plan de l'hygiène et de certifier la réalisation de ce plan.

*Matériel et méthodes.* – De l'an 2012 à 2014, quelques équipements du dépôt et du laboratoire immunohématologique ont été surveillés microbiologiquement une fois chaque an. Les examens ont été faits par des cultures bactériologiques par contact direct de plusieurs lieux de chaque appareil.

*Résultats.* – Dans la plupart de l'équipement, un nombre inaperçu de microorganismes de l'environ a été rencontré. Quelquefois les surgélateurs pour le plasma thérapeutique et les récipients pour le transport des médicaments ont révélé un nombre moyen élevé de microorganismes de l'environ contaminant et l'incubateur dans le laboratoire et les récipients pour le transport des échantillons sanguins de les malades ont révélé un nombre inadmissible élevé de microorganismes de l'environ contaminant.

*Conclusion.* – Les examens microbiologiques sont capables de rencontrer des points critiques dans le laboratoire immunohématologique d'un hôpital. Par communication de ces résultats, le personnel est motivé à observer les règlements du plan de l'hygiène.

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*Mots clés :* Hygiène ; Laboratoire immunohématologique ; Surveillance de l'environ

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## 1. Introduction

Transfusion transmitted viral infections have been reduced during the past decades, but bacterial contamination of blood products is still an important problem. Further efforts have to be made to maintain and to improve the microbial safety of blood transfusion.

On the part of blood donation services, safety of blood products from transmission of infections is achieved by:

- providing non-infectious source material by careful selection of blood donors and laboratory examination of the donated blood;
- preventing microbial contamination during blood collection and component preparation;
- leucocyte depletion and in some cases also pathogen inactivation;
- proper storage and transportation of the blood products from the blood donation service to the hospitals [1].

Therefore blood donation services have to draw up a hygiene plan fixing frequency and surveillance of cleaning and disinfection measures [2].

On the part of the users of blood products, microbial contaminations have to be avoided by:

- proper storage and transportation of the blood products within the hospital;
- aseptic techniques for the administration of the blood products [3].

For this reasons also hospitals have to draw up a hygiene plan that promotes not only the safety of the patients, but also the occupational safety of the employees [4]. This document concerns not only wards and outpatients departments, but also the immunohaematological laboratory including the depository for blood products in the hospital.

The realization of such a hygiene plan can be monitored by:

- written documentation of performing all measures of cleaning and disinfection;
- spot checks of the cleanness by microbiological environmental examinations [5].

It was the aim of our study to find out, whether hygiene monitoring can be realized in a hospital immunohaematological laboratory by microbiological environmental examinations.

## 2. Material and methods

From 2011 to 2014 one time every year the following equipment in the immunohaematological laboratory of an academic teaching hospital was examined for microbial contaminations.

In the depository contact cultures were taken from:

- one refrigerator for red blood cell concentrates (RBCC) at 9 different places of the inner room of the refrigerator;
- two refrigerators for plasma derivatives (PD), each at 4 different places of the inner room of the refrigerator (drawers, door);
- one climate box for platelet concentrates (PC) at 5 different places of the inner room of the climate box (drawers, side, door);
- two freezers for fresh frozen plasma (FFP), each at 4 different places of the inner room of the freezer (drawers);
- one thawing device for FFP at 3 different places of the inner room of the device (bottom, warming cushion, lid);
- one transport container for blood products (as a random sample for several such containers) at 2 different places of the inner room of the container (bottom, lid) (examinations were done only from 2012 to 2014).

In the laboratory contact cultures were taken from:

- one incubator for laboratory examinations (37 °C) at 4 different places of the inner room of the incubator (bottom, sides, door);
- two washing centrifuges for immunohaematological examinations, each at 2 different places of the inner room of the centrifuge (side, lid);
- one refrigerator for reagents at 4 different places of the inner room of the refrigerator (drawers, door);
- one transport container for patient's blood samples (as a random sample for several such containers) at 2 different places of the inner room of the container (bottom, lid).

The examination for growth of bacteria and fungi was done by direct contact cultures using impression plates (Rodac plates) with sheep blood agar, that were incubated at  $36 \pm 1$  °C for 24 and 48 hours [6]. The contact area of the impression plates was 25 cm<sup>2</sup>. On the basis of this area the number of the colony forming units (CFU) was determined. The results were semi-quantitatively assessed as follows:

- 1–15 CFU/cm<sup>2</sup> → harmless;
- 16–50 CFU/cm<sup>2</sup> → conspicuous;
- >50 CFU/cm<sup>2</sup> → inadequate;

## 3. Results

In the depository the refrigerators for RBCC and for PD as well as the climate box for PC and the thawing device for FFP showed harmless numbers of microorganisms (< 16 CFU/25 cm<sup>2</sup>) all over the years. Only environmental bacteria (*Bacillus sp.*, *Micrococcus sp.* and coagulase-negative staphylococci) were found, except 1 CFU/25 cm<sup>2</sup> moulds at one place in the refrigerator for RBCC only in 2014 and at one place in one refrigerator for PD only in 2012, and except 2 CFU/25 cm<sup>2</sup> *Staphylococcus aureus* at one place in one refrigerator for PD only in 2014 (Table 1). The two freezers for FFP and the transport container for blood products (as a random sample for several such containers) showed conspicuous numbers of microorganisms at some places in 2011, 2012 and 2014

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