

Validation of blood sample transportation system with directly launch of test tubes covering 400 meters and 13 meters in height

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AIM OF STUDY

We validated two new pneumatic transportation systems Tempus600[®] for blood samples, covering highest (13 meter) and longest (406 meter) distance to date.

- easy to use
- fast transportation from patients to laboratory
- no damage of blood samples.

Design

The Tempus600[®] system was examined to investigate to what extent the blood samples were affected by the transport. 2 blood samples were drawn from each patient.

- one sample tube was sent by routine transport
- one sample tube was sent by Tempus600[®].

METHODS

The validation included 50 patient samples, analyzed for chemistry and coagulation parameters and 20 patient samples, analyzed for hematology parameters.

The patients were randomly chosen among patients in the department's phlebotomy clinic.

The blood samples were tested for:

Biochemical tests (Roche Cobas6000 Analyzer)

- Plasma Potassium
- Lactate dehydrogenase (LD)
- Plasma Alkaline phosphatase
- Hemolytic index (H-index)

Coagulation tests (Stago STA-R analyzer)

- International Normalized Ratio (INR)
- Activated Partial Tromboplastin Time (APTT)

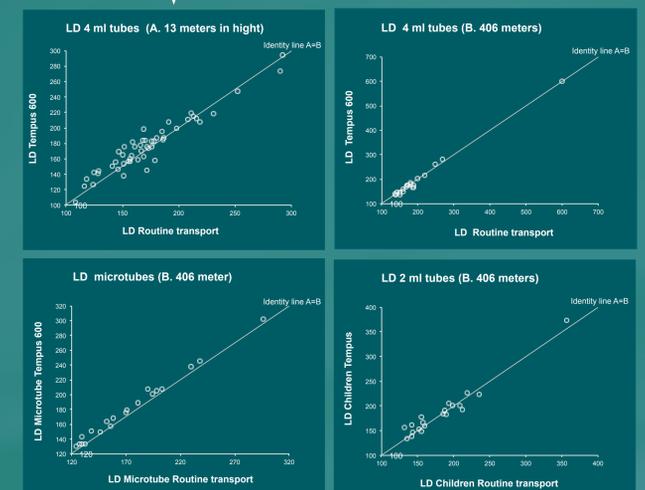
Hematology test (Sysmex XE2100 analyzer)

- Leucocyte, Lymphocyte and Trombocyte.

RESULTS

No significant differences were found between Tempus 600 and routine transport.

LD biasplot



INTRODUCTION

Tempus600[®] is a transport system dedicated for transporting blood sample tubes.

After drawing blood samples, the tubes are placed in the Tempus600[®] rack and loaded in the launch unit. Tempus600[®] systems were installed at Aarhus University Hospital at two locations:

A. Skejby: Covering 406 meters from the pediatric ward to Dept. Clinical Biochemistry.

B. Nørrebrogade: Covering 135 meters and lifting 13 meters (three floors) from Dept. of Emergency to Dept of Clinical Biochemistry.

The average time of transport in any of the two systems is 30 - 40 seconds.

MATERIALS

Becton Dickinson tubes were used for blood collection:

Lithium heparin plasma for biochemical tests:

- 4 ml (blood tests adults)
- 2 ml (blood tests children)
- Microtube Microvette (blood tests children).

Sodium citrate plasma for INR, APTT
EDTA plasma for hematology tests.

Statistics

We used Microsoft Excel 2003 for all statistical analyses. Comparisons of Tempus600[®] and routine transport were done by using Bland-Altman difference plots. Two-sided F- and T-test were done to test for significant differences.

CONCLUSIONS

For both systems significant differences were found between routine transport and Tempus600[®] transport for H-index (p-value <0,05).

Overall the higher values for the H-index were acceptable for the blood sample testing. For the other analyses no significant difference was noticed between routine transport and Tempus600[®] transport. The validation of Tempus600[®] has shown satisfying results.

Based on the findings Tempus600[®] is recommended for transporting blood sample tubes.

