Validation of a Pneumatic Post between Two Hospitals for the Transport of Red Cell Concentrates and Blood Samples

Concerning Liebscher et al: Transport of red blood cell concentrates and fresh frozen plasma in a pneumatic tube system. Transfusion Med Hemother 2003;30:157–162

Liebscher and colleagues concluded that a well installed and maintained tube post is a safe way to transport blood products without loss of quality. We agree with this conclusion but would like to add that it is also a cost-efficient device.

Recently we installed a similar system, connecting two hospitals in Flensburg that had decided to centralize their laboratories. The hospitals involved are the Diakonissen-Krankenhaus (housing the central laboratory and blood bank) and the St. Franziskus Hospital, which are only 600 m apart of each other, but separated by two house blocks and three main public roads.

Part of the civil engineering to install the tube system was performed using a water-driven tunnelling system, which made it possible to tunnel buildings and streets without temporary closing them.

Our tube post (Sumetzberger, Eichenried, Germany) as that of the authors is driven by pressurized air and offers two different speeds. The system right now has five stations. Effective

runtime at full speed between the two hospitals is about 2 min. The tube post vials ('bombs') have an inner diameter of 70 mm and a length of 350 mm.

The system is also used for blood samples for laboratory analysis, and it could be shown that even critical analytes such as blood gases are not biased by the tube transport [1]. Blood products are stored in extra plastic bags to prevent external contaminations.

Our validation comprised a program similar to that of Liebscher et al. Red cell concentrates (RCC) were analyzed for free K⁺ and hemoglobin (Hb) as well as hemolysis rate. Blood products were sent altogether four times (forth-back-forth-back). Two different speeds were validated: fast (5 m/s) and slow (2.5 m/s).

Results

Data of RCC transported with full speed are given in table 1. Additional data for blood products and laboratory samples at full or half speed can be obtained by the authors. Similar to Liebscher et al., we also found no relevant increase in hemolysis rate. It should be mentioned that the comparison of values before and after transportation is actually not fair because the alternative for tube post transport is not storage but transportation by a different mode (in our case transport worker, bicycle or taxi), that is less standardized and might well give rise to hemolysis.

Table 1. Changes of laboratory data of RCC by full-speed tube transport

RCC no.	Before transportation			After 2 transportations (forth-back)			After 4 transportations (forth-back-forth-back)		
	free Hb, mg/dl	rate of hemolysis, % of total Hb	K ⁺ , mmol/l	free Hb, mg/dl	rate of hemolysis, % of total Hb	K ⁺ , mmol/l	free Hb, mg/dl	rate of hemolysis, % of total Hb	K ⁺ , mmol/l
1	74.26	0.15	31.1	108.8	0.23	31.6	110.40	0.23	30.9
2	21.77	0.05	79.6	23.36	0.05	78.6	65.49	0.14	79.8
3	131.10	0.30	53.4	130.60	0.3	53.3	129.40	0.29	53.6
4	78.04	0.17	51.6	74.65	0.16	52.1	83.30	0.18	51.5
5	97.67	0.19	60.0	87.88	0.17	59.2	88.35	0.17	59.5
6	110.60	0.24	53.7	11.80	0.03	53.9	116.40	0.25	54.0
Mean	85.6	0.18	54.9	72.8	0.16	54.8	98.9	0.21	54.9
Min	21.77	0.05	31.1	11.8	0.03	31.6	65.49	0.14	30.9
Max	110.60	0.30	79.6	130.6	0.32	78.6	129.4	0.29	79.8
Legal cut-off		0.8		0.8				0.8	

Budget restrictions favor centralization of hospital laboratories and blood banks. However, centralization of these service departments is frequently impossible due to time loss during transportation. The costs of our tube post were EUR 40,000.– for the system plus EUR 25,000.– for civil engineering. It is used 24 h a day. On average about 100 transportations per day are carried out. The installation also includes high speed-dedicated glas fibers that can be used for data transfer and as telephone lines.

The costs saved by the system are as follows:

- Transport workers: To maintain a service similar to that of our tube post, we calculated that at least 3 additional transport workers would have been necessary; not to mention the additional work imposed on the laboratory staff to call taxis or transport workers and to organize the proper delivery.
- Phone costs: Renting a dedicated line for the transmission of laboratory results, digitalized x-ray radiographs, etc. costs at least EUR 1,000.– per month.

Considering this, it can be concluded that our setting of a tube post system is profitable within less than 1 year.

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Literatur

- 1 Petersen D, Schumann G, Panning B, Piepenbrock S, Büttner J: Blood gas analysis outside the ward. *Acta Anaesthesiol Scand Suppl* 1995;39:152.

Erratum

The list of authors of the article entitled 'Hepatitis C Virus' (*Transfus Med Hemother* 2003;30:239–250) on page 249 has been published with a substantial error. Please see below the correct list of authors.

This paper was completed on June 17, 2002 and approved by the German Advisory Committee Blood (Arbeitskreis Blut) on November 6, 2002. It was compiled by the members of subgroup 'Assessment of Pathogens Transmissible by Blood' of the German Advisory Committee Blood (Arbeitskreis Blut):

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