

Study on Pneumatic chute validation-Pneumatic Tube System (PTS) transported blood samples vs hand-carried blood samples



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AB/700

INTRODUCTION

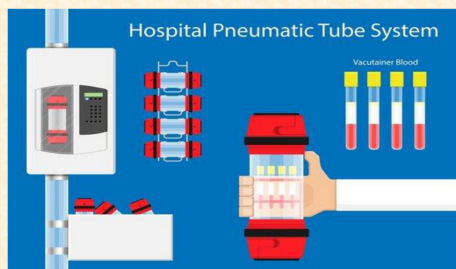
The Pneumatic Tube System (PTS) is a vital and basic inventory of a large hospital materials handling system, which provides an efficient means of transporting small quantities of materials such as laboratory specimens. A specimen is placed in a transparent plastic tube, a destination is selected from the sending station, then a powerful vacuum action inhales the tube & it begins its journey through the network of pipes connecting numerous locations throughout the hospital. The wards & collection center send specimen to the lab, pharmacy send medications to nursing units, blood bank supplying blood samples or blood components to different or emergency centered areas. In areas such as emergency center timely delivery & receipt of specimens, supplies & medications are very crucial for the patient care process. Thus, validation of PTS is important for effective patient care.

AIMS & OBJECTIVE

The study aimed to evaluate the effect on test results when blood samples were transported through Pneumatic tube system as compared to sample, which were carried manually through hands. The study was done to validate the tests results when samples were transported through PTS.

MATERIALS & METHODOLOGY

Samples were drawn from healthy volunteers. Samples were transported by PTS and they were hand carried to the laboratory for analysis. The blood samples were then centrifuged at 3500 g for 10 min prior to being analyzed. All the samples were analyzed for routine biochemistry parameters. The percent variation in results for samples transported through PTS and samples carried by hand, for each of the analyte was observed.



RESULTS

The variation in test results for all biochemistry parameters was <5% for samples transported through pneumatic tube system and manually carried samples except for LDH and direct bilirubin.

LDH shows 5.13 % variation & direct bilirubin showed 11.76% variation when samples were transported through PTS as compared to manually carried samples.

MAHAMANA PANDIT MADAN MOHAN MALVIYA CANCER CENTER				
DEPARTMENT OF BIOCHEMISTRY				
PNEUMATIC CHUTE VALIDATION				
	RUN DATE	03.08.2023		
	SR. NO.	1	2	3
	SAMPLE NO.	A	B	C
GLUCOSE	BY PNEUMATIC CHUTE	91	97	78
	BY MANUALLY	91	99	78
	% VARIATION	0	-2.06	0
UREA	BY PNEUMATIC CHUTE	23	21	20
	BY MANUALLY	22	21	20
	% VARIATION	4.35	0	0
UA	BY PNEUMATIC CHUTE	6.56	6.23	6.67
	BY MANUALLY	6.54	6.24	6.67
	% VARIATION	0.3	-0.16	0
CRE	BY PNEUMATIC CHUTE	0.91	0.86	0.87
	BY MANUALLY	0.92	0.83	0.87
	% VARIATION	-1.1	3.49	0
NA	BY PNEUMATIC CHUTE	140	140	140
	BY MANUALLY	141	140	140
	% VARIATION	-0.71	0	0
K	BY PNEUMATIC CHUTE	4.82	4.43	4.01
	BY MANUALLY	4.84	4.43	4.01
	% VARIATION	-0.41	0	0
CL	BY PNEUMATIC CHUTE	106	106	106
	BY MANUALLY	107	106	107
	% VARIATION	-0.94	0	-0.94
TP	BY PNEUMATIC CHUTE	7.39	7.65	8.1
	BY MANUALLY	7.38	7.64	8.1
	% VARIATION	0.14	0.13	0
ALB	BY PNEUMATIC CHUTE	4.7	4.57	4.94
	BY MANUALLY	4.7	4.56	4.87
	% VARIATION	0	0.22	1.42
ALP	BY PNEUMATIC CHUTE	82	105	112
	BY MANUALLY	83	105	112
	% VARIATION	-1.22	0	0
TBIL	BY PNEUMATIC CHUTE	0.87	0.68	0.71
	BY MANUALLY	0.86	0.68	0.72
	% VARIATION	1.15	0	-1.41
DBIL	BY PNEUMATIC CHUTE	0.17	0.16	0.17
	BY MANUALLY	0.16	0.15	0.15
	% VARIATION	5.88	6.25	11.76
AST	BY PNEUMATIC CHUTE	22	22	48
	BY MANUALLY	20	22	48
	% VARIATION	9.09	0	0
ALT	BY PNEUMATIC CHUTE	25	33	76
	BY MANUALLY	25	32	76
	% VARIATION	0	3.03	0
LDH	BY PNEUMATIC CHUTE	156	165	191
	BY MANUALLY	148	158	193
	% VARIATION	5.13	4.24	-1.05

DISCUSSION

PTS is an effective and efficient means to transport blood sample in tertiary care hospitals. There is a significant decrease in turnaround time and sample. Traceability is possible with this system. The PTS is an automated transport system, in which samples are carried by creating Vacuum and pressure between the lab and others areas of the hospital. The sample integrity can be affected by Acceleration, Deceleration forces and radial gravity forces during transportations. There is a possibility of blood cell damage and hemolysis during the process thus altering the test results The PTSs is the largest piece of equipment that a hospital owns, yet repairs, maintenance, speed, and other factors involving the PTSs often fall outside of the lab preview. There are no requirements or guidelines for how to evaluate a hospital PTSs.

Decrease in TAT For Sample when PTS is used.

CONCLUSION

The stability of the PTS system should be verified twice in a year for the parameters like LDH which are affected by hemolysis should be routinely checked. All laboratories should validate the stability of the results from samples according to transportation method. Pneumatic Tube Delivery System for Blood Samples Reduces Turnaround Times Without Affecting Sample integrity.

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