Evaluating 7-Day Stability of Lipid and Metabolic Analytes in Plasma Samples Prepared at the Point of Draw with the Torq™ Zero Delay Centrifuge System

BACKGROUND

Hemolysis is a leading contributor to preanalytical errors, which account for up to 75% of all diagnostic errors. Blood samples not promptly centrifuged are susceptible to hemolysis and other degradation *in vitro*, however centrifuges are often not available at the point of blood draw. Therefore, sample quality is often compromised and access to tests remains limited.

Sandstone's Torq™ zero delay centrifuge system is a lightweight, hand-portable device for immediately separating and stabilizing plasma at the point of collection. The Torq system comprises the ZDrive™ - a CLIA-waived, 4" diameter, battery-powered centrifuge - and ZDiscs™ - evacuated and anticoagulated cartridges designed to collect blood and isolate liquid plasma from cells following a brief (1-4 minute) spin upon collection. Torq enables shipment of stable plasma to centralized laboratories without the degradation that occurs in whole blood.

The Torq ZDrive

The Torq ZDisc

OBJECTIVE

The objective of this study was to determine if separation and storage of blood using the Torq system provides equivalent results to separation and storage in sterile control tubes for a variety of lipid and metabolic analytes.

METHODS

Lipid panels (cholesterol, triglyceride, HDL, LDL) were run on samples from five donors with blood separated in ZDiscs and blood separated in BD Vacutainer® plasma separation tubes (PSTs). Plasma was aliquoted into sterile storage tubes and stored at room temperature for 1 day, 3 days, and 7 days prior to testing at an external independent laboratory (InSource Diagnostics, Monrovia CA).

Additionally, metabolic analytes (BUN, Na, K, Cl) were run on samples from three donors with plasma that was stored at room temperature in both ZDiscs and in sterile control tubes for 1 day, 3 days, and 7 days prior to testing. The results of ZDisc samples vs. control samples for each analyte at each time point were averaged and compared.

RESULTS

Figure 1 shows example comparisons for both a metabolite marker (Potassium) and a lipid marker (cholesterol) at each time point.
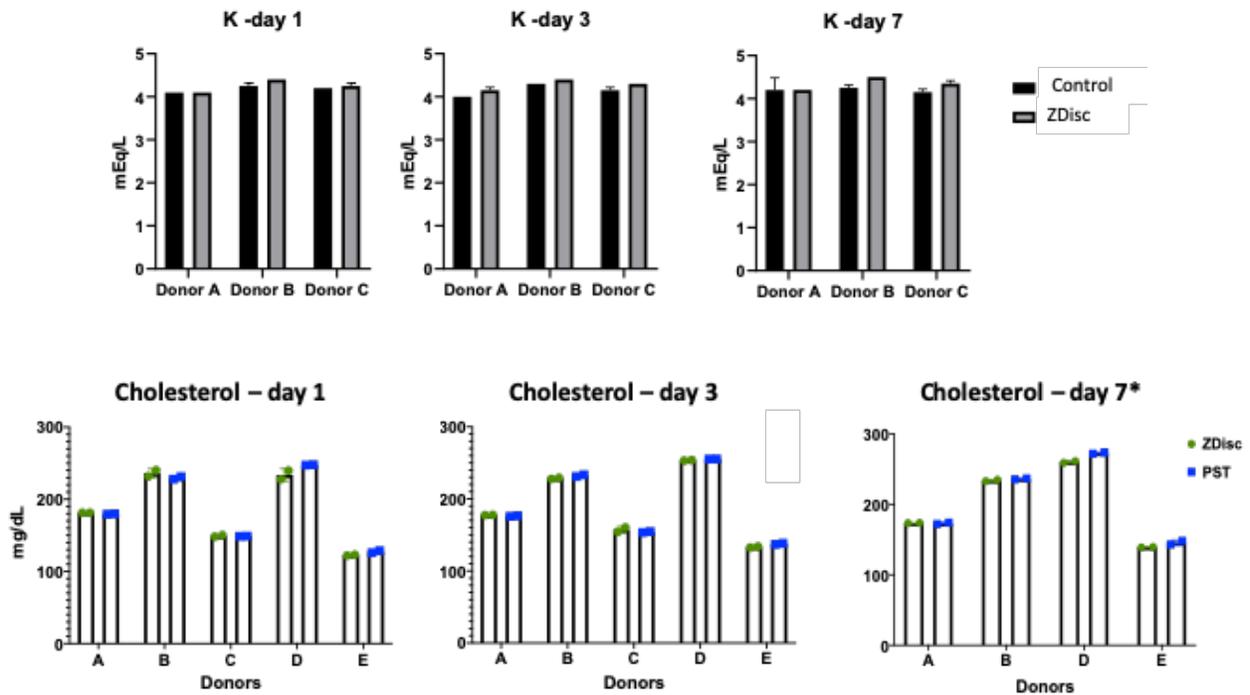
Figure 1. Example camparison results from metabolic study (potassium) and lipid study (cholesterol) at each time point. *Note: due to a clerical error, lipid study Donor C samples were not evaluated at the 7 day time point.

Figure 2 shows hemolysis levels at each time point measured alongside the lipid study.
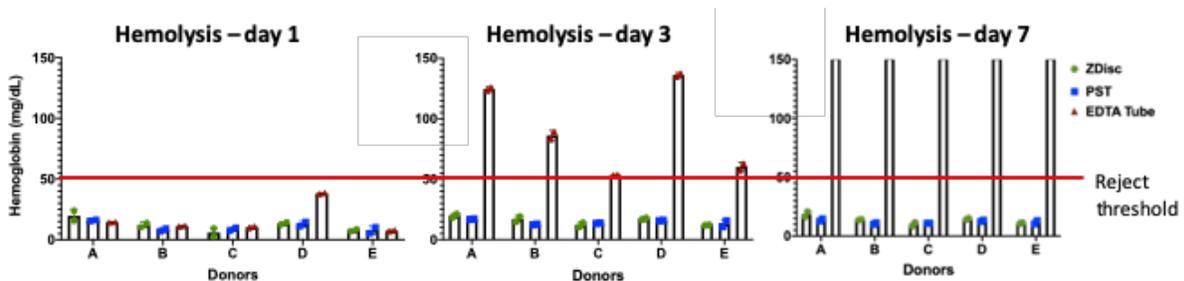
Figure 2. Hemolysis levels at each timepoint in ZDisc, PST, and EDTA whole blood tubes, measured in each Donor in the lipid study.

Table 1 shows the percent differences in ZDisc samples compared to Vacutainer control samples at each time point.

2

Table 1. Percent differences between ZDisc and control samples at each time point.

		% Difference		
		Day 1	Day 3	Day 7
Lipids	Cholesterol	2.67%	1.67%	2.54%
	Triglyceride	1.83%	2.98%	2.57%
	HDL	2.96%	1.56%	2.86%
	LDL	2.06%	2.81%	5.08%
Metabolites	BUN	2.02%	2.50%	5.78%
	Na	1.96%	3.10%	3.05%
	K	1.53%	3.13%	3.38%
	Cl	1.76%	2.70%	2.68%

CONCLUSIONS

Differences between ZDisc and control samples were not clinically significant at any time point tested for any analyte. Furthermore, the Torq ZDiscs maintain minimal sample hemolysis for at least 7 days.

The Torq system is suitable for plasma separation at the point-of-care for lipid panel analysis and that storage in ZDiscs is not a significant factor in metabolic analyte results.

ACKNOWLEDGMENTS

Want to know more about the Torq zero delay centrifuge system? Visit us at https://sandstonedx.com/torq/.

SANDSTONE