

Efficient Inactivation of Mers-Coronavirus in Human Apheresis Platelets with Amotosalen and Ultraviolet A Light Treatment

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BACKGROUND: Since 2012, the Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) caused >2,274 cases of human infection and 806 deaths in 27 countries with Saudi Arabia being the most affected country with 1896 cases and ~38,6% local mortality rate. Detection of infectious viral particles and genomic RNA in whole blood, serum, and plasma of acutely infected patients makes MERS-CoV a pathogen of concern for the safety of the blood supply especially in endemic regions.

AIMS: Investigation of the efficacy of Amotosalen/UVA light to inactivate MERS-CoV in human platelet concentrates to mitigate potential contamination with MERS-CoV.

METHODS: We inoculated four apheresis platelet units in 100% plasma with a clinical MERS-CoV isolate. Spiked units were then used to evaluate the efficacy of Amotosalen/UVA (INTERCEPT Blood System, Cerus Corporation, Concord, U.S.A.) to inactivate MERS-CoV in platelet concentrates. Infectious and genomic viral titers were assessed by plaque assay and real-time RTqPCR, respectively, in spiked and treated samples in parallel with positive and negative (platelets only) controls. Collected samples were also inoculated on Vero E6 cells for three consecutive passages to exclude presence of replicative MERS-CoV in inactivated platelets.

RESULTS: Treatment of spiked platelet units with Amotosalen/UVA light resulted in complete inactivation of infectious viral titer with mean log reduction of $>4.48 \pm 0.3 \log_{10}$ pfu/mL. No viral replication or CPE was observed in cells inoculated with inactivated samples even after 9 days of incubation and three successive passages. Evaluation of genomic titer in inactivated samples showed almost equivalent titers to those observed in pretreatment samples as expected.

SUMMARY/CONCLUSIONS: Amotosalen and UVA light treatment of platelet concentrates spiked with MERS-CoV efficiently and completely inactivated infectious MERS-CoV with >4 logs suggesting that treatment of platelets with Amotosalen and UVA light could minimize the risk of transfusion-related MERS-CoV transmission in endemic areas.