Methods to detect blood splatter from an IV catheter with engineered sharps injury protection

Abstract:

Objective: To determine whether retractable intravenous devices produced blood splatter and whether blood splatter frequency differed between visual and microscopy detection methods.

Methods: In this laboratory-based experiment, 105 venipunctures were performed in a simulated brachial vein containing mock venous blood. The retraction mechanism was activated in a testing chamber with precut fabric filters, placed at 3 different locations, to capture blood splatter. Differences in filter mass, visual inspection, and microscopic analysis for presence of blood on filters were the units of analysis. Descriptive statistics, paired Student t tests, and κ statistics were used for data analysis.

Results: Blood splatter was detected visually and microscopically as follows: filter A, 70% and 71%, respectively; filter B, 12% and 9%, respectively; and filter C, 13% and 10%, respectively. A statistically significant difference was observed in the mean mass of filter A between before and after activation when confirmed by the naked eye ( ) and microscopically ( ). Substantial agreement between methods was observed for filter A ( [95% confidence
interval, 0.64–0.92]), filter B ( [95% confidence interval, 0.51–0.95]), and filter C ( [95% confidence interval, 0.55–0.96]). However, blood was detected by microscopy and not by the naked eye in 7 instances (7%).

Conclusions: Our findings demonstrate that splatter, which can potentially expose healthcare workers (HCWs) to bloodborne pathogens, is associated with the activation of intravascular catheters with retraction mechanisms. HCWs may not detect this splatter when it occurs and may not report a splash to mucous membranes or nonintact skin. The need to wear personal protective equipment when using such devices is reinforced.