

Securing Central lines in Intensive Care: A multicentre randomised controlled trial

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Background

Central venous access devices (CVADs) are vital to deliver treatments, monitor central-venous pressure and enable blood sampling from patients in intensive care units. However, approximately one-quarter of CVADs fail from mechanical or infective complications. Poor securement to the skin contributes to CVAD failure, and dressings for jugular CVADs are particularly vulnerable to pull-out forces and failure. A topical medical liquid adhesive (MLA) has been manufactured to address this problem. This study aimed to evaluate the effectiveness of MLA, compared to standard care, for improving internal jugular CVAD dressing adhesion.

Methods

A multicentre, parallel, superiority randomised controlled trial comparing standard care dressings with standard care plus MLA (intervention) was undertaken in four ICUs. Eligible participants were: ≥ 18 years of age, ≤ 12 hours post jugular CVC insertion, requiring a CVC for ≥ 72 hours, with an expected ICU admission ≥ 24 hours. The primary endpoint was premature dressing failure. Secondary outcomes included first dressing dwell-time, all-cause CVC failure, skin injury and cost.

Results

Between September 2021 and February 2023, 160 participants (82 control; 78 intervention) were enrolled. Premature dressing failure was significantly lower in the MLA versus control group (Risk difference -0.22%, 95% confidence interval (CI) -0.37 to -0.07, $p=0.005$). The MLA group had longer time to first dressing failure (median difference 43.3 hours [interquartile range 16.4, 70.3], $p=0.002$) and fewer dressing changes (Incidence rate ratio (IRR) 0.74; 95% CI 0.55 to 0.99, $p=0.041$) compared to standard care. All-cause CVC failure was similar in both groups (IRR 1.44; 95% CI 0.36 to 5.79, $p=0.607$). The estimated cost for the intervention was \$310.43/participant (95% Credible interval (CrI) \$308.42 to \$312.44) versus \$321.45/participant (95% CrI \$319.29 to \$323.61) for standard care, with an expected saving of \$11.02/participant (95% CrI \$8.08 to \$13.96). Three skin injuries occurred: two in standard care (maceration and skin-tear) and one in the intervention group (blister).

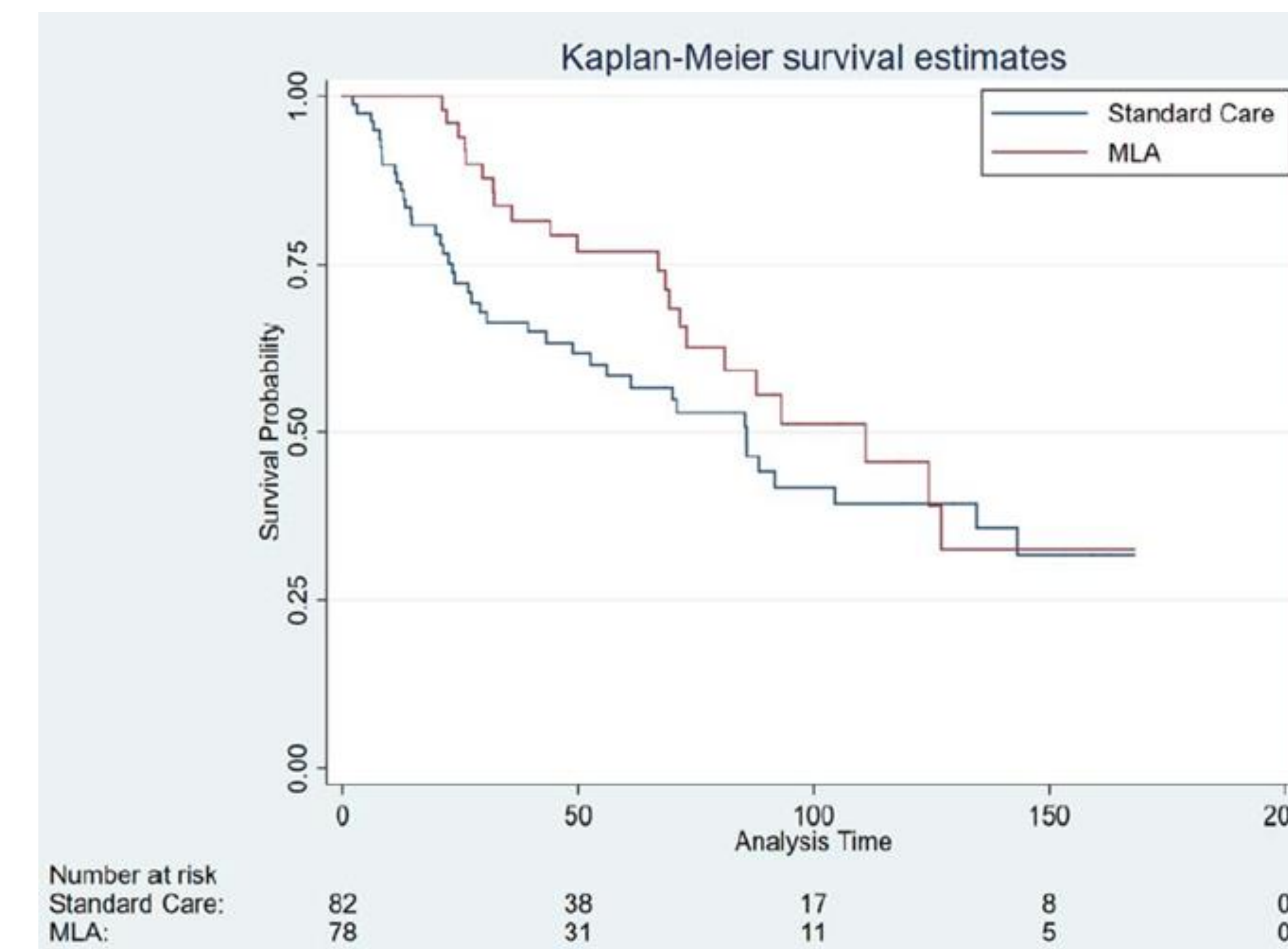


Figure 1. Kaplan-Meier Survival Curve for premature dressing failure



Conclusion

MLA is significantly associated with decreased jugular CVC dressing failure and longer dressing dwell. Clinicians should consider using MLA when applying CVC dressings in ICU.