To estimate the incidence of vascular access-associated skin complications, and to identify patient, catheter and healthcare-related characteristics associated with skin complication development” Ullman et al (2018).

Abstract:

BACKGROUND: Vascular access devices are widely used in healthcare settings worldwide. The insertion of a vascular access device creates a wound, vulnerable to irritation, injury and infection. Vascular access-associated skin complications are frequently reported in the literature, however very little evidence is available regarding the incidence and risk factors of these conditions to inform practice and technology development.

OBJECTIVES: To estimate the incidence of vascular access-associated skin complications, and to identify patient, catheter and healthcare-related characteristics associated with skin complication development.


SETTINGS: Six hospitals (metropolitan and regional) in Queensland, Australia.
PARTICIPANTS: The 13 studies involved paediatric and adult participants, across oncology, emergency, intensive care, and general hospital settings. A total of 7669 participants with 10,859 devices were included, involving peripheral venous (n = 9933), peripheral arterial (n = 341), and central venous access (n = 585) devices.

ANALYSIS: Standardised study data were extracted into a single database. Clinical and demographic data were descriptively reported. Cox proportional hazards regression models (stratified by peripheral vs central) were used for time-to-event, per-device analyses to examine risk factors. Univariate associations were undertaken due to complexities with missing data in both outcomes and covariates, with p < 0.01 to reduce the effect of multiple comparisons. RESULTS: Over 12% of devices were associated with skin complication, at 46.2 per 1000 catheter days for peripheral venous and arterial devices (95% confidence interval, CI 42.1-50.7), and 22.5 per 1000 catheter days for central devices (95% CI 16.5-306). The most common skin complications were bruising (peripheral n = 134, 3.7%; central n = 33, 6.8%), and swelling due to infiltration for peripheral devices (n = 296; 2.9%), and dermatitis for central devices (n = 13; 2.2%). The significant risk factors for these complications were predominantly related to device (e.g., skin tears associated with peripheral arterial catheters, radial insertion [HR 18.0] basilic insertion [HR 26.0])) and patient characteristics (e.g., poor skin integrity associated with increased risk of peripheral device bruising [HR 4.12], infiltration [HR 1.98], and skin tear [HR 48.4]), rather than management approaches.

CONCLUSIONS: Significant skin complications can develop during the life of peripheral and central vascular access devices, and these are associated with several modifiable and non-modifiable risk factors. Further research is needed to evaluate effectiveness technologies to prevent and treat skin complications associated with vascular access devices.

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