

Category : **Cardiovascular: Other**

A24 - Mechanical complications after central venous catheterisation in the ultrasound-guided era: a prospective multicentre cohort study of 12 667 procedures

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Introduction:

We aimed to determine the incidence of mechanical complications and to identify associated independent risk factors in a healthcare system where real-time ultrasound guidance is clinical practice for central venous access.

Methods:

All central venous catheter insertions in patients ≥ 16 years at four emergency care hospitals between 2 March 2019 and 31 Dec 2020 were eligible for inclusion. During the study period, dedicated collaborators at each study site continuously reviewed the insertion records and chest X-rays. The primary outcome measures were mechanical complications that occurred within 24 hours after catheterisation. Multivariable logistic regression analysis was used to determine associations between independent variables and major mechanical complications defined as pneumothorax, arterial catheterisation, major bleeding, serious cardiac arrhythmia and persisting nerve injury. The study was registered at clinicaltrials.gov (NCT03782324) and the study protocol was published in September 2019.[1]

Results:

In total, 12 667 central venous catheter insertions were prospectively included. The incidence of mechanical complications was 7.7% (95 % exact binomial confidence interval [CI] 7.3 – 8.2), out of which 0.4% (95% CI 0.3 – 0.5) were major mechanical complications. Patient BMI < 20 kg/m² (OR 2.63 [95% CI 1.20 – 5.32]), male operator sex (OR 2.65 [95% CI 1.36 – 5.57]), limited operator experience (OR 3.12 [95% CI 1.71 – 5.60]) and number of skin punctures (OR 2.11 [95% CI 1.58 – 2.72]) were associated with a higher risk for major mechanical complications (Table 1).

Conclusion:

In a healthcare system where real-time ultrasound guidance is clinical practice for central venous access, the incidence of major mechanical complications was found to be low. Patient BMI < 20 kg/m², male operator sex, limited operator experience, and more than one skin puncture were identified as independent risk factors of major mechanical complications.

References:

[1] Adrian M et al. BMJ Open 9: e029301, 2019

Table:

Independent variables	Odds Ratios	95% Confidence Intervals	P-values
BMI < 20 (1)	2.63	1.20 - 5.32	0.010
BMI ≥ 30 (1)	0.77	0.34 - 1.57	0.488
Positive pressure ventilation	0.75	0.41 - 1.35	0.330
Male operator sex	2.65	1.36 - 5.57	0.007

Limited operator experience (2)	3.12	1.71 - 5.60	<0.001
No. of skin punctures	2.11	1.58 - 2.72	<0.001

Observations = 10 634

1 Compared to patients with BMI 20-30 kg/m², 2 Compared to operators that had performed >100 CVC insertions at the beginning of the study period