



Risk factors for self-removal of vascular access devices in non-intensive care unit departments: a monocentric retrospective observational study

M. Masseroli¹, T. Lanzi¹, A. Bartoli¹, M. Calloni¹, P. Zappa¹, A. Foschi², N. Busatto², A. Taino¹, A. Gidaro¹

1. Division of Internal Medicine, Luigi Sacco Hospital, University of Milan, Milan, Italy 2. Department of Infectious Diseases, Unit II, L. Sacco Hospital, ASST Fatebenefratelli Sacco, Milan, Italy



Ospedale Luigi Sacco
AZIENDA OSPEDALIERA - POLO UNIVERSITARIO

BACKGROUND

In ICU settings inadvertent/self removal of VADs is a quality-of-care indicator. Data outside ICU are limited, even though the population in medical and surgical wards – characterized by older age, increased fragility, and cognitive impairment – is very much affected by this problem.
Our aim was to evaluate the rate and identify risk factors of VAD self-removal in 10 non-ICU medical and surgical wards.



METHODS

This is a retrospective observational study conducted at L. Sacco Hospital (January 2021-March 2023). We evaluated long peripheral catheters, Midline, PICC and FICC. A time-to-event cumulative incidence analysis was performed using Cox proportional hazards models to assess the risk over time and identify risk factors for VAD removal. Potential risk factors were analyzed using univariate Cox models. Variables with a p-value of less than 0.2 in the univariate analysis were subsequently included in multivariate models (population as a whole, patients with or without cognitive impairment/delirium)

Tab.1

Patients characteristics	No self-removal (n 1290)	Self-removal (n 141)	p-value
Age (years)	77 (62 - 84)	80 (72 - 87)	<0.001
Male sex	592 (45.9%)	78 (55.3%)	0.01
Psychotropic medication	247 (19.2%)	42 (29.8%)	0.005
Upper limb restraints	157 (12.2%)	29 (20.6%)	0.84
Cognitive impairment	158 (12.3%)	32 (22.7%)	0.003
Delirium	91 (7.1%)	20 (14.2%)	<0.001
Previous self-removal of pvc	45 (3.5%)	13 (9.2%)	0.01
Previous self-removal of other VADs	8 (0.6%)	5 (3.6%)	<0.001
Catheter characteristics	No self-removal (n 1290)	Self-removal (n 141)	p-value
PICC	339 (26.3%)	19 (13.5%)	<0.001
Midline/LPC	951 (73.7%)	122 (86.5%)	
Average dwell time (days)	11 (7 - 19)	3 (1 - 9)	<0.001
Upper limb placement	740 (57.4%)	38 (26.9%)	
Lower limb placement	550 (42.6%)	103 (73.1%)	<0.001
One lumen	1117 (86.6%)	122 (86.5%)	
Two lumens	173 (13.4%)	19 (13.5%)	0.42
Securacath	156 (12.1%)	26 (18.4%)	0.09

Tab.2

Patients characteristics	No self-removal (n 248)	Self-removal (n 51)	p-value
Age	83 (78 - 87)	84 (79 - 88)	0.21
Male sex	104 (41.9%)	25 (49%)	0.05
Psychotropic medication	185 (74.6%)	32 (62.7%)	0.33
Upper limb restraints	146 (58.9%)	27 (52.9%)	0.84
Previous self-removal of pvc	40 (16.1%)	12 (23.5%)	0.22
Previous self-removal of other VADs	6 (2.4%)	3 (5.9%)	0.23
Catheter characteristics	No self-removal (n 248)	Self-removal (n 51)	p-value
PICC	33 (13.3%)	5 (9.8%)	
Midline/LPC	215 (86.7%)	46 (90.2%)	0.13
Average dwell time (days)	10 (6 - 17)	3 (1 - 7)	<.001
Upper limb placement	103 (41.5%)	7 (13.7%)	
Lower limb placement	145 (58.5%)	44 (86.3%)	0.006
One lumen	218 (87.9%)	45 (88.2%)	
Two lumens	29 (11.7%)	6 (11.8%)	0.4
Securacath	32 (12.9%)	5 (9.8%)	0.30

Tab 1: characteristic of the population as a whole
Tab 2: characteristic of the population with delirium and/or cognitive impairment



CONCLUSIONS

Age, male sex, delirium, cognitive impairment, and lower limb positioning are significant risk factors for catheter self-removal both in patients affected by cognitive impairment/delirium and with normal cognitive status.
Regarding lower limb placement we must highlight a potential selection bias in patients with delirium/cognitive impairment, in whom this placement is often preferred due to lack of cooperation.

RESULTS

1431 VADs were positioned in 1249 patients (mean age 78), and 141 were self-removed (9.8%) mostly in the first days after positioning (3 days of average dwell time). Risk factor for VAD removal were age (77 vs 80 years, p = 0.026), male sex (OR 1.789, CI 1.26-2.54, p=0.001), positioning in the lower limb (OR 2.543, CI 1.682-3.846, p<0.001), delirium (OR 2,66, CI 1.362-5.198, p=0.004), and cognitive impairment (OR 1.87, CI 1.116-3.133, p=0.017 PICC placement was less associated with self-removal (OR 0.558, CI 0.333-0.933, p = 0.026).
In the subgroup of patients with cognitive impairment or delirium (290 patients, 336 VADs) PICC placement was no longer a protective factor.