

CENTRAL AND PERIFERIC VENOUS ACCESS DEVICES IN UNCOOPERATIVE PATIENTS WITH SEVERE ACQUIRED BRAIN INJURIES.

Efficacy, complication and failures of bedside ultrasound-guided positioning with two operators.

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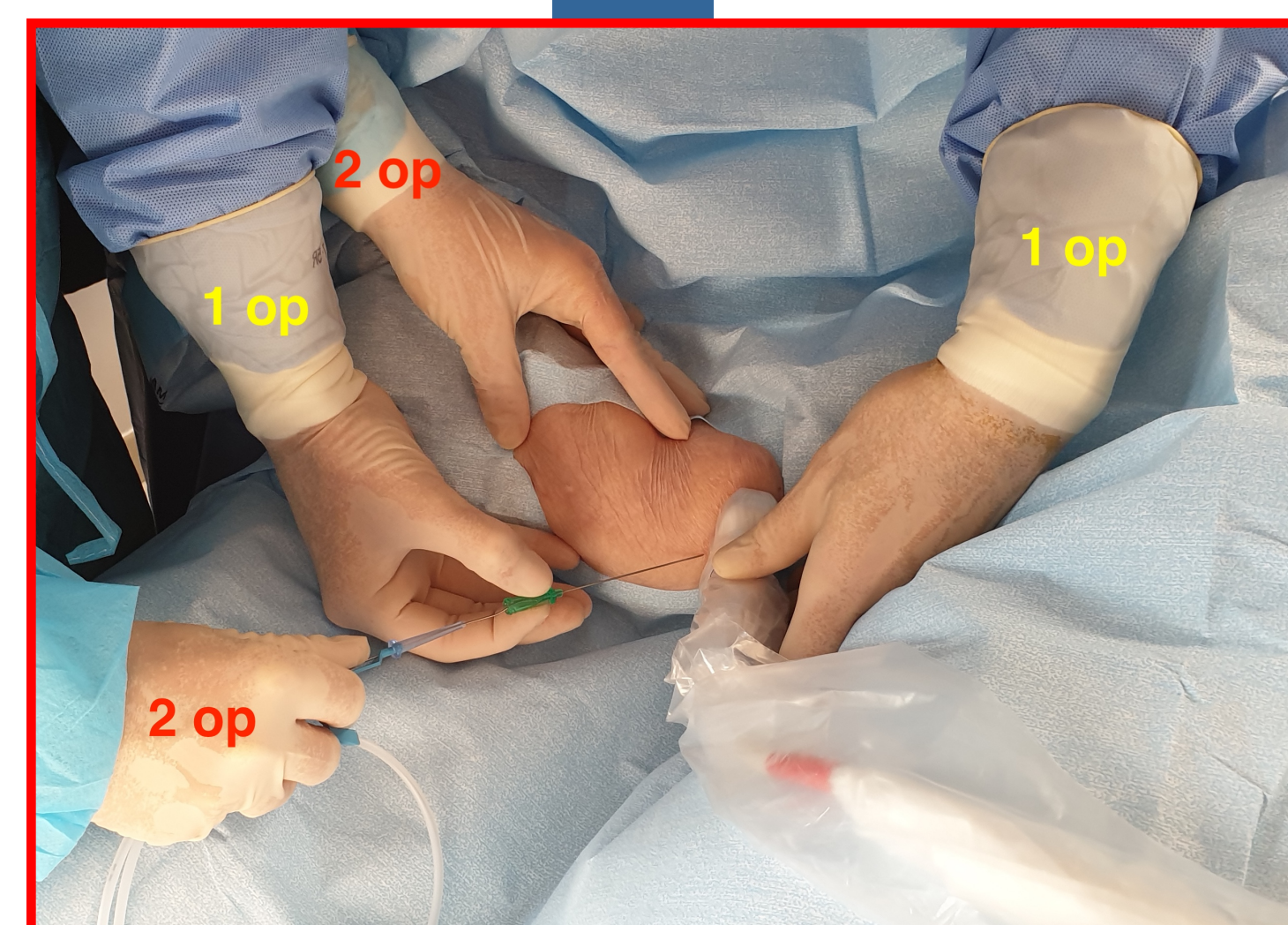
Introduction

In uncooperative hospitalized patients with Severe Acquired Brain Injuries (SABI) Venous Access Devices (VAD) positioning is made difficult by several clinical conditions such as spasticity, plegia and muscle fasciculations, clonus, joint ankylosis, involuntary movements, sarcopenia, cachexia, means of restraint, behavioral disorders, mechanical ventilation, tracheostomy ecc. Bedside VAD positioning, useful to avoid patient transportation, has to adapt to conditioned posture and neurologic and muscle-skeletal status, accepting oblique or even vertical surfaces to achieve echo-guided venipuncture

Goals

The presence of a «second operator» is aimed to:

- contain and stabilize the operating field
- keeping a continuous echographic monitoring of guidewire progression and venous device itself along its anatomical path
- minimize patient sedation



PICTURE 1. Right basilica vein echo-guided venipuncture on vertical plane in spastic tetraparesis patient. **Op1** performs venipuncture and keep echographic monitoring while **Op2** inserts guidewire and stabilizes arm and operating sterile field.

Method

151 bedside VAD positioning has been consecutively performed (9124 total days) in 106 patients (age 66,5, range19-93) :

CVC-nt 25 (gg 1863),
MIDLINE(mid-clavicular) 45 (gg 2468),
PICC. 81 (gg 4793).

Failure categories adopted:

accidental removal (AR),
catheter related infection (CRI),
malfunctioning (ML),
symptomatic thrombosis (ST) and
insertion site emathoma (IE).

Positioning success rate, Failure type rate during first, second and third months of VAD indwelling time, Failure Incidence rate/1000 days (IR) for overall VAD, for VAD Type, for Failure category has been examined.

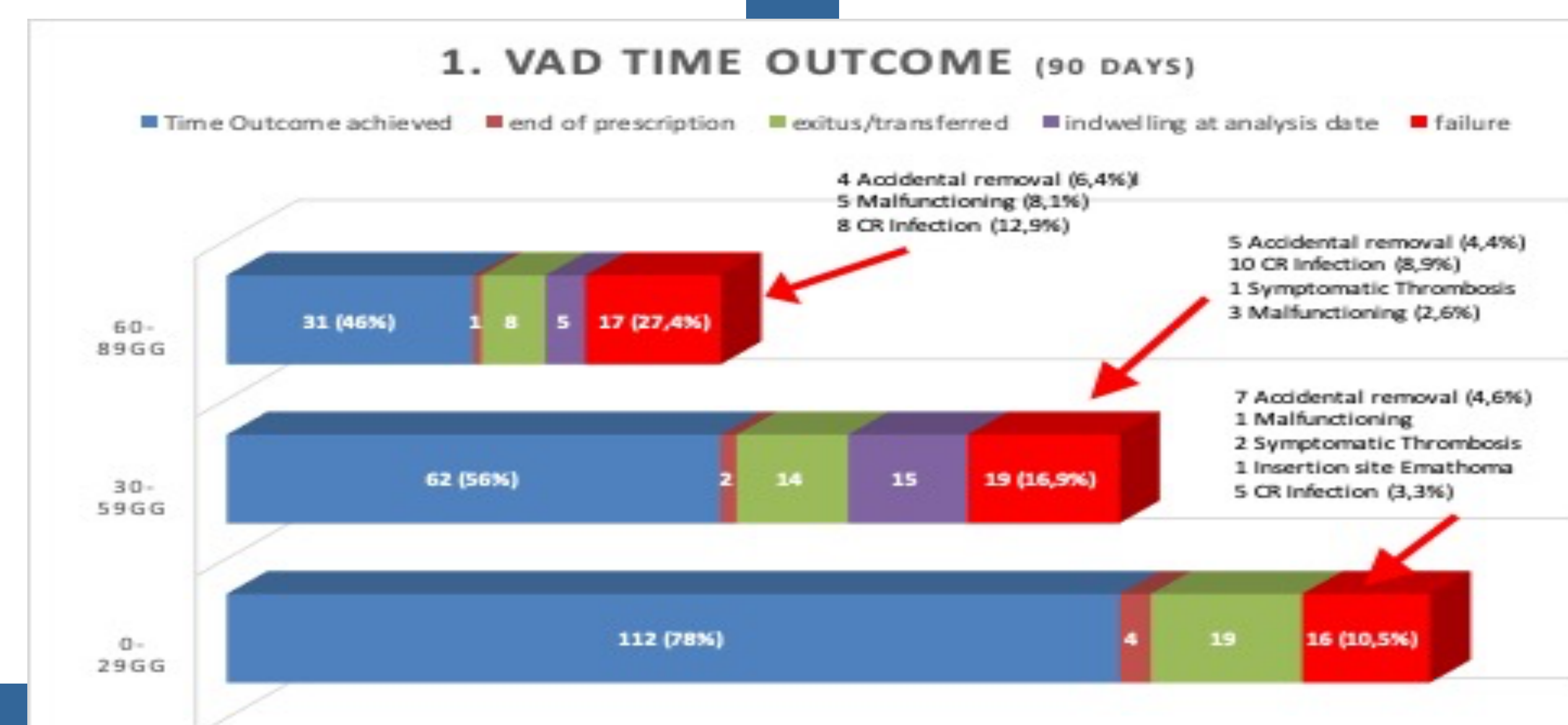
Results

“Two operators approach” achieved 100% positioning success rate and no need for pharmacological sedation at all. In 4 cases out of 151, chest Xray showed VAD Tip malpositioning, resolved by “in situ” revision without VAD removal



Picture 2 . PICC Tip malposition in left subclavian vein (Bedside Xray)

In first three month analysis 112 VAD (74,1%) out of 151 target 30 days indwelling time with 4 VAD (2,6%) removed because of no more indication, 19 VAD (12,5%) exitus/tranferred and 16 VAD Failures (10,5%) of which 5 (3,3%) catheter related infection (IRC), 7 (4,6 %) accidental removal (RA), 1 (0,6%) malfunctioning (ML), 2 (1,2%) symptomatic thrombosis (ST), 1 (0,6%) insertion site emathoma (IE). For second and third month Failures rate and Overall and VAD type IR Failure see Graph and Tab



VAD TYPE FAILURE IR*

	CVC-nt	MIDCLAVICULAR	PICC	All VADs
Number	25	45	81	151
Days	1863	2468	4793	9124
Overall Failure	6,4	8,9	6,4	7,0
Catheter Related Infection (IRC)	4,2	0,8	4,4	3,3
Accidental Removal(AR)	1,6	2,0	1,4	1,7
Malfunctioning(ML)	0	4,8	0,4	1,5
Symptomatic Thrombosis (ST)	0,5	0,8	0	0,3
Insertion Site Emathoma (IE)	0	0,1	0	0,1

*IR = Incidence Rate/1000 days

Conclusion

In first 30 days analysys, causes of VAD removal reasonably related to “difficult positioning conditions” are 3 out of 151 (1,9%) (2 early brachial thrombosis and 1 early insertion site emathoma) and rate of removal for catheter related infection is 5 cases out of of 151 (3,3%). About Tip positioning, Mid clavicular shows less risk for infection and increased risk for malfunction as already known from literature

Considering that:

- provides 100% success positioning
- cancel need for farmacological sedation
- does not increase risk of catheter infection in first 30 days from positioning date
- reports an incidence rate of Failures according to medical literature data both for overall, VAD type and sub cathegory of failure

“two operators” bedside echoguided VAD positioning is a safe and reasonable approach for uncooperative patient with Severe Acquired Brain Injuries.