

25 Maggio 2018

Assistenza al paziente portatore di LVAD (Left Ventricular Assist Device) in Pronto Soccorso



Dott.ssa Alessandra Ongaro

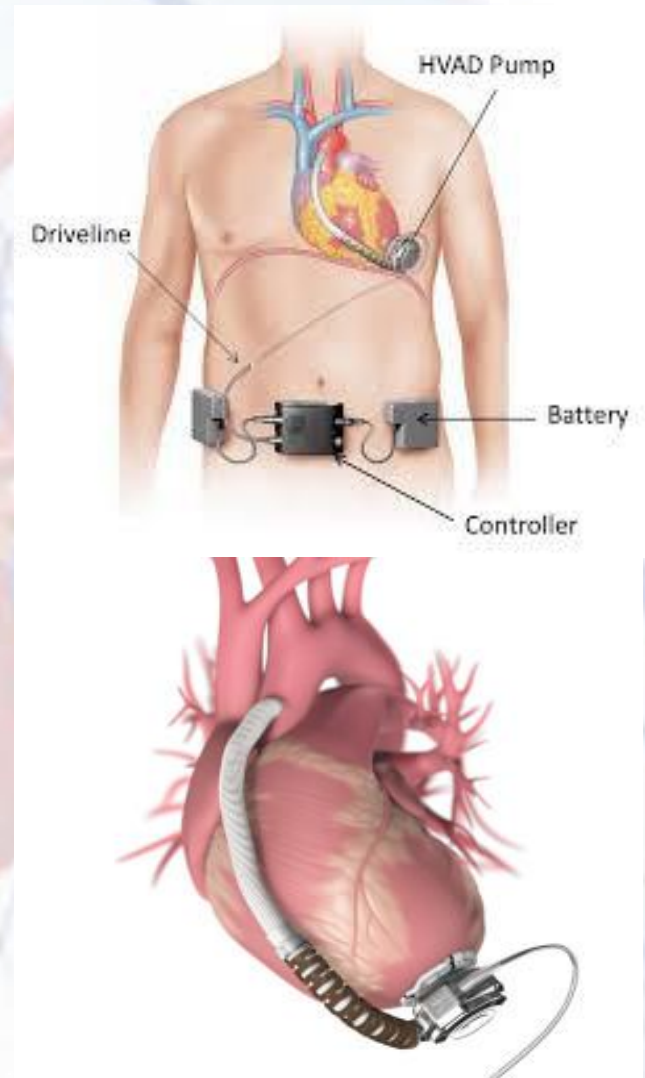
Dispositivo di assistenza ventricolare (VAD)

Un **dispositivo di assistenza ventricolare** (*Ventricular Assist Device, VAD*) è un supporto meccanico al circolo volto a garantire un'adeguata portata sanguigna a pazienti affetti da insufficienza cardiaca avanzata.

È costituito da:

- pompa meccanica a flusso continuo
- cannula di inflow
- cannula di outflow
- driveline percutanea
- controller esterno alimentato da batterie ricaricabili

La pompa meccanica decarica il ventricolo sinistro riducendo il lavoro miocardico e mantenendo il flusso in uscita, migliorando quindi i sintomi clinici e il danno d'organo legato alla bassa portata.



Dispositivo di assistenza ventricolare (VAD)

**Scompenso
cardiaco avanzato
(IV classe
funzionale NYHA)**

Terapia medica

Efficacia

Refrattarietà e progressivo
deterioramento funzionale

Terapia Gold Standard
TRAPIANTO CARDIACO

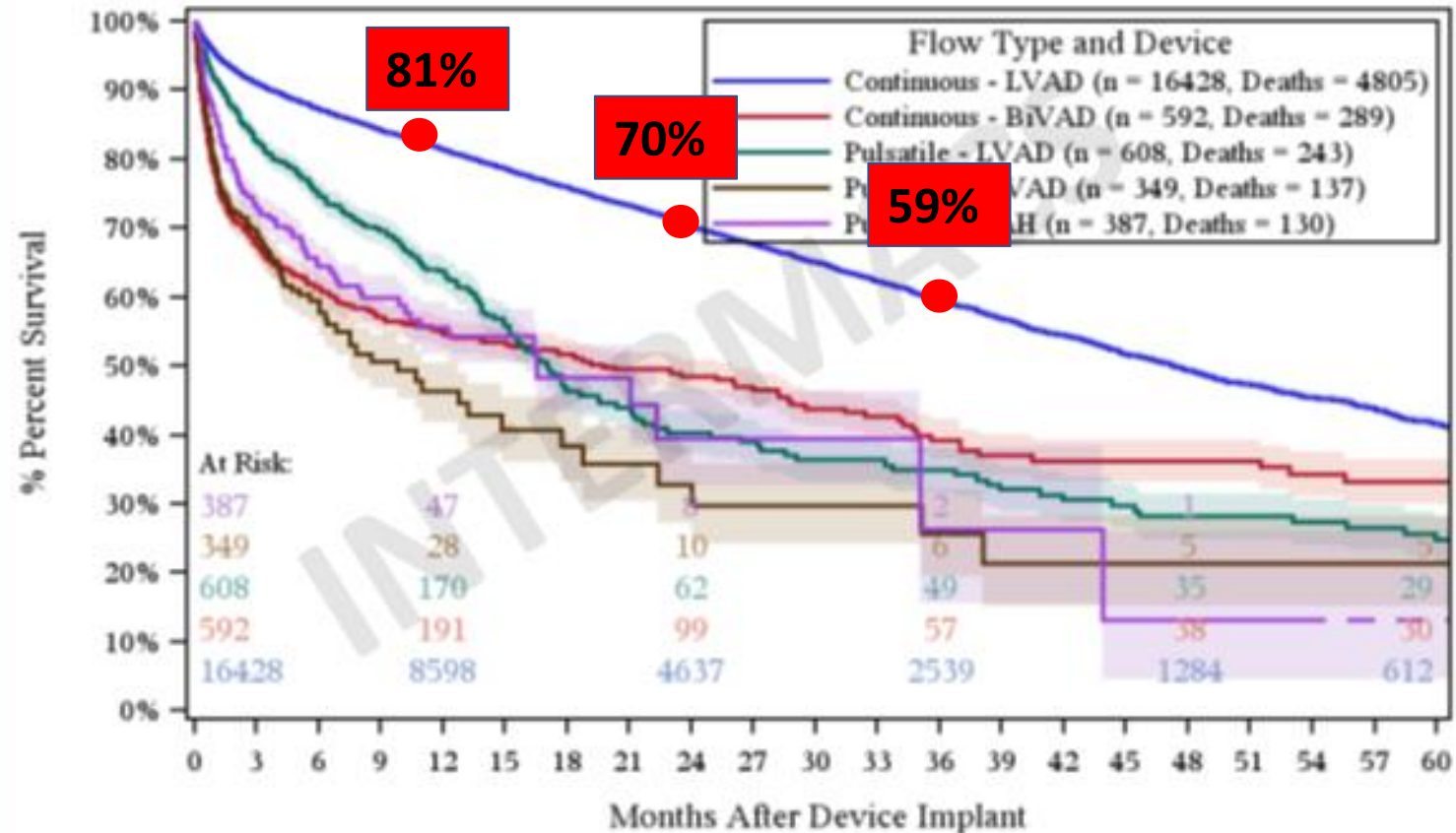
MA -scarsità di donatori
-controindicazioni al
trapianto
ES: età >65 anni
ipertensione polmonare

'Bridge to Trasplant' (BTT)
'Bridge to Candidacy' (BTC)
'Bridge to Decision' (BTD)

**Dispositivo di assistenza
ventricolare (VAD)**

'Destination Therapy' (DT)

Intermacs - Kaplan-Meier Survival by Flow Type and Device Primary Prospective Implants: June 23, 2006 to September 30, 2016



Shaded areas indicate 70% confidence limits

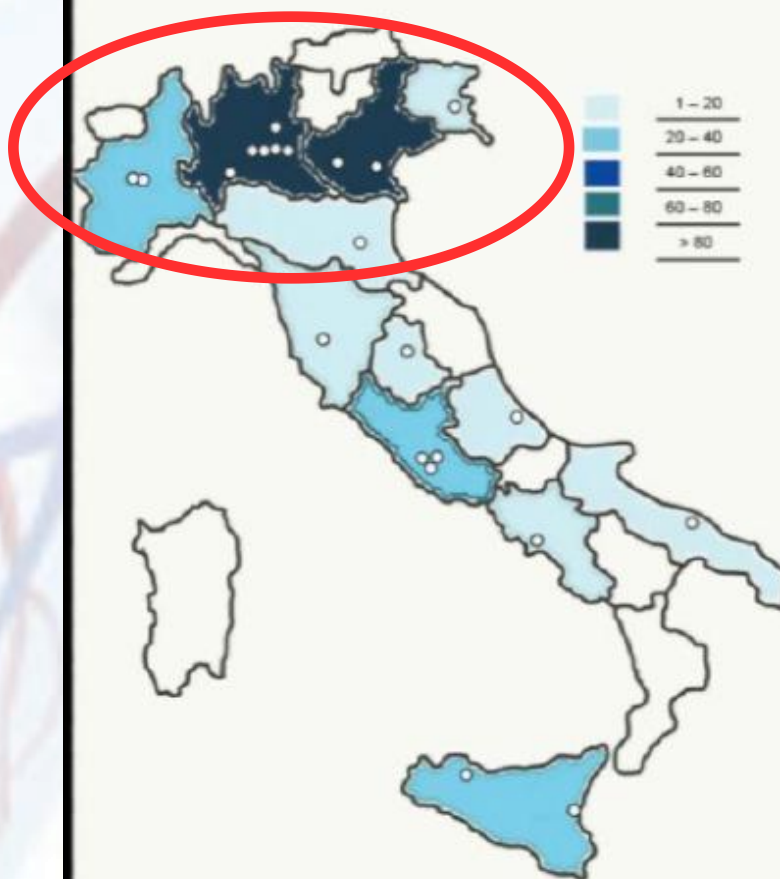
p (log-rank) = <.0001

Event: Death (censored at transplant or recovery)

Intermacs

All Adult LVAD Implants – by Region and Center

Period: 2010-2015*



PADOVA*	86
MILANO NIGUARDA*	83
TORINO SAN G. BATTISTA*	41
MILANO SAN RAFFAELE*	51
ROMA SAN CAMILLO	27
VERONA*	31
PALERMO ISMETT*	30
BERGAMO	21
UDINE	18
SIENA*	21
CHIETI	11
BOLOGNA*	14
NAPOLI MONALDI	9
BARI*	11
MILANO HUMANITAS*	7

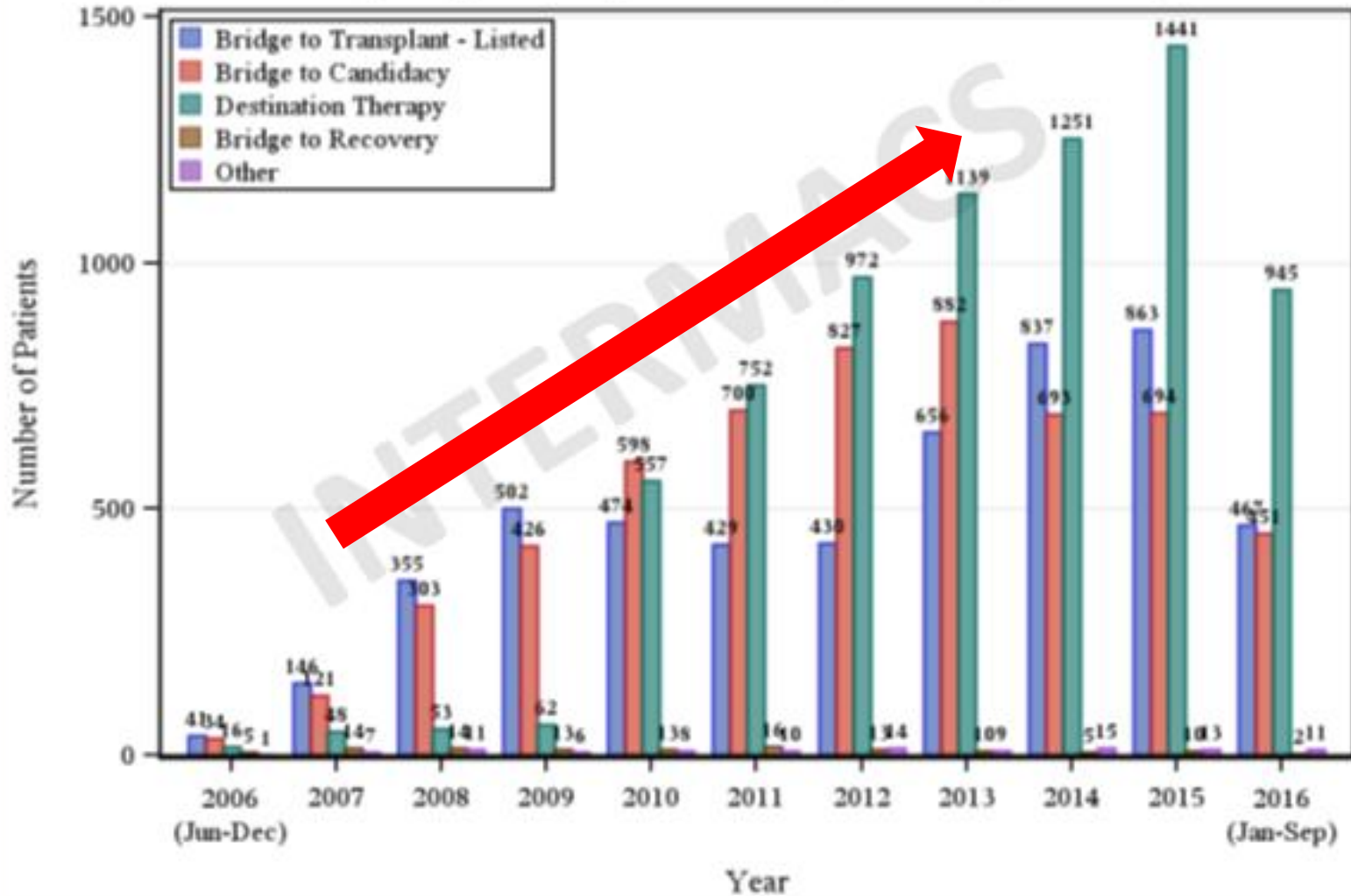
MILANO MONZINO	7
ROMA GEMELLI*	5
CATANIA	5
PERUGIA	4
PAVIA*	7
TOTALE	489

20 Centers

* Preliminary data

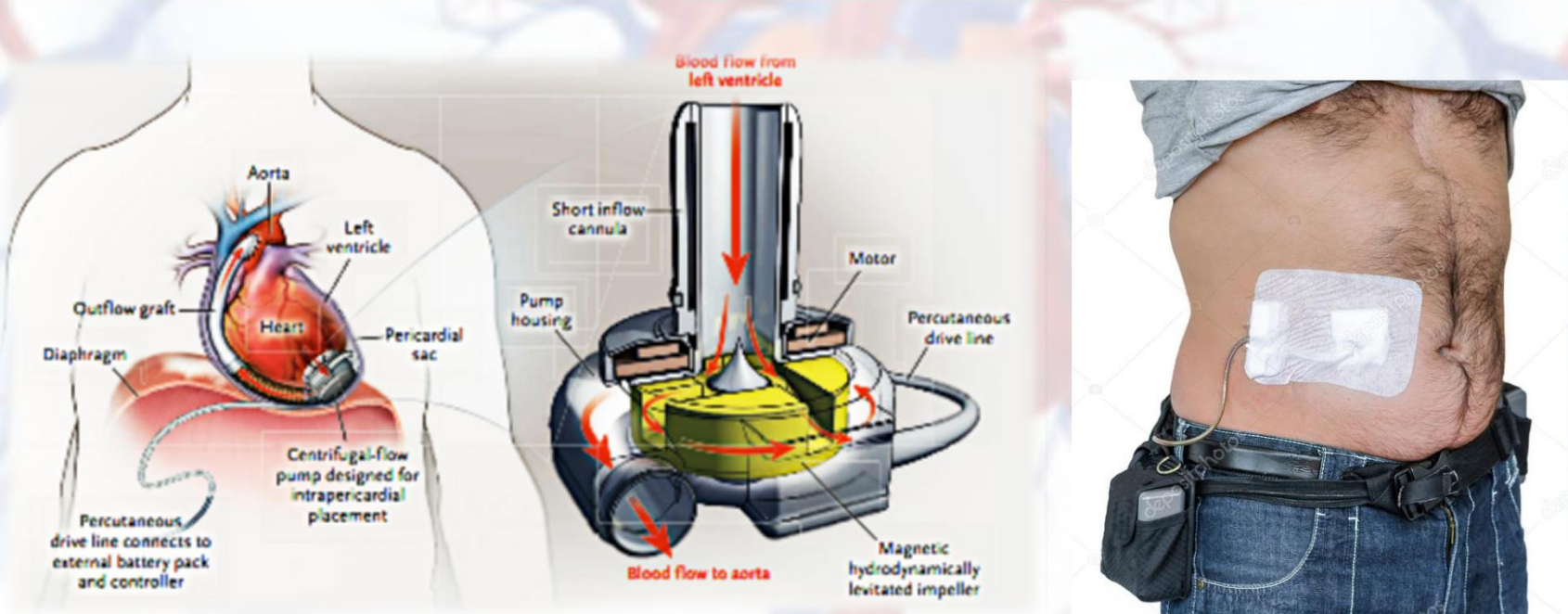


Intermacs - Implants per Year by Device Strategy Primary Prospective Implants: June 23, 2006 to September 30, 2016

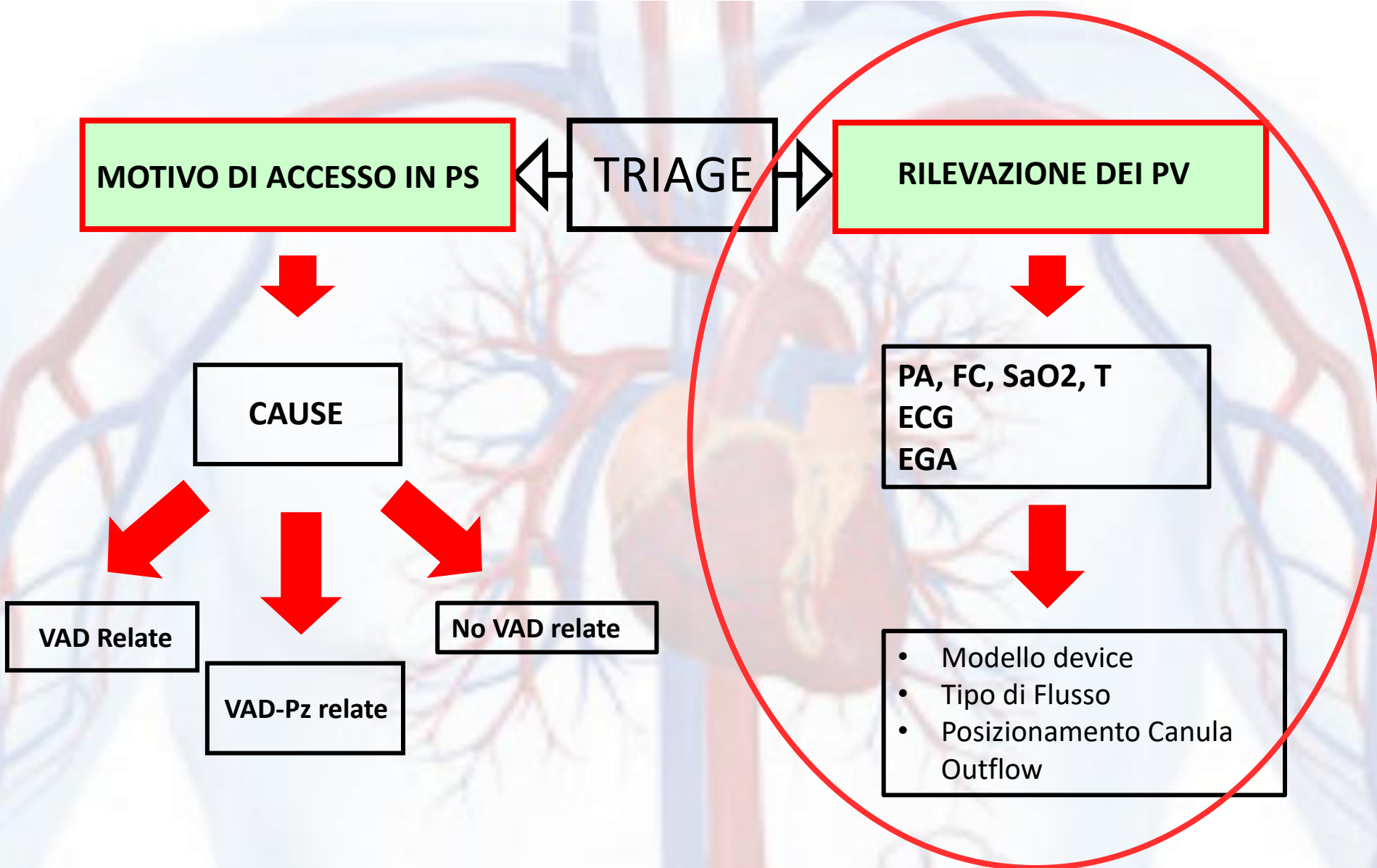


Avere un VAD implica...

- **Aspetti TECNICI** (gestione componenti, conoscenza allarmi e meccanismo d'azione della pompa)
- **Aspetti TERAPEUTICI** (terapia farmacologica con anticoagulanti, antiaggreganti, eventuali antibiotici)
- **Aspetti PSICOLOGICI** (ansia e depressione, processo di *Embodying*)
- **Aspetti GESTIONALI** (rapporti con AST di riferimento e MMG, 118)



Paziente con VAD in PS



VALUTAZIONE DEL PAZIENTE

Valutazione
ABCD



C

Il CIRCOLO

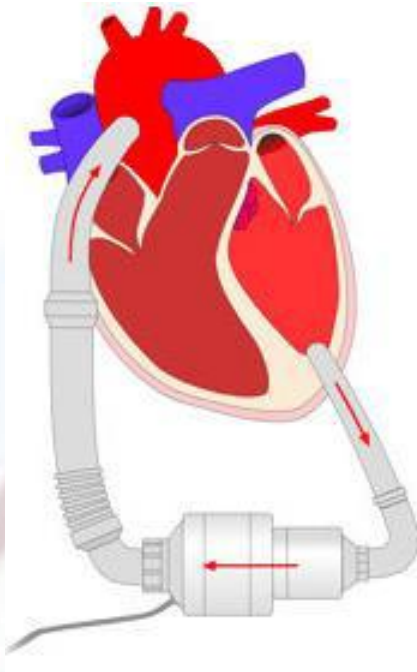


A-B-D

Il LIVELLO DI COSCIENZA, lo STATO NEUROLOGICO, il RESPIRO e le VIE AEREE devono essere valutati nello stesso modo rispetto a un paziente senza VAD



FLUSSO CONTINUO!!



FLUSSO CONTINUO



Minor differenza tra PAS e PAD



**Minor possibilità di apprezzare
polso arterioso periferico**

PA

FC

SpO2

DOPPLER ARTERIOSO



MONITORAGGIO ECG



EGA ARTERIOSO

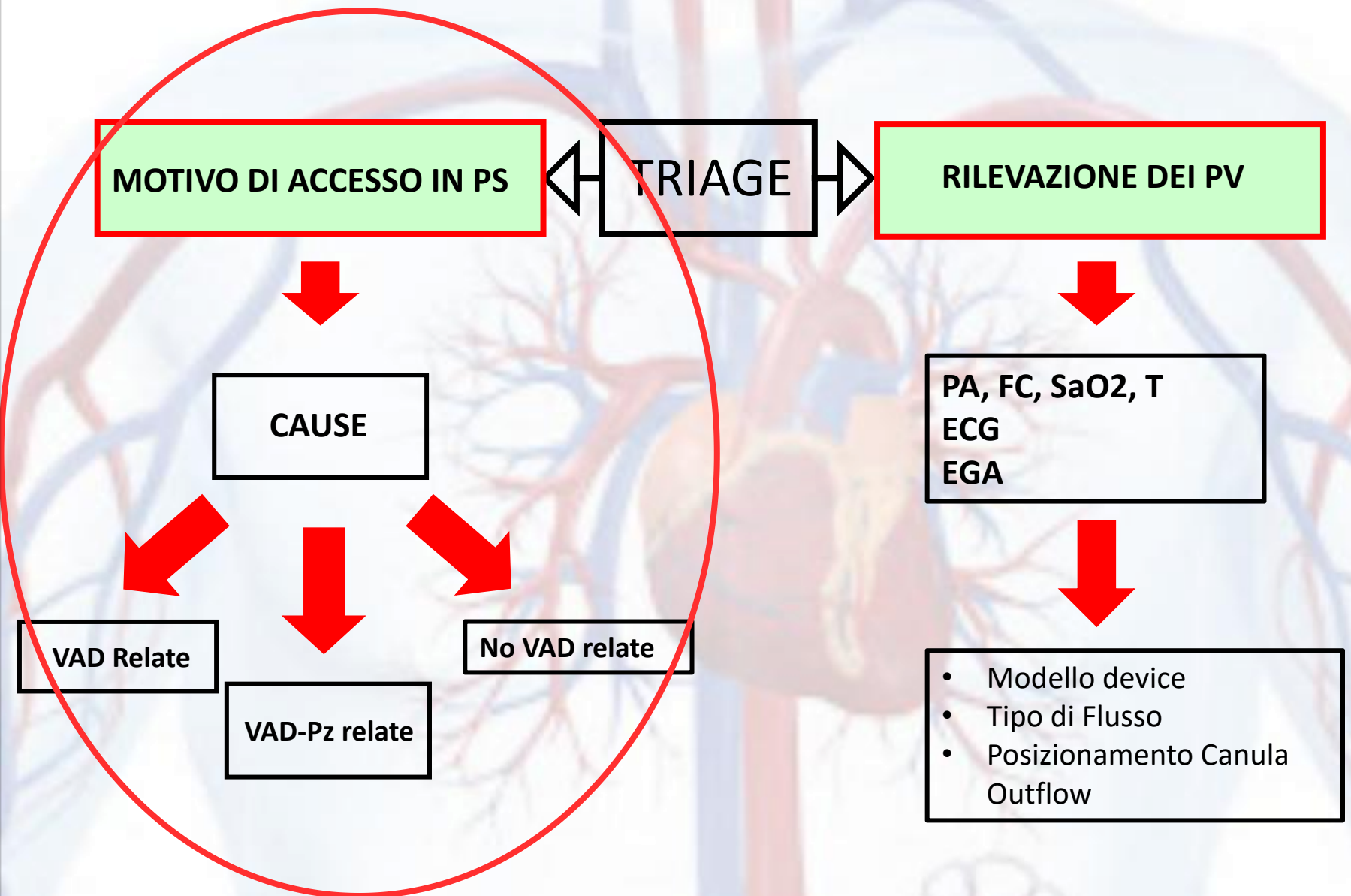


IL DEVICE STA FUNZIONANDO?

- ✓ Auscultazione torace (ronzio meccanico)
- ✓ Valutazione parametri sul display
- ✓ Controllo dell'HardWare e della carica delle batterie



Paziente con VAD in PS



MOTIVI DI ACCESSO IN PS

VAD RELATE

- ALLARMI CONTROLLER
- DANNEGGIAMENTO HARDWARE

VAD-PZ RELATE

- INFEZIONI
DRIVELINE (superficiale e/o profonda)
- SANGUINAMENTI
- TROMBOSI VAD
- ICTUS
- ARITMIE
- DISFUNZIONE Vdx

NON VAD RELATE

- IVU
- Neoplasie
- Problematiche ortopediche



Contattare SEMPRE centro impiantatore di riferimento per indicazioni sulla gestione del problema

VAD RELATE - ALLARMI

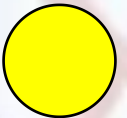
Alarm type	Alarm display	Meaning	Potential causes	Actions required
Hazard/Critical	Pump off VAD stopped	Pump has stopped Pump is not operating correctly Pump flow <2.5 L/min Percutaneous lead is disconnected	– Driveline disconnected – Driveline fracture – Connector malfunction/ breakage – VAD electrical failure	Check connections from driveline, controller and power source Change controller
	Critical battery Low voltage	<5 min of battery power remaining. Controller receiving inadequate power	– Limited battery time – Battery malfunction	Replace battery Connect to alternate power source • Do not remove both batteries simultaneously – VAD will stop
	Controller failed	Controller component failed	– Controller component failed	Change controller
Advisory/Medium	Controller fault	Controller fault. Alarms disabled	– Controller component malfunction – Electrostatic discharge	Change controller Review alarm thresholds
	High watts	High power condition in running VAD pump	– VAD thrombus – High RPM – High flow – VAD electrical fault	Assess and optimise preload/afterload Assess for thrombus
	Low flow Suction	Pump flow < 2.5 L/min Average flow dropped below threshold	– Suction event – Poor VAD filling – Elevated BP/ afterload – Outflow graft kink – RPM too high or low	• Ensure adequate preload/filling • Treat arrhythmias • Investigate for VAD occlusion (inflow and outflow tracts) • Consider afterload reduction or decreasing pump speed
Advisory/Low	Low battery Low voltage	<15 min of battery power remaining		Replace battery Connect to alternate power source
	Power cable disconnected	Power cable disconnected		Ensure all connections intact
	Replace system controller	System controller is operating in backup mode		Replace system controller

1. ALLARMI ROSSI:



- STOP della macchina
- Batteria scarica
- Guasto del controller

2. ALLARMI GIALLI:



- ↑ Power
- ↓ Flusso
- Batteria quasi scarica
- Disconnessione delle batterie
- Difetto del controller

DANNO HARDWARE

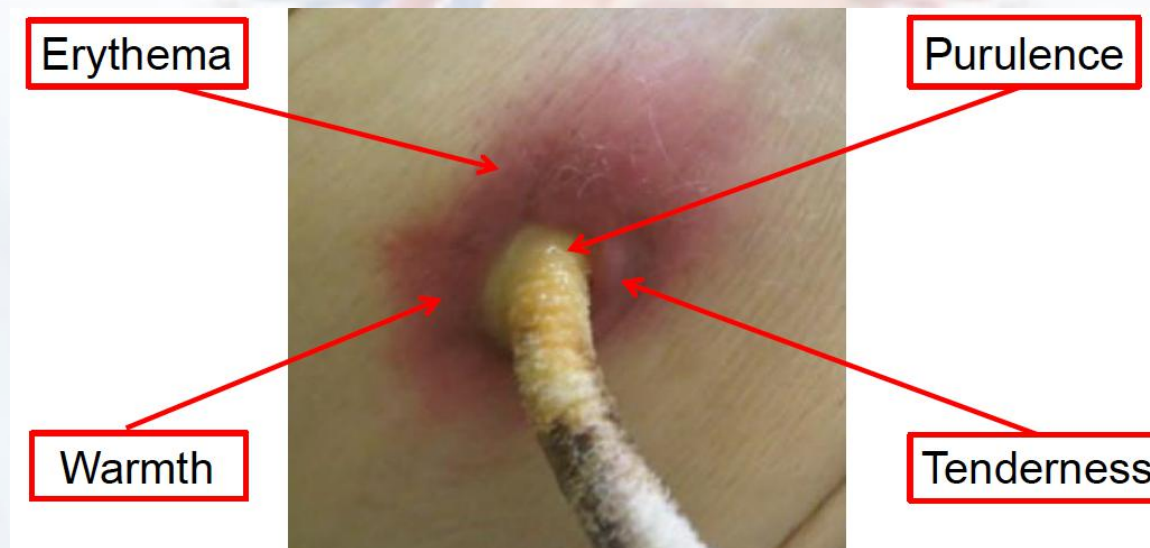


VAD-PZ RELATE:INFEZIONI

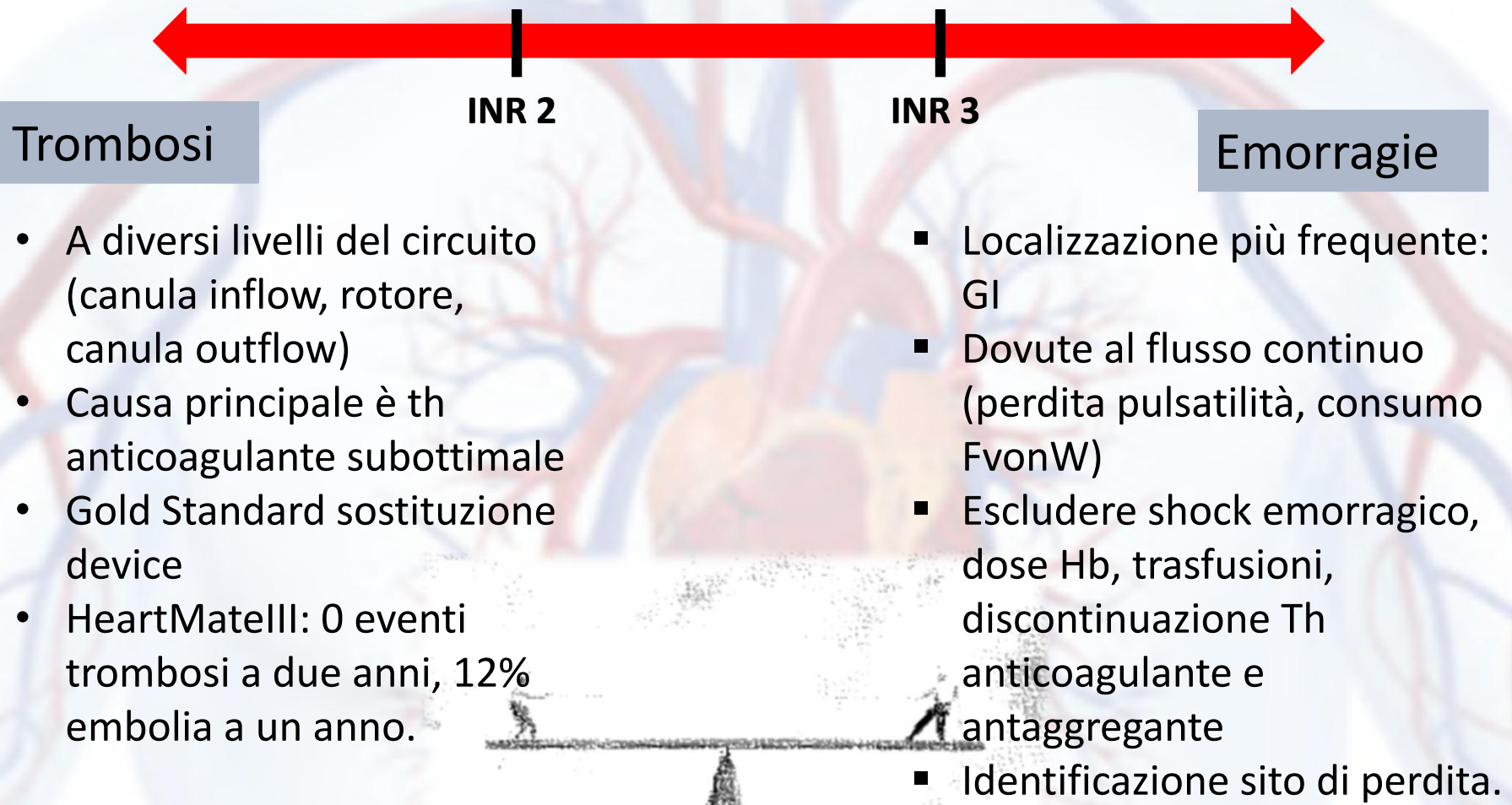
80% delle infezioni nei pz con VAD sono **INFEZIONI DELLA DRIVELINE**

Accesso in PS per FEBBRE → **rischio SEPSI**

- Escludere stato settico (PV)
- Anamnesi (recupero info infezioni cronica driveline)
- Emocolture
- Terapia antibiotica empirica



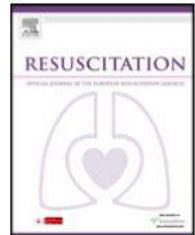
VAD-PZ RELATE: TROMBOSI/EMORRAGIE





Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Short communication

Chest compressions may be safe in arresting patients with left ventricular assist devices (LVADs)[☆]

Zachary Shinar^{a,*}, Joseph Bellezzo^a, Marcia Stahovich^a, Sheldon Cheskes^b,
Suzanne Chillcott^a, Walter Dembitsky^a

Table 1

Demographics of LVAD patients receiving chest compressions.

Patient	Type of LVAD	Gender	Age	Time from insertion to arrest	Duration of chest compressions	OHCA
1	Heartmate II	M	57	254 days	>20 min	Yes
2	Heartmate II	M	64	556 days	15–20 min	Yes
3	Heartmate II	M	69	234 days	10–15 min	Yes
4	Heartmate II	M	80	50 days	<1 min	No
5	Heartmate II	M	50	1324 days	Unclear	Yes
6	Heartmate II	M	79	431 days	2.5 h	Yes
7	Heartmate II	F	56	753 days	Unclear	Yes
8	Heartmate II	M	76	85 days	5 min/3 min	No

Table 2

Results of LVAD patients post-chest compressions.

Patient	ROEC	RONF	Reason for arrest	Defibrillation	VAD flow	Autopsy
1	No	No	Accidental disconnect	No	5 l min ⁻¹	No
2	Yes	No	Accidental disconnect	No	5.7 l min ⁻¹	Yes, confirmed intact cannulas
3	Yes	No	Accidental disconnect	Yes, AICD	5.4 l min ⁻¹	No
4	Yes	Yes	LV thrombus	No	6.6 l min ⁻¹	Yes, confirmed intact cannulas
5	Yes	Yes	Accidental disconnect	No	5.2 l min ⁻¹	No
6	No	No	Vfib	Yes, AICD	No flow documented	Yes, confirmed intact cannulas
7	Yes	Yes	Driveline malfunction	No	3.7 l min ⁻¹	No
8	Yes	Yes	Unclear	No	5.2/4.9 l min ⁻¹	No

GRAZIE PER L'ATTENZIONE!

