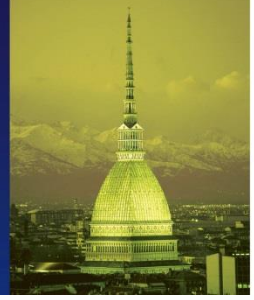
TURIN,
October
25th-27th
2018
Starhotels
Majestic

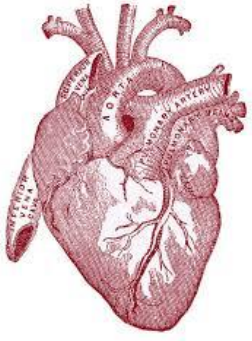
GIORNATE
CARDIOLOGICHE
TORINESI



UNIVERSITÁ DEGLI STUDI DI TORINO

AZIENDA OSPEDALIERO - UNIVERSITARIA
Città della Salute e della Scienza di Torino

I DON'T WANT A TRANSPLANT: COULD BE A CANDIDATE FOR LVAD?

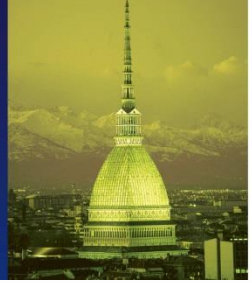


ANESTESIOLOGIST

Turin, October 26th 2018

Daniela Pasero

S. C. Anestesia e Rianimazione 1 U
Anaesthesiology and Critical Care Medicine Department
AOU Città della Salute e della Scienza.



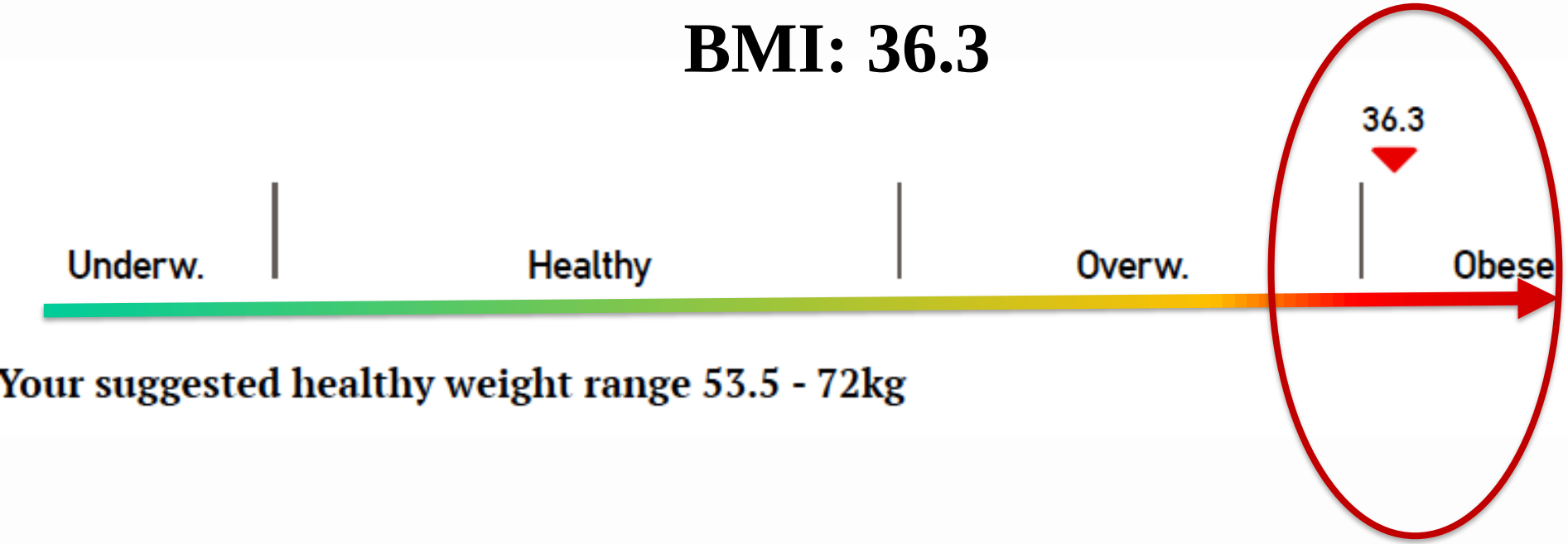
Screening per LVAD

- Rischio infettivo
- Funzionalità epatica e renale
- Rischio trombotico/emorragico
- Stato nutrizionale
- Valutazione psicologica
- Identificazione del caregiver

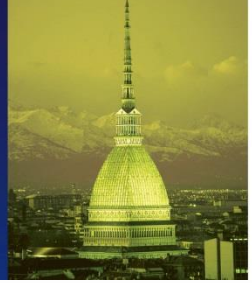
NON CONTROINDICAZIONI A LVAD

Uomo 56 anni (185 cm x 105 kg)

BMI: 36.3



Your suggested healthy weight range 53.5 - 72kg



Anaesthesiology management during LVAD implantation: PITFALLS

Induction of anaesthesia in patient with hypokinetic CMP:
which are the best drugs?

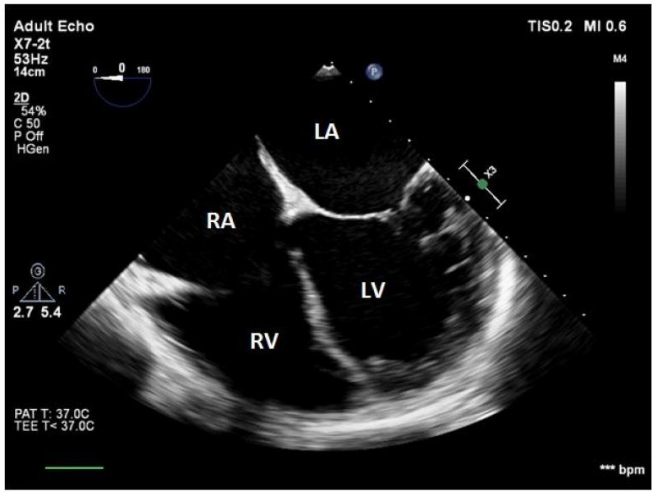
Mechanical ventilation: heart and lung interaction

Hemodynamic monitoring and management:
right ventricular failure and vasoplegia

Anaesthesiology management during LVAD implantation: PITFALLS

Induction of anaesthesia in patient with hypokinetic CMP:
which are the best drugs?

- Low haemodynamic effect:
  - Vasodilation, decrease of C.O.
- Short acting drugs:
  - To avoid prolonged M.V.
- Bispectral Index (BIS)



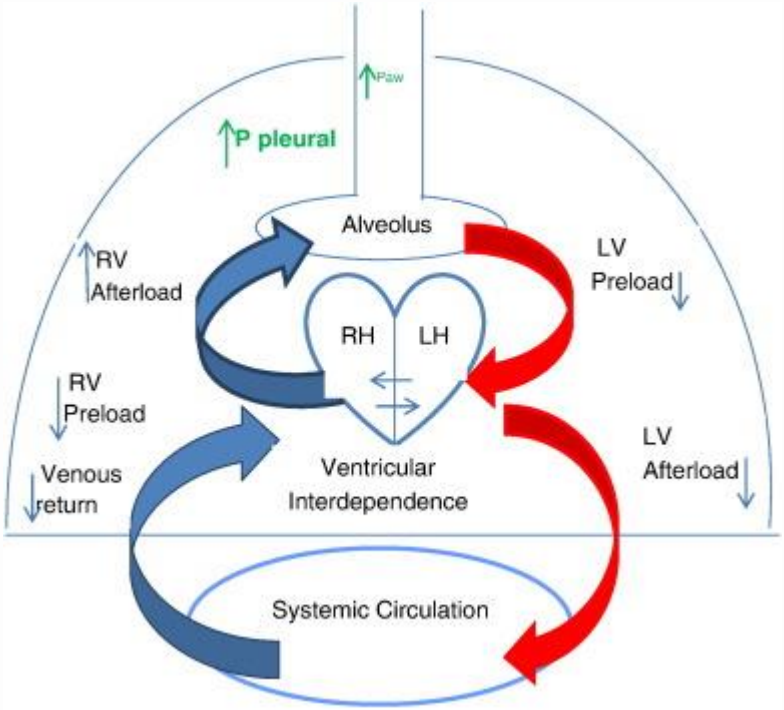
Anaesthesiology management during LVAD implantation: PITFALLS

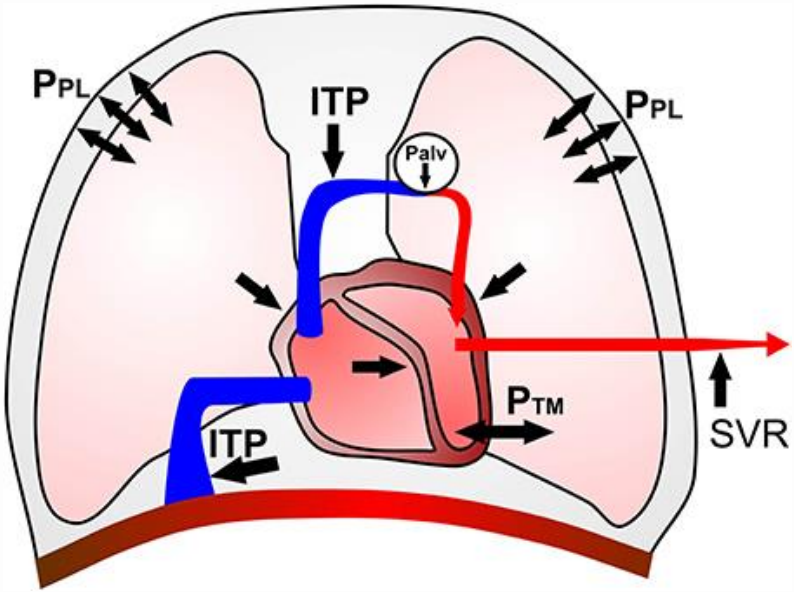
Mechanical ventilation: heart and lung interaction

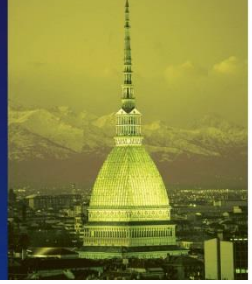
- Intrathoracic positive pressure: PIP, PEEP
- Reduction of venous return
- Increase of loading on right ventricle:
  - increased risk of right ventricular failure

Anaesthesiology management during LVAD implantation: PITFALLS

Mechanical ventilation: heart and lung interaction







Anaesthesiology management during LVAD implantation: PITFALLS

Hemodynamic monitoring and management:
right ventricular failure and vasoplegia

Swan Ganz Catheter:
- Pulmonary pressure
- Left atrial pressure (PCWP)
- Right atrial pressure

Trans Esophageal Echocardiography
- De-airing
- Correct inflow cannula position
- Right ventricular function

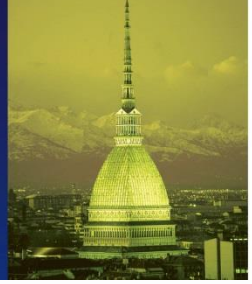
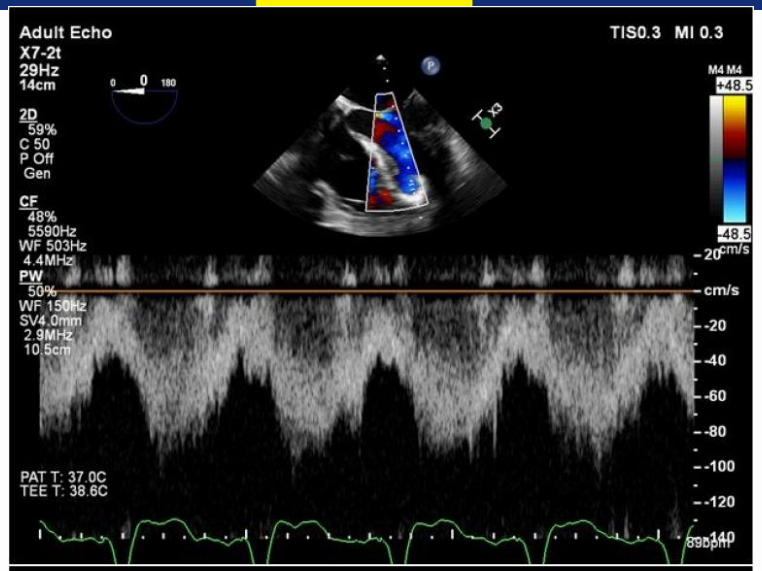


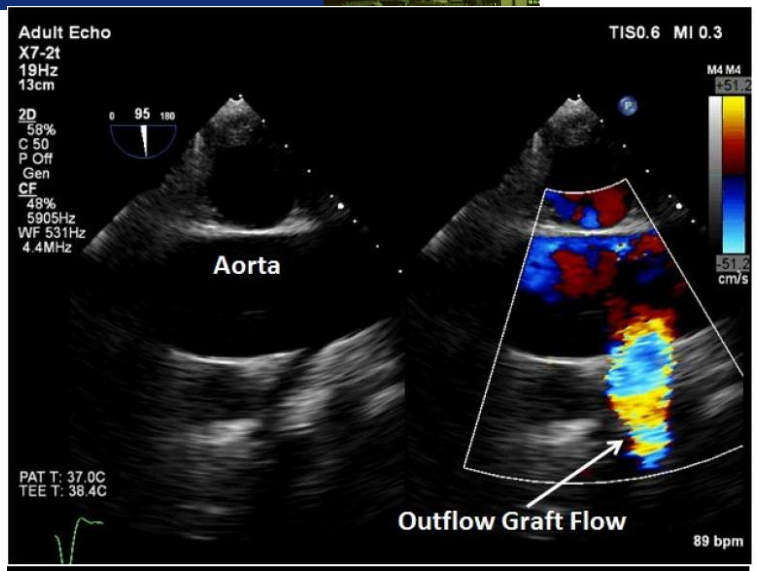
Table 2: The post-CPB TEE checklists

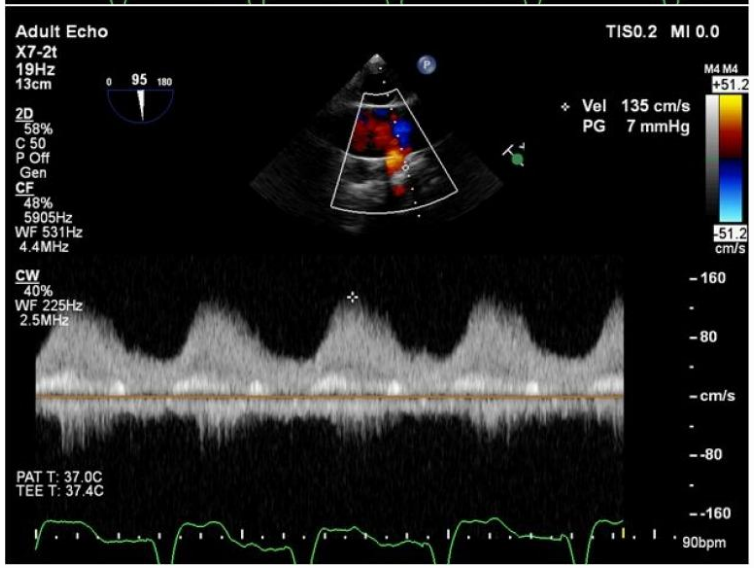
Ensure adequate de-airing of all the four cardiac chambers and of the LVAD cannulae
Recheck for and exclude any intra-cardiac shunts, especially a PFO
Before and immediately after discontinuation of CPB, evaluate cannulae positions and blood flow velocities using color and spectral Doppler (confirm low-velocity inflow and outflow patterns, i.e., peak velocities < 2.0 m/s and more frequently, <1.5 m/s[15,20-22])
After discontinuation of CPB, confirm proper LVAD function by evaluating left ventricular decompression, central position of the interventricular septum, aortic valve closure during LVAD systole and cannulae color and spectral flow patterns

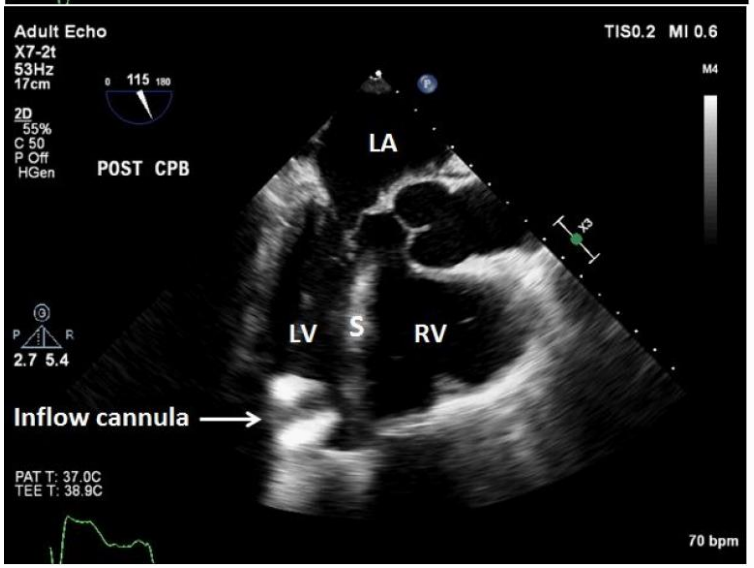
TEE: Transesophageal echocardiography, LVAD: Left ventricular assist device, PFO: Patent foramen ovale, CPB: Cardiopulmonary bypass

Patangi et al. Annals of Cardiac Anaesthesia, 2013, Vol. 16: 4


Adult Echo
TIS0.3 MI 0.3
X7-2t
29Hz
14cm
2D
59%
C 50
P Off
Gen
CF
48%
5590Hz
WF 503Hz
4.4MHz
PW
50%
WF 150Hz
SV4.0mm
2.9MHz
10.5cm
PAT T: 37.0C
TEE T: 38.6C
89bpm


Adult Echo
TIS0.6 MI 0.3
X7-2t
19Hz
13cm
2D
58%
C 50
P Off
Gen
CF
48%
5905Hz
WF 531Hz
4.4MHz
Aorta
PAT T: 37.0C
TEE T: 38.4C
Outflow Graft Flow
89 bpm


Adult Echo
TIS0.2 MI 0.0
X7-2t
19Hz
13cm
2D
58%
C 50
P Off
Gen
CF
48%
5905Hz
WF 531Hz
4.4MHz
Vel 135 cm/s
PG 7 mmHg
CW
40%
WF 225Hz
2.5MHz
PAT T: 37.0C
TEE T: 37.4C
90bpm


Adult Echo
TIS0.2 MI 0.6
X7-2t
53Hz
17cm
2D
55%
C 50
P Off
HGen
POST CPB
LA
LV
S
RV
2.7 5.4
Inflow cannula
PAT T: 37.0C
TEE T: 38.9C
70 bpm

Postoperative Right Heart Failure

- ✓ Receiving short or long-term right-sided circulatory support
- ✓ Continuous inotropic support for ≥ 14 days
- ✓ Or inhaled-NO ventilation for ≥ 48 hours

***Circulation. 2018;137:891–906*.**

Circulation Journal Vol.79, March 2015

	All (N=83)	Levo_preop (N=62)	No_Levo_preop (N=21)
Age, Median (IQR)	60 (51-65)	60 (50-65)	62 (57-67)
Gender, Female, N(%)	12 (14.46)	9 (10.85)	3 (3.61)
BMI, Median (IQR)	23.7(21.9-26.4)	23.2 (21.9-26.6)	24.2(22.4-25.6)
MCS before LVAD implantation, N (%)	32 (38.55)	24 (39)	8 (38)
Hospital stay before LVAD implantation, Median (IQR)	8 (3-12)	7 (2-12)	10 (8-13)
INTERMACS			
1	10 (12)	5 (8)	5 (24)
2	26 (31)	22 (35)	4 (19)
3	30 (36)	26 (42)	4 (19)
4	12 (15)	8 (13)	4 (19)
5	1 (1)	1 (2)	0
6	4 (5)	0	4 (19)
Type of LVAD			
INCOR	23 (28)	12 (19)	11 (52)
Heart Ware	44 (53)	39 (63)	5(24)
Heart Mate III	10 (12)	10 (16)	0
Other	6 (7)	1(2)	5 (24)
Right Heart Dysfunction	20 (24)	15 (24)	7 (33)
Inotropic support >14days	17 (20.48)	13 (21)	4 (19)
iNO>48 h	8 (9.64)	6 (10)	2 (10)
RVAD	3 (3.61)	2 (3)	1 (5)
Mechanical Ventilation, hours, Median (IQR)	24 (12-96)	24 (12-96)	28 (24-144)
AKI (RRT), N(%)	8 (10)	6 (10)	2 (10)
ICU-LOS, days, median (IQR)	6 (3-20)	23 (22-26)	24 (22-25)
30 days mortality	3 (3.61)	0	3 (14)*

Vasoplegia

Determinants and Outcomes of Vasoplegia Following Left Ventricular Assist Device Implantation

Clinical Perspective

What Is New?

- In this first study to assess the severity of vasoplegia following left ventricular assist device implantation, we demonstrated that vasoplegia was a common complication, with 27% of patients developing a mild form and 23% developing a moderate to severe form, and that functional status, preoperative central venous pressure, preoperative systolic blood pressure, and cardiopulmonary bypass time were predictive of vasoplegia development and severity.

What Are the Clinical Implications?

- Because vasoplegia was associated with worse survival outcomes, future work is warranted to help inform physicians about how to prevent and/or mitigate vasoplegia.

Table 4. Hazard Ratios for Mortality (Competing Risks Analysis for Transplantation)

Model	Vasoplegia Category	Estimate	95% CI	*P* Value
Model 1	Mild vs none	1.38	0.74–2.58	0.32
	Moderate/severe vs none	1.99	1.08–3.69	0.03
Model 2	Mild vs none	1.28	0.67–2.45	0.45
	Moderate/severe vs none	2.12	1.08–4.18	0.03

Tecson K.M. et al. J Am Heart Assoc. 2018; 7: e008377. DOI: 10.1161

CONCLUSIONS

Gentle induction of anaesthesia.

Advanced haemodynamic monitoring: SG cath, TEE.

Reduce Time on mechanical ventilation.

CONCLUSIONS

MECHANICAL CIRCULATORY SUPPORT

The multidisciplinary team

Care of patients following VAD implantation is complex and involves a team approach with input from intensivists, cardiac surgeons, cardiologists, intensive care nurses, VAD nurse coordinators, dietitians, physical therapists, social workers, cardiac rehabilitation nurses and psychiatrists/psychologists. Regular multidisciplinary meetings should be held, initially on a daily basis, to review the patient's progress, plan interventions and address specific issues (e.g., discharge planning).

…A TEAMWORK

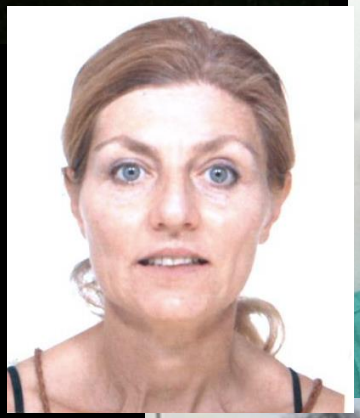
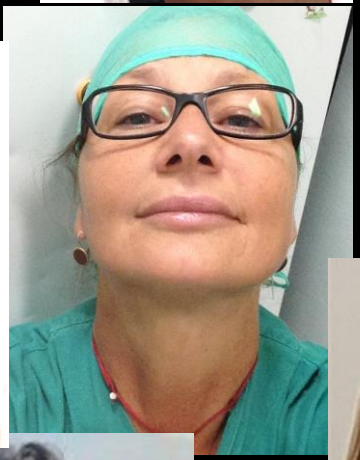
OUR TEAM



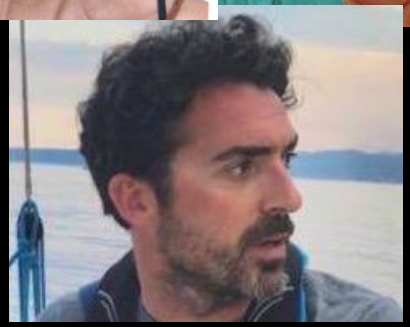










THANKS

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