44° Convegno Nazionale di Studi di Medicina Trasfusionale

Terapia di supporto nel COVID

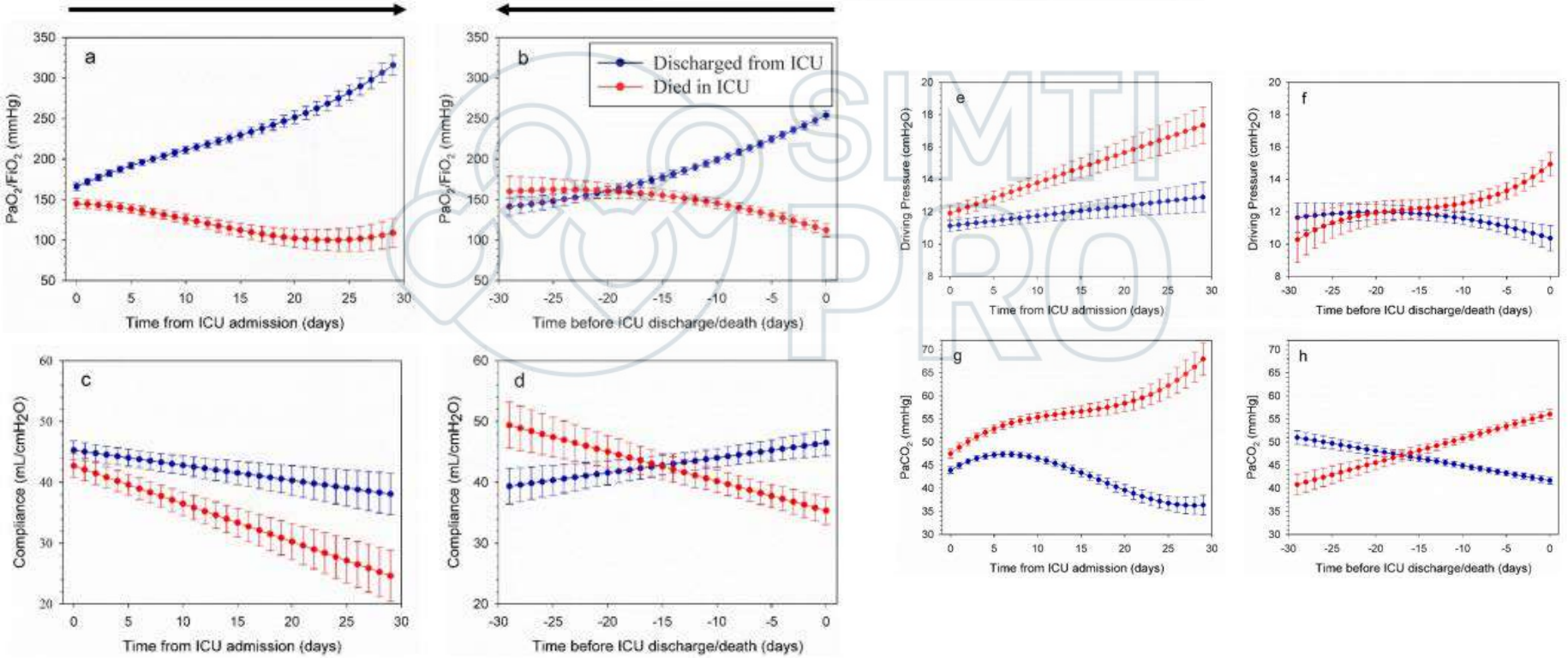
il punto di vista dell'Intensivista

Sistema Socio Sanitario
Ospedale Niguarda
Regione Lombardia

Riccardo Giudici, MD

ICU

Time course of risk factors associated with mortality of 1260 critically ill patients with COVID-19 admitted to 24 Italian intensive care units



Ventilazione invasiva

COVID-19 pneumonia: pathophysiology and management

Luciano Gattinoni[1], Simone Gattarello[1], Irene Steinberg[1], Mattia Busana[1], Paola Palermo[1], Stefano Lazzari[1], Federica Romitti[1], Michael Quintel[1,2], Konrad Meissner[1], John J. Marini[3], Davide Chiumello[4] and Luigi Camporota[5]

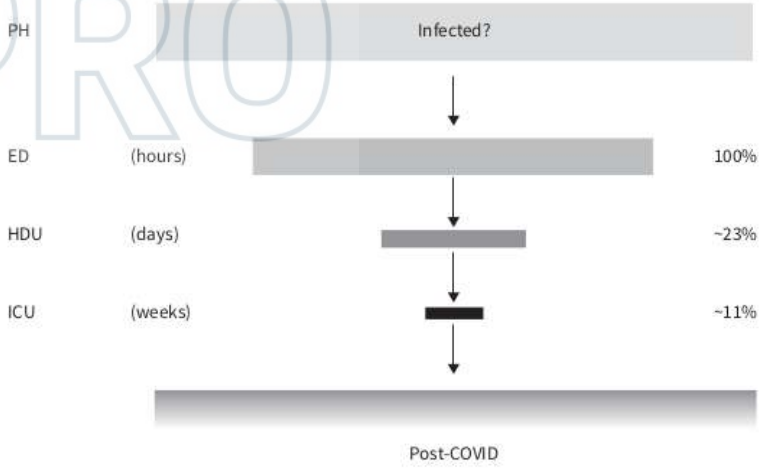
Discordance between respiratory mechanics and oxygenation

Initial manifestations:

- hypoxaemia
- vasocentric injury
- high gas lung volume

Is severe COVID-19 pneumonia a typical or atypical form of ARDS? And does it matter?

Ewan C. Goligher[1,2,3], V. Marco Ranieri[4] and Arthur S. Slutsky[1,5*]



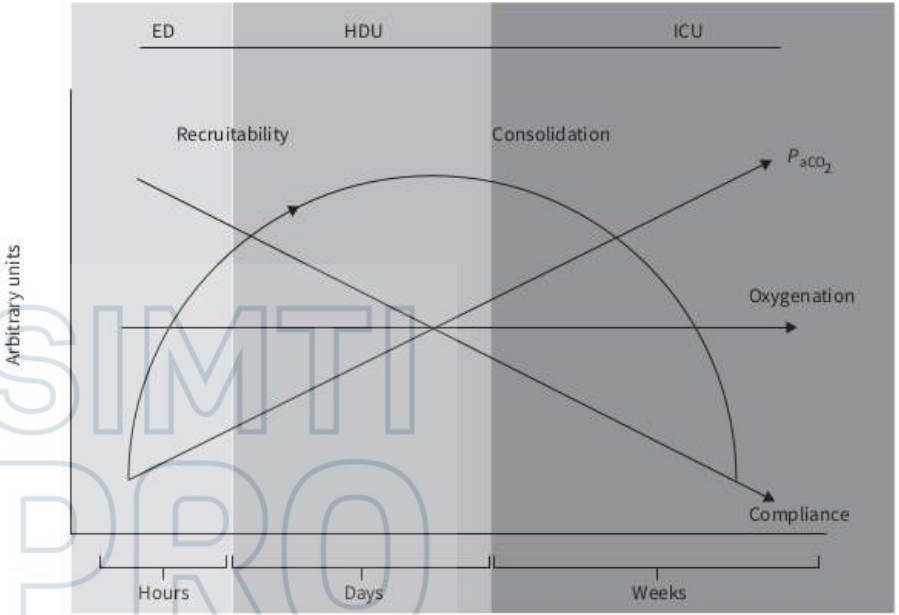
COVID-19 and ARDS: the baby lung size matters

Luciano Gattinoni[1*], Mattia Busana[1], Luigi Camporota[2], John J. Marini[3] and Davide Chiumello[4]

Ventilazione invasiva

Unresolving disease progression:

- Inflamed non-oedematous non-atelectatic lung
- Increased oedema and atelectasis phase
- Eventually fibrotic lung structure in the late phase



Ventilazione non invasiva

COVID-19 pandemic and non invasive respiratory management: Every Goliath needs a David. An evidence based evaluation of problems

J.C. Winck[a,*], N. Ambrosino[b]

Phenotype: normal compliance, “silent hypoxemia”

- P/F < 200
- Early presentation
- Prone position

Work of breathing

Protective lung ventilation: 6-8 ml/kg

La posizione prona

RESEARCH Open Access

Prone position in intubated, mechanically ventilated patients with COVID-19: a multi-centric study of more than 1000 patients

Improvement of the V/Q matching, favoured by a redistribution of flow from dorsal to ventral lung area.

CO_2 production somehow increased during prone position, requiring an increase in minute ventilation to maintain stable $PaCO_2$ values

Lung recruitment was not the major mechanism

La posizione prona

RESEARCH Open Access

Prone position in intubated, mechanically ventilated patients with COVID-19: a multi-centric study of more than 1000 patients

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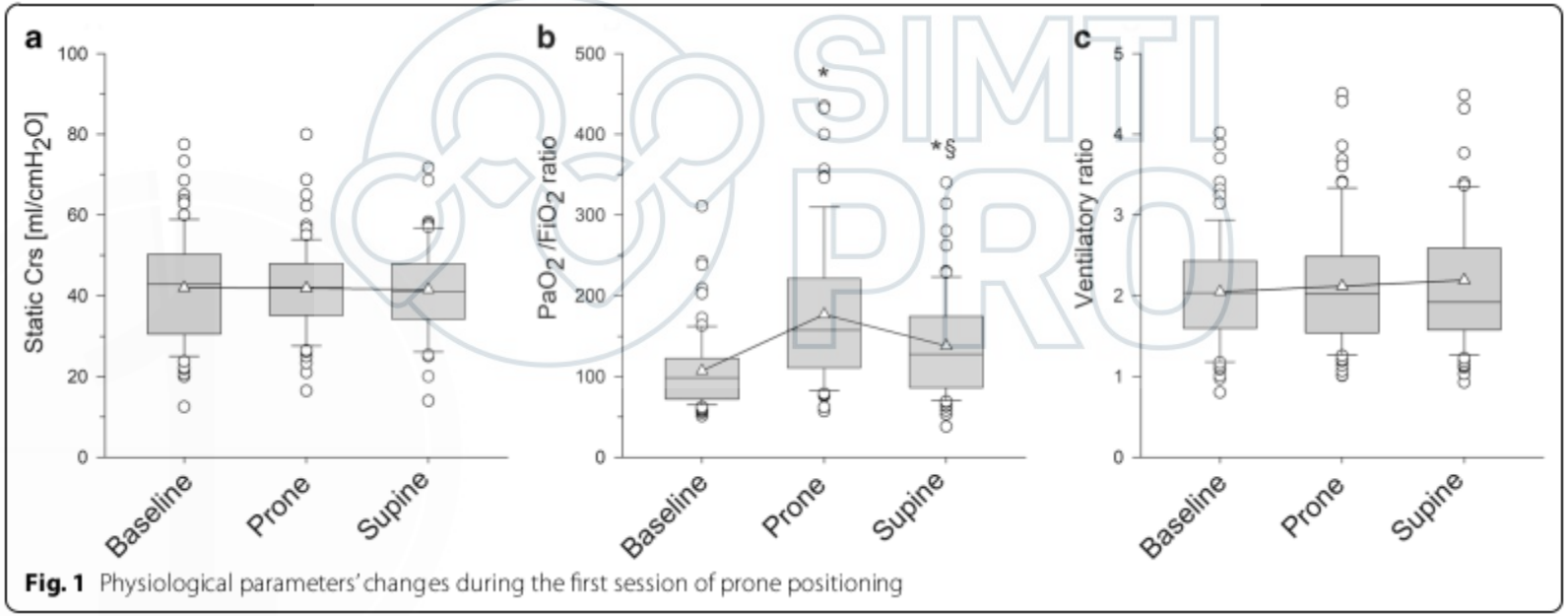

Fig. 1 Physiological parameters' changes during the first session of prone positioning

La posizione prona

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Prone position in intubated, mechanically ventilated patients with COVID-19: a multi-centric study of more than 1000 patients

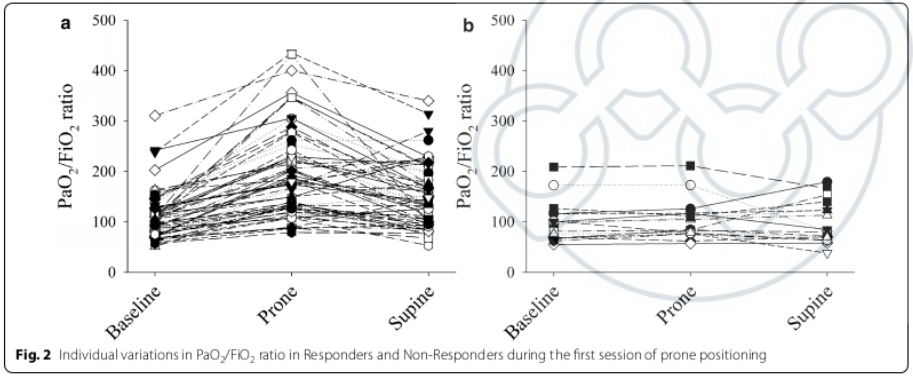
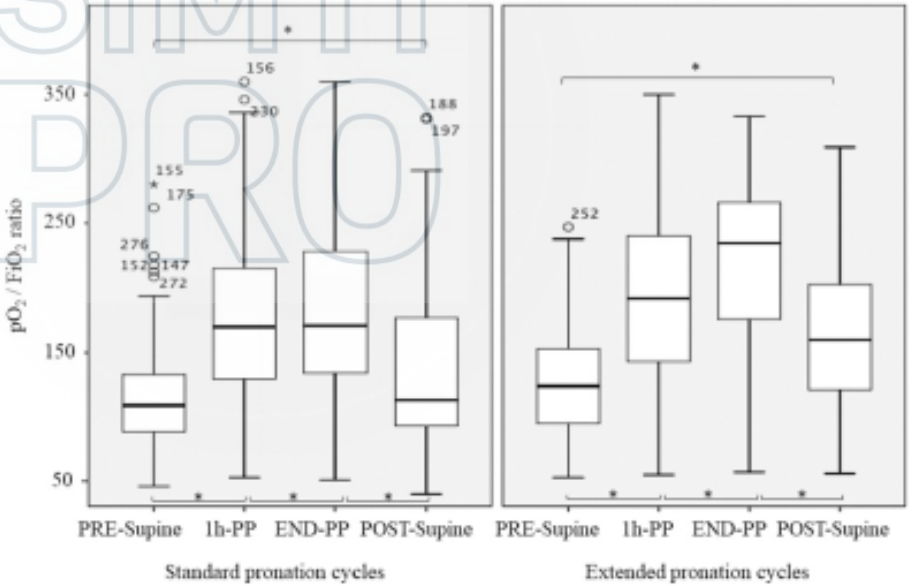


Fig. 2 Individual variations in PaO_2/FiO_2 ratio in Responders and Non-Responders during the first session of prone positioning

16-18 h Vs 24-36 h



La posizione prona

Research Article

Short and long-term complications due to standard and extended prone position cycles in CoViD-19 patients☆

Alberto Lucchini [a,*], Vincenzo Russotto [b], Nicola Barreca [a], Marta Villa [a], Giulia Casartelli [c], Yelenia Marcolin [c], Barbara Zyberi [c], Domenico Cavagnuolo [c], Giacomo Verzella [c], Roberto Rona [a], Roberto Fumagalli [d], Giuseppe Foti [a]

MRC Test results in patients undergoing three months follow-up visit.

Muscle	Side	MRC Scale					
		Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Shoulder adductors	Left	0 (0%)	0 (0%)	0 (0%)	1 (2%)	12 (21%)	45 (78%)
	Right	0 (0%)	0 (0%)	0 (0%)	2 (3%)	8 (14%)	48 (83%)
Elbow flexors	Left	0 (0%)	0 (0%)	0 (0%)	0 (0%)	8 (14%)	50 (86%)
	Right	0 (0%)	0 (0%)	0 (0%)	1 (2%)	6 (10%)	51 (88%)
Wrist extensor	Left	0 (0%)	0 (0%)	0 (0%)	0 (0%)	7 (12%)	51 (88%)
	Right	0 (0%)	0 (0%)	0 (0%)	1 (2%)	6 (10%)	51 (88%)
Hip flexors	Left	0 (0%)	0 (0%)	0 (0%)	0 (0%)	9 (16%)	49 (84%)
	Right	0 (0%)	0 (0%)	1 (2%)	0 (0%)	8 (14%)	49 (84%)
Knee extensors	Left	0 (0%)	0 (0%)	0 (0%)	0 (0%)	9 (16%)	49 (84%)
	Right	0 (0%)	0 (0%)	0 (0%)	0 (0%)	8 (14%)	50 (86%)
Foot dorsiflexors	Left	1 (2%)	0 (0%)	0 (0%)	1 (2%)	9 (16%)	47 (81%)
	Right	0 (0%)	2 (3%)	0 (0%)	1 (2%)	8 (14%)	47 (81%)

La posizione prona

Research Article

Short and long-term complications due to standard and extended prone position cycles in CoViD-19 patients☆

Alberto Lucchini [a,*], Vincenzo Russotto [b], Nicola Barreca [a], Marta Villa [a], Giulia Casartelli [c], Yelenia Marcolin [c], Barbara Zyberi [c], Domenico Cavagnuolo [c], Giacomo Verzella [c], Roberto Rona [a], Roberto Fumagalli [d], Giuseppe Foti [a]

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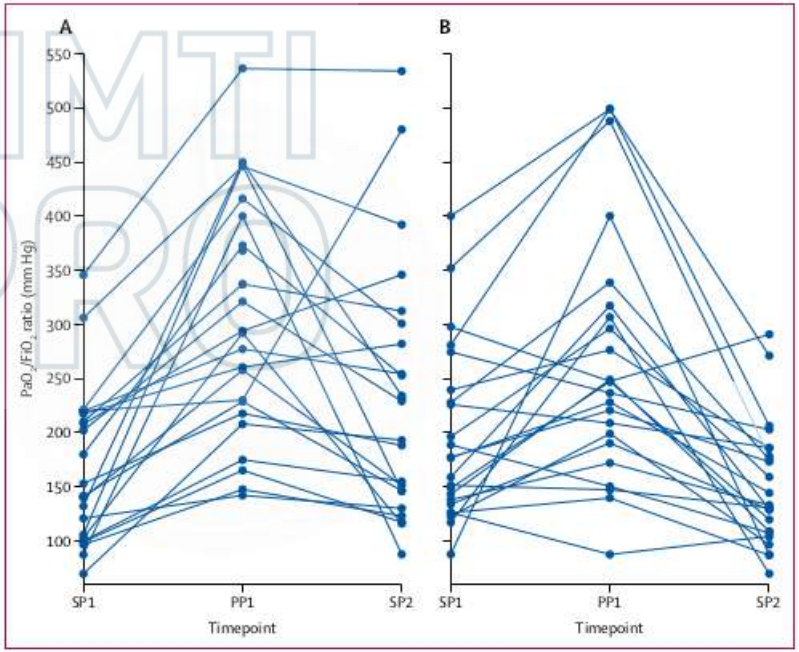
La posizione prona

Feasibility and physiological effects of prone positioning in non-intubated patients with acute respiratory failure due to COVID-19 (PRON-COVID): a prospective cohort study

Anna Coppo, Giacomo Bellani, Dario Winterton, Michela Di Pierro, Alessandro Soria, Paola Faverio, Matteo Cairo, Silvia Mori, Grazia Messinesi, Ernesto Contro, Paolo Bonfanti, Annalisa Benini, Maria Grazia Valsecchi, Laura Antolini, Giuseppe Foti

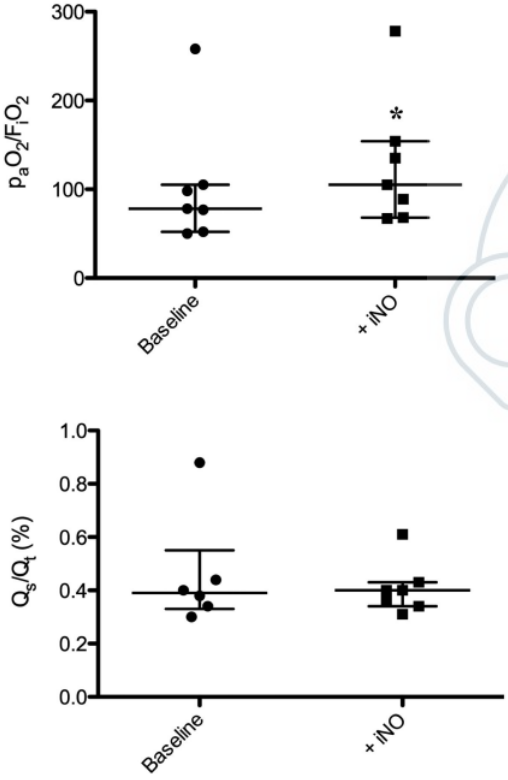


La posizione prona

Rodin's Thinker: An Alternative Position in Awake Patients with COVID-19

	Baseline Supine ($Supine_{PRE}$)	In Rodin's Position (Rodin)	After Resuming Supine Position ($Supine_{POST}$)	P
FI_{O_2}, %	60 (50.0–77.5)	60 (50.0–77.5)	60 (50.0–77.5)	
PEEP, cm H_2O	10 (8–10)	10 (8–10)	10 (8–10)	
Arterial blood gas				
pH	7.45 ± 0.03	7.45 ± 0.04	7.45 ± 0.04	
Pa_{O_2}, mm Hg	86.9 ± 26.3	185.2 ± 81.6	130.0 ± 63.4	
Pa_{CO_2}, mm Hg	35.1 ± 4.6	35.1 ± 4.6	36.0 ± 3.8	
Respiratory rate, breaths/min	24.7 ± 5.6	23.2 ± 4.0	22.5 ± 3.8	
Platelets, $10^3/\mu l$	266.0 (208.0–345.0)	—	—	
C-reactive protein, mg/L	8.1 ± 6.4	—	—	
D-dimer, ng/ml	411.0 (313.5–862.25)	—	—	

Ossido Nitrico



Effects of inhaled nitric oxide in COVID-19–induced ARDS – Is it worthwhile?

Christopher Lotz[1] | Ralf M. Muellenbach[2] | Patrick Meybohm[1] | Haitham Mutlak[3] | Philipp M. Lepper[4] | Caroline-Barbara Rolfes[2] | Asghar Peivandi[5] | Jan Stumpner[1] | Markus Kredel[1] | Peter Kranke[1] | Iuliu Torje[2] | Christian Reyher[2]

Improved oxygenation was not only explainable with decreased of pulmonary shunting

iNO action including:

- Regulation of angiotensin II receptors
- Inhibition of platelet aggregation
- Surfactant function
- Antiviral properties
- Alterations of the immune response

ECMO

COVID-19 IN INTENSIVE CARE

What's new in ECMO for COVID-19?

Graeme MacLaren[1*], Alain Combes[2,3] and Daniel Brodie[4,5]

Extracorporeal LifeSupport Organization (ELSO) registry (213 centres across 36 countries):

- 1035 COVID-19 patients supported with ECMO
- Estimated cumulative incidence of in-hospital mortality 90 days after ECMO initiation: 37%

COVID-19 and ECMO: the interplay between coagulation and inflammation—a narrative review

Mariusz Kowalewski[1,2,3*†], Dario Fina[2,4†], Artur Słomka[5], Giuseppe Maria Raffa[6], Gennaro Martucci[7], Valeria Lo Coco[2,6], Maria Elena De Piero[2,8], Marco Ranucci[4], Piotr Suwalski[1] and Roberto Lorusso[2,9]

ECMO therapy and COVID-19 itself are associated with certain, often synergistic changes in hematological and inflammatory status of the patients.

The efficacy of ECMO is largely dependent on centers' experience

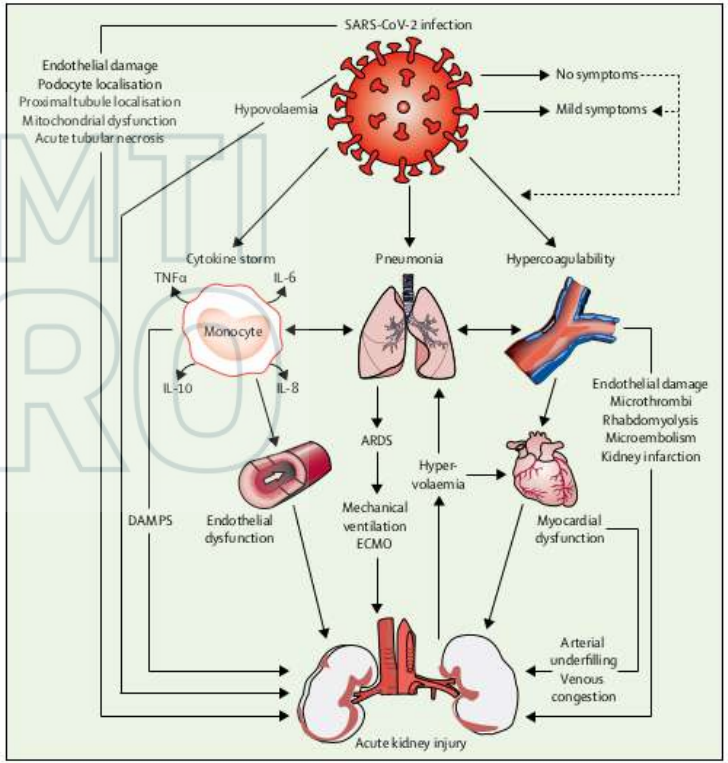
AKI in ICU

Management of acute kidney injury in patients with COVID-19

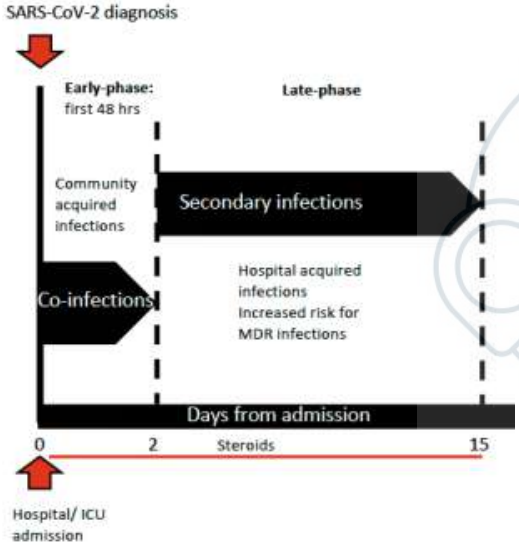
Claudio Ronco, Thiago Reis, Faeq Husain-Syed

Kidney involvement:

- >40% of cases have abnormal proteinuria at hospital admission
- Acute kidney injury is common affecting approximately 20–40% of patients admitted ICU



Infezioni da MDR



Review

Multi-Drug Resistance Bacterial Infections in Critically Ill Patients Admitted with COVID-19

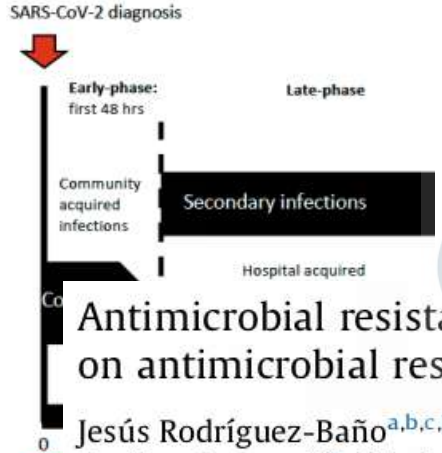
Daniela Pasero [1,2,*], Andrea Pasquale Cossu [2] and Pierpaolo Terragni [1,2]

Table 1. Summary of the main studies reported data on MDR secondary infections in COVID-19 critically ill patients.

Study	Type of Study	Country of the Study	Sample Size	Age Median (IQR)	Empiric Antibiotic Therapy at Admission N (%)	Steroid N (%)	Any MDR Bacterial Infection N (%)	CPE Infections N (%)	Acinetobacter Baumannii Infections N (%)	Pseudomonas Aeruginosas Infections N (%)	MRSA N(%)	Enterococcus Species N (%)	ICU-LOS, Days Median (IQR)	ICU */In-hospital Mortality N (%)
Karulli A. et al. [32]	Retrosp, single-center	Italy	32	68 (55–75)	25 (78.1)	17 (53.1)	16 (50)	5 (32)	3 (19)	3 (19)	1 (6)	2 (13)	10.5 (5.7–17)	23 (71.8) *
Patel A. et al. [33]	Retrosp, single-center	Maryland, USA	71	N.A.	69 (97)	25 (35)	71 (100)	33 (46)	27 (38)	27 (38)	N.A.	N.A.	11 (7–20)	27 (38) *
Baiou A. et al. [34]	Retrosp, single-center	Qatar	234	49 (40–60)	N.A	11 (4.7)	78 (33)	2 (2.5)	0	6 (7.7)	N.A.	N.A.	31 (20–48)	12 (15) *
Cultrera R. et al. [35]	Retrosp, single-center, case-control study	Italy	28	N.A.	N.A.	N.A.	9 (32)	4 (44)	17 (61)	3 (33)	5 (56)	24 (86)	N.A.	N.A.
Bogossian E. G. et al. [36]	Retrosp, single-center, case-control study	Belgium	72	61 (14)	56 (78)	7 (10)	24 (33)	3 (9)	0	4 (13)	0	3 (10)	11 (3–28)	22 (31) *
Nasir N. et al. [37]	Retrosp, single-center, case-control study	Pakistan	100	60 (52–70)	82 (82)	77 (77)	28 (56)	0	16 (32)	5 (10)	5 (10)	2 (4)	9 (6–14)	30 (30)
Giacobbe D.R. et al. [38]	Retrosp, single-center	Italy	78	66 (57–70)	75 (96)	24 (31)	N.A.	0	0	0	6 (13)	8 (18)	N.A.	20 (26) *
Bonazzetti C. et al. [39]	Retrosp, single-center	Italy	89	61 (53–69)	N.A.	N.A.	32 (36)	10 (8.5)	1 (0.8)	1 (0.8)	9 (7.6)	53 (45)	12 (8–18)	44 (49.4) *
Ripa M. et al. [40]	Retrosp, single-center	Italy	731	64 (55–76)	N.A.	483 (66.1)	21 (2.8)	2 (10)	9 (43)	5 (24)	1 (4.8)	4 (19)	N.A.	194 (26.5)
Grasselli G. et al. [8]	Retrosp, multicentric	Italy	774	62 (54–68)	534 (69)	207 (27)	272 (35)	72 (26)	19 (2.4)	34 (4.4)	83 (31)	29 (4)	14 (8–26)	234 (30) *
Giacobbe D.R. et al. [41]	Retrosp, multicentric	Italy	171	64 (57–71)	162 (95)	108 (63)	60 (35)	25 (15)	N.A.	27 (16)	8 (5)	N.A.	N.A.	78 (46) *
Li J. et al. [42]	Retrosp, single-center	Wuhan, China	102	66 (30–93)	99 (97.1)	NA	69(4.6)	32 (31)	50 (49)	7 (4.4)	3 (1.9)	6 (3.8)	N.A.	50 (49)

MDR, multi-drug resistant; CPE, Carbapenems Resistant Enterobacterales; MRSA, Methicillin Resistant Staphylococcus Aureus; ICU-LOS, Intensive Care Unit Length of Stay; * ICU mortality.

Infezioni da MDR



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										5 (10)	5 (10)	2 (4)	9 (6–14)	30 (30)
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et al. [41]	multicentric									27 (16)	8 (5)	N.A.	N.A.	78 (46) *
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Antimicrobial resistance research in a post-pandemic world: Insights on antimicrobial resistance research in the COVID-19 pandemic

Jesús Rodríguez-Baño[a,b,c,B], Gian Maria Rossolini[d,e], Constance Schultsz[f], Evelina Tacconelli[g], Srinivas Murthy[h], Norio Ohmagari[i], Alison Holmes[j], Till Bachmann[k], Herman Goossens[l], Rafael Canton[m,n], Adam P. Roberts[o], Birgitta Henriques-Normark[p,q], Cornelius J. Clancy[r], Benedikt Huttner[s], Patriq Fagerstedt[t], Shawon Lahiri[t], Charu Kaushic[u,v], Steven J. Hoffman[w], Margo Warren[x], Ghada Zoubiane[y], Sabiha Essack[y,z], Ramanan Laxminarayan[A], Laura Plant[u,*]