

Supplementary materials

Initial tumor necrosis factor-alpha and endothelial activation are associated with hemorrhagic complications during extracorporeal membrane oxygenation

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Table S1. ELISA Kit

Markers	ELISA kit
Human IL-1β	MyBioSource. San Diego, CA, USA, Cat. No: MBS2884829
Human TNF-α	MyBioSource. San Diego, CA, USA, Cat. No: MBS2502004
Human β-TG	MyBioSource. San Diego, CA, USA, Cat. No: MBS 762705
human PF4	MyBioSource. San Diego, CA, USA, Cat. No: MBS 3803480
human APC	MyBioSource. San Diego, CA, USA, Cat. No: MBS283174
human thrombin-TM complex	MyBioSource. San Diego, CA, USA, Cat. No: MBS047233

IL-1 β , interleukin-1 β ; TNF- α , tumor necrosis factor- α ; β -TG, β -thromboglobulin; PF4, platelet factor 4; APC, activated protein C; TM, thrombomodulin.

Supplement 2. ECMO-related protocols

ECMO protocols were implemented in accordance with the Extracorporeal Life Support Organization's guidelines (1). Bedside care for patients undergoing ECMO was delivered by a multidisciplinary intensive care team (2). All catheters were managed with a standardized protocol and inserted peripherally by an experienced cardiothoracic surgeon, using the Seldinger approach under ultrasound guidance.

References

1. Extracorporeal life support organization (ELSO) general guidelines for all ECLS cases. version 1.4. Available at: <http://www.elso.org/resources/guidelines.aspx>. 2017; Accessed April 22, 2022.
2. Yeo HJ, Cho WH, Kim D. Learning curve for multidisciplinary team setup in veno-venous extracorporeal membrane oxygenation for acute respiratory failure. *Perfusion*. 2019;34(1_suppl):30-8.

Table S2. Clinical outcomes according to the hemorrhagic complications

Variables	Total (n=132)	H group (n=23)	N group (n=109)	P-value
Bridge to recovery	52 (39.4%)	6 (26.1%)	46 (42.2%)	0.151
Bridge to transplantation	66 (50.0%)	14 (60.9%)	52 (47.7%)	0.251
ICU mortality	33 (25.0%)	7 (30.4%)	26 (23.9%)	0.508
Hospital mortality	43 (32.6%)	10 (43.5%)	33 (30.3%)	0.220
Transfusion				
RBC	3 (1-13.8)	7 (2-18)	2 (1-11.5)	<0.001
FFP	1 (0-7.8)	3 (1-10)	1 (0-6.5)	<0.001
PLT	1.25 (0-6)	4 (1-7)	1 (0-6)	<0.001
Major thrombotic complication^a	25 (18.9%)	6 (26.1%)	19 (17.4%)	0.381 [†]
DIC	23 (17.4%)	4 (17.4%)	19 (17.4%)	1.000

Data are presented as N (%) or median (interquartile range).

[†]Fisher's exact test was conducted.

ICU, intensive care unit; RBC, red blood cell; FFP, fresh frozen plasma; PLT, platelet; DIC, disseminated intravascular coagulation.

^aMajor thrombotic complications were defined as thrombotic complications in major organs, including cerebral infarction, spinal infarction, pulmonary thromboembolism, deep vein thrombosis, splenic infarction, and arterial thrombosis.

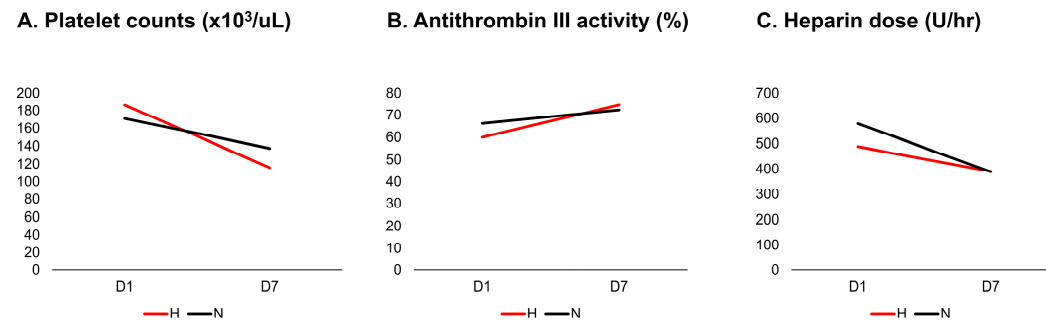


Figure S1. Heparin dose, antithrombin III activity, and platelet count between the two groups

There were no differences in heparin dose, antithrombin III activity, and platelet count between the two groups on D1 and D7 (Figure S2).

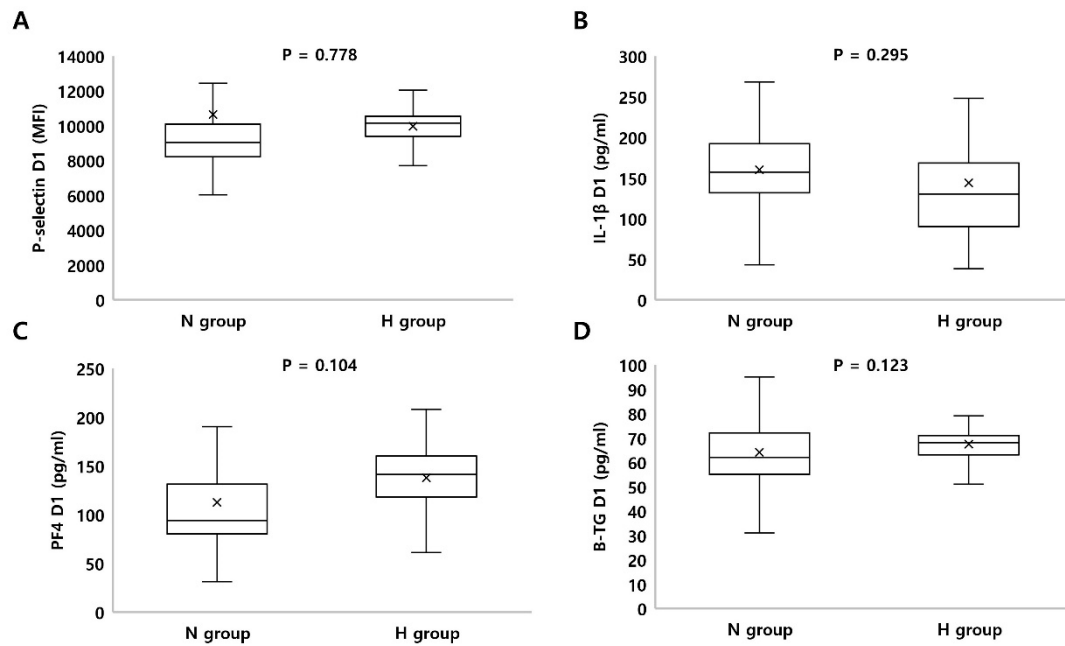
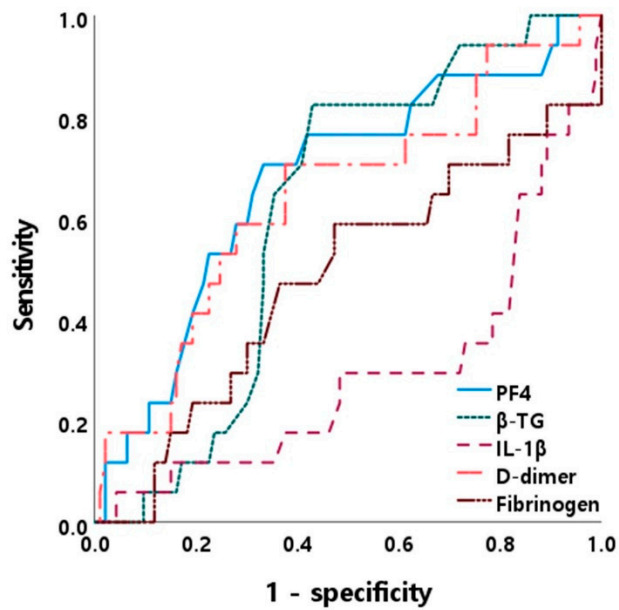


Figure S2. Comparison of inflammation markers, endothelial markers and platelet activation markers at D1 on ECMO. There were no significant differences of P-selectin, IL-1 β , PF4 and β -TG between two groups.

IL-1 β , interleukin-1 β ; PF4, platelet factor 4; β -TG, β -thromboglobulin.



	AUC	P
PF4	0.607	0.023
β-TG	0.615	0.133
IL-1β	0.293	0.007
D-dimer	0.643	0.062
Fibrinogen	0.794	0.480

Figure S3. ROC curve analysis of inflammatory markers and platelet activation markers predicting hemorrhagic complications during ECMO. PF4 and D-dimer showed significantly poor discriminated hemorrhagic complications.

PF4, platelet factor 4; β-TG, β-thromboglobulin; IL-1β, interleukin-1β.