

Consent

Dear participant,

You are invited to participate in a study on intracranial hemorrhage in patients treated with extracorporeal life support by completing an online survey. The researchers are based at University Health Network (UHN) in Toronto, Canada.

There are wide variations in the reported incidence and prognosis of intracranial hemorrhage in the literature. This may in part be explained by significant variations between centers in terms of patient management in the absence of robust data or guidelines. The aim of this study is to describe the current practices surrounding the prevention, diagnosis, and management of intracranial hemorrhage in patients on extracorporeal membrane oxygenation across the world. We aim to obtain 200 answers.

Your answers will enhance our understanding of the topic, but you will not gain any direct benefit from your participation. Participation in this survey is completely voluntary. If you decide not to participate, there will not be any negative consequences. If you decide to participate, you may decide not to answer any specific question by skipping it. You may stop participating at any time by simply closing your browser. Your answers/ information will be collected and used only after clicking "done" at the end of the survey. Please note that once you submit the survey, it will not be possible to withdraw your data, as the survey is anonymous. Consent to participate in the study is implied upon completion and submission of the survey.

The survey is anonymous and as such will not be collecting information that will easily identify you, like your name or other unique identifiers. Although your Internet Protocol (IP) address can be tracked through the survey platform, the researchers will not be collecting this information. Additionally, there is no contract specific to the University Health Network that controls the disposition of the information. The unique web link that was provided in your invitation allows the researcher to track who responded but your answers will not be linked to your name, email or IP address.

To further protect your information, data stored on Survey Monkey (USA) servers is password-protected. Only the researchers named in this study will have access to the data as collected. Any future publications will include collective information. Your individual responses will not be shared with anyone outside of the research team.

Study data will be kept by the researchers at UHN for up to 5 years after the study is completed.

If you have any questions about the study or would like a copy of this consent letter, please contact Dr. Y.A. Cavayas, Research fellow at Interdepartmental Division of Critical Care Medicine, UHN - Toronto General Hospital: alex.cavayas@uhn.ca*

*Please note that communication via e-mail is not absolutely secure. Thus, please do not communicate personal sensitive information via e-mail.

The study has been reviewed by the UHN Research Ethics Board (contact number 416-581-7849).

Please print this page or write down the contact information in case you want to access this information once you complete the survey.

By submitting this form, you are indicating that you have read the description of the study and that you agree to the terms as described.

Thank you.

Best regards,

Yiorgos Alexandros Cavayas, MD

Lorenzo del Sorbo, MD

Eddy Fan, MD PhD

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M5G 2C4, Canada

Intracranial hemorrhage on ECMO

Your center

2. In what country is your ECMO center

3. What is your background?

☐

Medicine: Anesthesia

☐

Medicine: Emergency medicine

☐

Medicine: Medical subspecialty

☐

Perfusionnist

☐

Medicine: Surgery

☐

Nurse

4. For how long has your center had an ECMO program?

☐

<3 years

☐

3-6 years

☐

7-9 years

☐

>10 years

5. How many adult ECMO cases did you perform in the last 12 months in your center?

Approximate number of cases

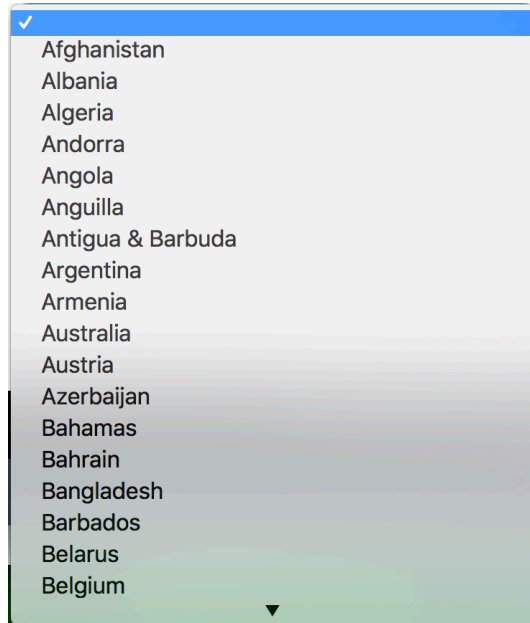
VV-ECMO

VA-ECMO for
cardiogenic shock

ECPR

TOTAL (all
configurations
combined)

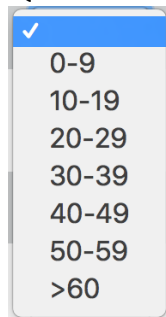
Question 2



A dropdown menu for Question 2. The menu is open, showing a list of countries. The first item, 'Afghanistan', is highlighted with a blue background and a checkmark icon. The list includes: Afghanistan, Albania, Algeria, Andorra, Angola, Anguilla, Antigua & Barbuda, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, and Belgium. A small downward arrow is visible at the bottom of the list.

- ✓ Afghanistan
- Albania
- Algeria
- Andorra
- Angola
- Anguilla
- Antigua & Barbuda
- Argentina
- Armenia
- Australia
- Austria
- Azerbaijan
- Bahamas
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium

Question 5



A dropdown menu for Question 5. The menu is open, showing a list of age ranges. The first item, '0-9', is highlighted with a blue background and a checkmark icon. The list includes: 0-9, 10-19, 20-29, 30-39, 40-49, 50-59, and >60.

- ✓ 0-9
- 10-19
- 20-29
- 30-39
- 40-49
- 50-59
- >60

Intracranial hemorrhage on ECMO

Perceptions

6. In trials that have compared anticoagulation alone to anticoagulation with fibrinolysis for acute pulmonary embolism, the risk of any intracranial bleeding in the anticoagulation alone group was 0.2%. (Chatterjee et al, JAMA 2014). How would you compare the risk of intracranial bleeding in patients on ECMO?

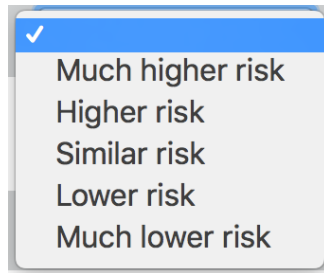
level of risk

VV-ECMO

VA-ECMO for
cardiogenic shock

ECPR

Question 6



A dropdown menu with a blue header bar containing a white checkmark. The menu is open, showing five options: 'Much higher risk', 'Higher risk', 'Similar risk', 'Lower risk', and 'Much lower risk'.

- ✓ Much higher risk
- Higher risk
- Similar risk
- Lower risk
- Much lower risk

Intracranial hemorrhage on ECMO

Brain imaging

7. In what proportion of patients do you obtain imaging of the brain (CT/CTA/MRI) ?

	Before ECMO initiation or in the first 24 hours of ECMO	At any point during their ICU stay
VV-ECMO	<input type="text"/>	<input type="text"/>
VA-ECMO for cardiogenic shock	<input type="text"/>	<input type="text"/>
ECPR	<input type="text"/>	<input type="text"/>

8. How would quantify the risk of major complications (such as cannula dislodgement, circuit rupture, etc.) associated with transporting an ECMO patient to the radiology department.

- ☐ <1%
- ☐ 2-4%
- ☐ 5-9%
- ☐ = or > 10%

Question 7



Never (0%)

1-25%

26-50%

51-75%

76-100%

Intracranial hemorrhage on ECMO

Anticoagulation management

9. For a 70 kg male without any bleeding risk factor, what bolus of heparin do you give during cannulation?

- | | |
|--|--|
| <input type="radio"/> No anticoagulant bolus | <input type="radio"/> 4000-6000 units |
| <input type="radio"/> <2000 units | <input type="radio"/> >6000 units |
| <input type="radio"/> 2000-3999 units | <input type="radio"/> Other anticoagulant used |

10. For a 70 kg male without any bleeding risk factor, at what rate would you start your heparin infusion?

- | | |
|---|--|
| <input type="radio"/> no anticoagulant infusion | <input type="radio"/> 1500-1999 units/h |
| <input type="radio"/> <500 units/h | <input type="radio"/> >2000 units/h |
| <input type="radio"/> 500-999 units/h | <input type="radio"/> Other anticoagulant used |
| <input type="radio"/> 1000-1499 units/h | |

11. What anticoagulation strategy do you adopt when there is no bleeding?

- | | |
|---|--|
| <input type="radio"/> Fixed infusion rate (i.e., no titration of anticoagulation) | <input type="radio"/> Anti-Xa target |
| <input type="radio"/> ACT target | <input type="radio"/> Heparin blood concentration target |
| <input type="radio"/> aPTT target | |
| <input type="radio"/> Other (please specify) | |

12. If there is a confirmed or highly suspected intracranial bleeding, and the clotting parameters are within usual target: What do you do with anticoagulation?

- ☐ Continue anticoagulation unchanged
- ☐ Reduce anticoagulant infusion and reduce target
- ☐ Stop anticoagulant
- ☐ Stop anticoagulant and reverse effect (ex:protamine)

13. If there is a confirmed or highly suspected intracranial bleeding, and the clotting parameters are within usual target: Do you give antifibrinolytics?

- ☐ No
- ☐ Yes
- ☐ Only if TEG/ROTEM suggestive of hyperfibrinolysis

Intracranial hemorrhage on ECMO

Transfusion thresholds

14. What is your transfusion threshold for packed Red Blood Cells?

	No active bleeding	Intracranial bleeding
Hemoglobin	<input type="text"/>	<input type="text"/>

15. What is your transfusion threshold for Platelet concentrates?

	No active bleeding	Intracranial bleeding
Platelets	<input type="text"/>	<input type="text"/>

16. What is your transfusion threshold for Fresh Frozen Plasma?

	No active bleeding	Intracranial bleeding
INR	<input type="text"/>	<input type="text"/>

17. What is your transfusion threshold for Cryoprecipitates?

	No active bleeding	Intracranial bleeding
Fibrinogen	<input type="text"/>	<input type="text"/>

18. Do you use TEG or ROTEM to guide the administration of the following blood products?

	yes or no?
Platelets	<input type="text"/>
Fresh Frozen Plasma	<input type="text"/>
Cryoprecipitates	<input type="text"/>

Question 14

✓

- < 70 g/L
- 70-79 g/L
- 80-89 g/L
- 90-99 g/L
- 100-119 g/L
- = or >120 g/L

Question 15

✓

- 0-19
- 20-39
- 40-69
- 70-99
- = or > 100

Question 16

✓

- 1.0-1.4
- 1.5-1.9
- >2.0
- I give FFP, but not based on INR
- I never give FFP in this situation

Question 17

✓

- = or < 1.0 g/L
- 1.1-1.5 g/L
- 1.6-2.0 g/L
- >2.0 g/L
- I never give Cryo in this situation
- I give Cryo, but not based on fibrinogen levels

Question 18

✓

- yes
- no

Intracranial hemorrhage on ECMO

Gas exchange

19. In patients on VV-ECMO, over what time period do you aim to correct the following parameters?

	PaCO2	pH	PaO2 and/or SpO2
Time	<input type="text"/>	<input type="text"/>	<input type="text"/>

20. What PaO2 do you target? (part 1)

	Low limit	High limit
in patients on VV-ECMO?	<input type="text"/>	<input type="text"/>

21. What SpO2 do you target?

	Low limit	High limit
in patients on VV-ECMO?	<input type="text"/>	<input type="text"/>

22. What PaO2 do you target? (part 2)

	Low limit	High limit
in patients on VA-ECMO for cardiogenic shock?	<input type="text"/>	<input type="text"/>
in patients on ECPR?	<input type="text"/>	<input type="text"/>

Question 19

PaCO₂

✓

<1h
1-4 h
5-8 h
9-12 h
13-24 h
>24 h
I only target pH

pH

✓

<1h
1-4 h
5-8 h
9-12 h
13-24 h
>24 h
I only target PaCO₂

SpO₂ and/or PaO₂

✓

<1h
1-4 h
5-8 h
9-12 h
13-24 h
>24 h

Question 20

Low limit

✓

<40 mmHg (<5.3 kPa)
40-50 mmHg (5.3-6.6 kPa)
50-59 mmHg (6.7-7.9 kPa)
60-79 mmHg (8.0-10.7 kPa)
= or > 80 mmHg (= or > 10.8 kPa)
I only target pulse oxymetry

High Limit

✓

<80 mmHg (<10.7 kPa)
80-99 mmHg (10.7-13.2 kPa)
100-149 mmHg (13.3-19.9 kPa)
150-299 mmHg (20.0-39.9 kPa)
= or > 300 mmHg (= or > 40.0 kPa)
I only target pulse oxymetry

Question 21

Low limit

✓

<80%
80-84%
85-89%
90-94%
= or > 95%
I only target PaO₂

High limit

✓

<90%
90-93%
94-96%
97%
I only target PaO₂

Question 22

Low limit

✓

<40 mmHg (<5.3 kPa)
40-50 mmHg (5.3-6.6 kPa)
50-59 mmHg (6.7-7.9 kPa)
60-79 mmHg (8.0-10.7 kPa)
= or > 80 mmHg (= or > 10.8 kPa)
I only target SVO₂ and/or lactates

High limit

✓

<80 mmHg (<10.7 kPa)
80-99 mmHg (10.7-13.2 kPa)
100-149 mmHg (13.3-19.9 kPa)
150-299 mmHg (20.0-39.9 kPa)
= or > 300 mmHg (= or > 40.0 kPa)
I only target SVO₂ and/or lactates

Intracranial hemorrhage on ECMO

Outcomes

23. What is the rate of ICH in your center? (please do not guess if you don't know)

- | | |
|-------------------------------|------------------------------|
| <input type="radio"/> Unknown | <input type="radio"/> 10-14% |
| <input type="radio"/> 0-4% | <input type="radio"/> 15% |
| <input type="radio"/> 5-9% | |

24. In your experience, what is the rate of survivors independently living among patients with ICH?

- | | |
|-------------------------------|-------------------------------|
| <input type="radio"/> Unknown | <input type="radio"/> 40-59% |
| <input type="radio"/> 0-19% | <input type="radio"/> 60-79% |
| <input type="radio"/> 20-39% | <input type="radio"/> 80-100% |

25. In your opinion, what is the probability of surviving and independently living, in a patient on ECMO who does not wake up after stopping sedation, with normal brainstem function and a CT-scan showing multiple bihemispheric 1 cm intraparenchymal hematomas?

- | | |
|------------------------------|-------------------------------|
| <input type="radio"/> 0-19% | <input type="radio"/> 60-79% |
| <input type="radio"/> 20-39% | <input type="radio"/> 80-100% |
| <input type="radio"/> 40-59% | |

26. In your opinion, what is the probability of surviving and independently living, in a patient on ECMO who does not wake up after stopping sedation, with normal brainstem function and a CT-Scan showing a single large 5 cm parietal intraparenchymal ICH with edema, mass effect and a midline shift?

- | | |
|------------------------------|-------------------------------|
| <input type="radio"/> 0-19% | <input type="radio"/> 60-79% |
| <input type="radio"/> 20-39% | <input type="radio"/> 80-100% |
| <input type="radio"/> 40-59% | |

SUBMIT SURVEY

By clicking the "done" button below, you agree to the use of your information collected in this survey for research purposes



DONE