

International Survey on Anticoagulation Practices in Cardiopulmonary Bypass and ECMO

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Abstract

Background: Anticoagulation practices during cardiopulmonary bypass and extracorporeal membrane oxygenation are critical for the success of these procedures, yet there exists significant variation in these practices across different regions and among healthcare professionals and institutes.

Methods: An international survey was conducted targeting perfusionists and other healthcare professionals involved in both cardiopulmonary bypass and extracorporeal membrane oxygenation procedures. The survey collected data on professional roles, geographic practice locations, heparin usage in prime solutions, initial and maintenance dosing, anticoagulation monitoring methods, and alternative anticoagulants for patients with Heparin-Induced Thrombocytopenia.

Results: Responses were received from professionals in over 20 countries, predominantly perfusionists. Most respondents use heparin in the prime solution for cardiopulmonary bypass, with typical initial doses ranging from 3,000 to 10,000 units. Heparin administration before initiating CPB typically varies between 300 to 400 Units/Kg whereas for extracorporeal membrane oxygenation, doses are generally lower. Monitoring of anticoagulation primarily employs activated clotting time, with a notable number also using Thromboelastography. For heparin induced thrombocytopenia cases, Bivalirudin and Argatroban were the most cited alternatives.

Conclusion: The survey highlights a diversity of anticoagulation practices in cardiopulmonary bypass and extracorporeal membrane oxygenation across different regions, reflecting variations

in clinical protocols, regional standards, and available resources. This diversity highlights the need for ongoing international dialogue and standardization efforts to optimize outcomes in patients who require these critical procedures.

Introduction

Anticoagulation management during cardiopulmonary bypass (CPB) and extracorporeal membrane oxygenation (ECMO) represents a critical facet of cardiovascular surgeries and intensive care that directly impacts patient outcomes. The risk of thrombosis must be meticulously balanced against the dangers of bleeding, a challenge compounded by the complexity of patient profiles and the invasive nature of these procedures. Thrombotic complications can lead to circuit or filter thrombosis, embolic events, and compromised organ function, while excessive anticoagulation may precipitate severe bleeding episodes, necessitating careful management of anticoagulant agents. (1)

Global practices in anticoagulation management vary widely due to differences in regional clinical guidelines, availability of anticoagulation monitoring technologies, accessibility to different anticoagulant drugs, and individual clinician preferences and experiences. These disparities are influenced by both resource limitations and varying interpretations of the clinical evidence available, leading to diverse treatment protocols. (2,3)

Although several professional societies have published recommendations on anticoagulation management, these guidelines often allow broad ranges for heparin dosing and anticoagulation

targets, and many institutional or regional protocols are not publicly available. (4) Consequently, there is no universally accepted standard for initial or maintenance heparin dosing, target activated clotting time (ACT) levels, or anticoagulation monitoring methods, contributing to significant heterogeneity in clinical practice. This lack of standardization has resulted in an amalgam of anticoagulation strategies aimed at balancing thrombotic and bleeding risks, highlighting an important practice gap between guideline recommendations and real-world implementation. This variation is driven by factors such as local expertise, perceived patient demographics, and differing prioritizations of outcomes (e.g., minimising thrombotic vs. bleeding risks). Additionally, technological advancements and the introduction of new anticoagulant agents continually evolve the landscape of anticoagulation management, necessitating ongoing education and adaptation by clinical teams. (5)

This international survey was designed to capture a snapshot of current anticoagulation practices among healthcare professionals involved in CPB and ECMO, aiming to identify common patterns, variations, and innovative practices across different regions. By understanding these global practices, we can highlight areas of consensus, identify gaps in knowledge or application, and suggest pathways for future research and guideline development to enhance patient care universally.

Methods

Survey Design and Distribution

A comprehensive, structured questionnaire was developed to assess the anticoagulation practices among healthcare professionals specifically involved in CPB and ECMO. The survey was

designed to capture detailed information regarding anticoagulation strategies, including **heparin dosing, anticoagulation monitoring, management of heparin resistance, and approaches to complications such as heparin-induced thrombocytopenia (HIT)**. (6)

The survey consisted of 15 multiple-choice questions, check-all-that-apply questions, and a few open-ended questions to allow respondents to provide additional details or clarifications about their practices.

Questions were formulated to cover:

1. Demographic information, including professional role and country of practice.
2. Specific practices for anticoagulation in CPB, including whether heparin is used in the prime solution, the doses of heparin added, and the initial dosing strategy.
3. Details regarding ECMO anticoagulation practices, including the use of heparin in the ECMO prime and initial dosing.
4. Techniques used for monitoring anticoagulation during these procedures.
5. Alternatives to heparin used in cases of HIT.

Distribution Method

The survey was distributed electronically over a three-month (April 15-June 15) period using Google Forms (Google LLC, Mountain View, CA, USA). Dissemination occurred through international professional networks, including SWAAC (South West Asia and Africa chapter of the Extracorporeal Life Support) ELSO, professional perfusion and cardiovascular surgery groups on

social media platforms (LinkedIn), and email distribution lists of cardiovascular professional societies. Reminder messages were sent bi-weekly to enhance response rates.

Data Collection

Responses were collected anonymously to encourage honest and unbiased responses. The electronic survey platform automatically compiled the data into a database, ensuring accuracy in capturing respondent entries. The data were then exported for analysis.

Statistical Analysis

Descriptive statistics were used to analyse the data, with results presented as percentages for categorical variables. The data were further segmented based on geographical region and professional role to identify patterns and variations in practice. Where applicable, comments and open-text responses were qualitatively analysed to extract themes and additional insights that were not captured in the structured responses.

Given that approximately one-third of respondents originated from a single country, a descriptive subgroup analysis was additionally performed to evaluate the potential influence of this overrepresentation on overall findings. Key anticoagulation variables, including initial CPB heparin dosing, ACT targets during CPB, ECMO priming practices, anticoagulation monitoring modalities, and alternative anticoagulant use in HIT, were compared descriptively between respondents from this country and those from all other countries combined. Formal hypothesis testing was not undertaken due to the exploratory nature of the analysis and unequal subgroup sizes.

Ethical Considerations:

This survey was conducted in accordance with ethical guidelines, and participants provided informed consent via an online consent form prior to participation. IRB approval was not required for this study as it involved anonymous survey responses. (7)

Results

In this study, we present the data using descriptive statistics, as we believe this approach best captures the variability in anticoagulation practices without over-interpretation. Given the diverse sample sizes across different regions and professional roles, we decided not to perform formal hypothesis testing due to concerns about the validity of such tests with smaller sample sizes. As such, the data are presented in a descriptive manner to offer a comprehensive overview of the differences observed. Please note that the number of responses varies across different questions due to skip logic or optional questions in the survey design. Not all respondents answered every question, and in some cases, they were directed to skip certain sections based on their prior responses. As a result, the total number of responses reported for each question differs. The denominators for each specific question are provided to clarify the total number of responses for each item.

Overview of Survey Participation

A total of 451 respondents completed the survey, representing healthcare professionals involved in CPB and ECMO practice across more than 20 countries worldwide. Many respondents were perfusionists (88%, 396/451), with additional participation from anaesthesiologists, cardiac surgeons, intensivists, ECMO specialists, and allied professionals. Geographic representation

included Europe, the Middle East, South and East Asia, North and South America, Africa, and Oceania, reflecting a broad international distribution of contemporary anticoagulation practices. As the survey was anonymized and institution names were not collected, the exact number of participating centres could not be determined.

Table 1. Overview of Survey Participation

Characteristic	Summary
Total respondents	451
Survey period	April 15 – June 15
Countries represented	>20 countries
Geographic regions	Europe, Middle East, South & East Asia, North America, South America, Africa, Oceania
Primary professional role	Perfusionists: 88% (396/451)
Other professional roles	Anaesthesiologists, cardiac surgeons, intensivists, ECMO specialists, nurses, trainees
Participating centres	Not quantifiable (institutional identifiers not collected)
Survey design	Anonymous, international, web-based questionnaire
Data presentation	Descriptive statistics with question-specific denominators

Demographics and Professional Roles

- **Total Responses:** 451
- **Primary Respondents:** The survey predominantly received responses from **perfusionists** (88%, 396/451). The remaining respondents included cardiac surgeons (1.1%, 5/451), anaesthesiologists (5%, 23/451), and other healthcare professionals involved in CPB and ECMO procedures (5.9%, 27/451).

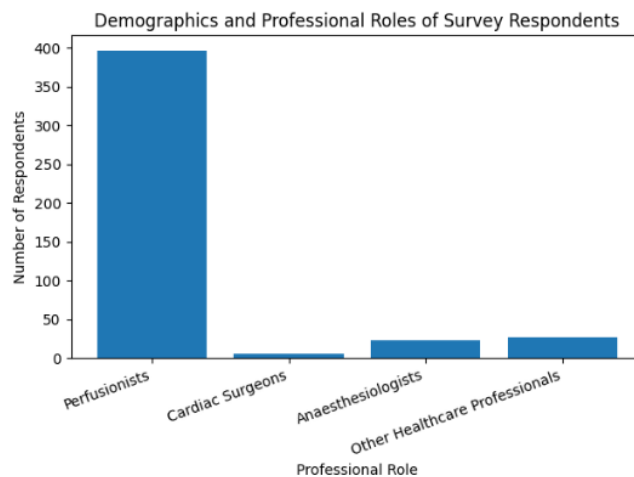


Figure 1: Demographics and Professional Roles of Survey Respondents

Distribution of survey respondents by profession, with perfusionists making up 88% of the participants, followed by cardiac surgeons, anaesthesiologists, and other healthcare professionals involved in CPB and ECMO procedures.

Geographical Distribution:

The respondents represented a diverse international community, spanning over 20 countries. The highest number of responses came from Pakistan, United Kingdom, United States, United Arab Emirates, Saudi Arabia, and India, reflecting a broad cross-section of anticoagulation practices across different healthcare systems.

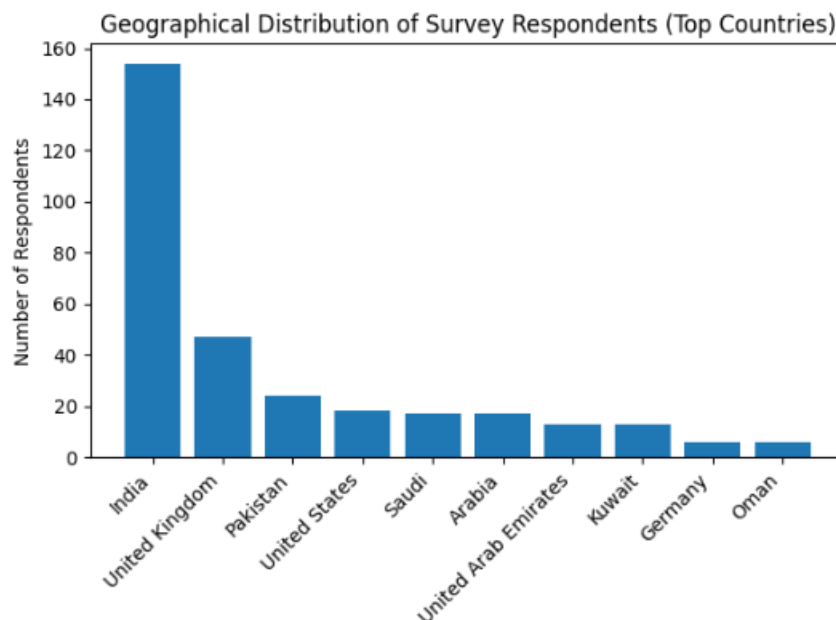


Figure 2: Geographical Distribution of survey respondents

Representation of survey responses from over 20 countries, with the highest number of responses coming from Pakistan, the United Kingdom, the United States, the UAE, Saudi Arabia, and India, reflecting diverse anticoagulation practices.

Subgroup Analysis

Total respondents who reported country of practice: 440/451 (97.6%) , 154 (35%) were from India, prompting a descriptive subgroup analysis to assess potential influence on overall findings. Comparison between Indian respondents and those from other countries demonstrated consistent directional trends across key variables. The most common initial

CPB heparin dose (300 U/kg) and preferred ACT target (≥ 480 seconds) were similar in both groups, and Bivalirudin remained the predominant alternative anticoagulant for HIT internationally and within India. Indian respondents more frequently reported adding heparin to the ECMO prime and showed a stronger preference for ACT-based ECMO monitoring, whereas international respondents demonstrated comparatively greater use of Anti-Xa monitoring. Despite these proportional differences, no reversal of overall trends was observed, and variability within the Indian subgroup was comparable to that seen globally, indicating that the subgroup did not materially skew the study's primary conclusions of international practice heterogeneity.

Anticoagulation Practices in CPB

Heparin in Prime Solution: Majority respondents (96%, 422/440) reported adding heparin to the prime solution used for CPB.

Typical Dose: The most common dose reported was 5000 Units or 10000 units, although doses ranged from nil to 10000 Units depending on regional protocols and specific patient factors.

Do you add heparin in the prime solution for cardiopulmonary bypass?

440 responses

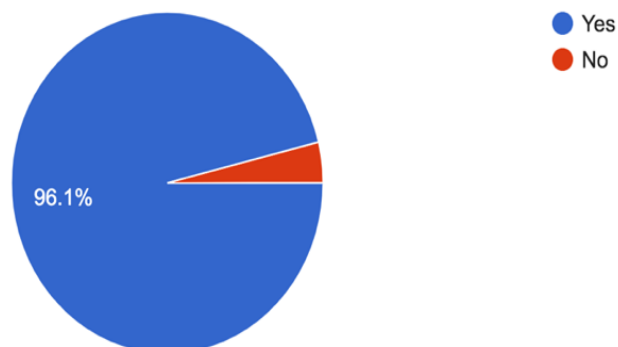


Figure 3: Heparin in Prime Solution for CPB

Percentage of respondents adding heparin to the CPB prime solution, with 96% indicating its use.

If yes, how much heparin do you typically add in the prime for CPB Circuit?

429 responses

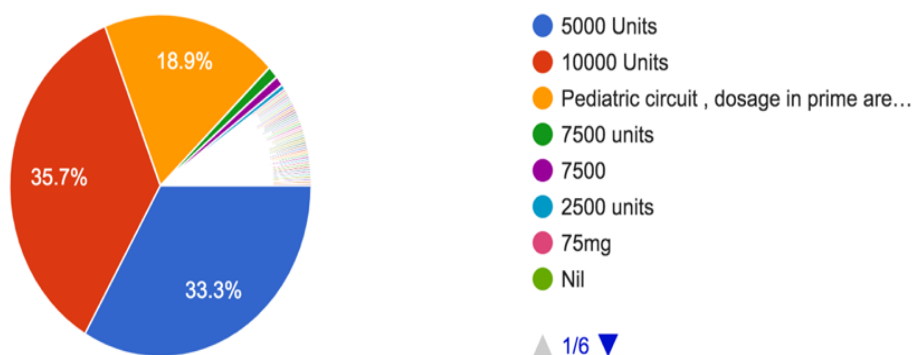


Figure 4: Typical Heparin dose in CPB Prime Solution

Range of heparin doses used in CPB prime solution, with the most common doses reported as 5000–10000 units.

Initial Heparin Dose before CPB:

The doses varied widely, with 300 Units/Kg being the most frequently reported (55.1% 240/437), followed by 400 Units/Kg (36.6% 160/437), and lower doses including 200 Units/Kg.

What is your protocol for heparin administration dose before initiating cardiopulmonary bypass?
437 responses

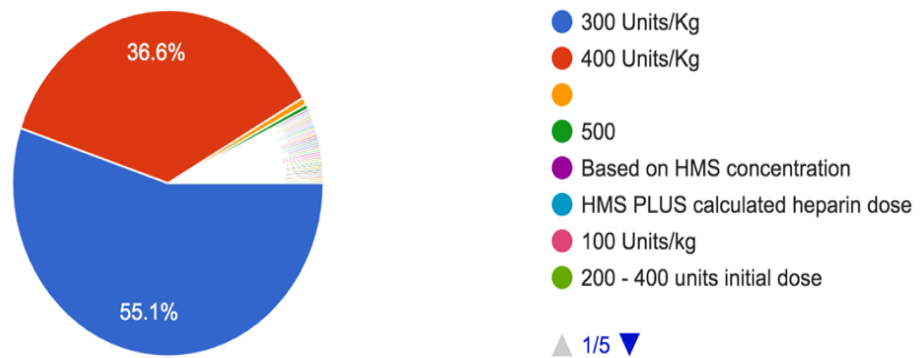


Figure 5: Initial heparin dose before CPB

Distribution of initial heparin doses before CPB, with 300 Units/Kg being the most reported, followed by 400 Units/Kg and lower doses.

Anticoagulation Management During CPB

Out of 439 responses, (69.5%, 306/439) of respondents consider 480 seconds as the acceptable ACT level to maintain adequate anticoagulation during CPB.

(20%, 88/439) prefer 400 seconds, while the remaining 10.5% are divided among other options such as 3× baseline, 450 seconds, or 480–500 seconds.

This indicates a strong global preference for targeting ACT \geq 480 seconds during CPB.

Acceptable ACT levels to maintain adequate anticoagulation during CPB

439 responses

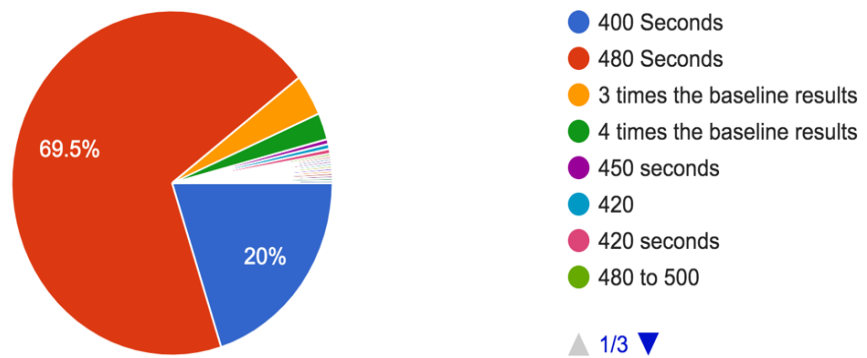


Figure 6: ACT Levels During CPB

Preferences for acceptable ACT levels during CPB, with 69.5% of respondents targeting 480 seconds, and 20% preferring 400 seconds.

Maximum Heparin Dose for unmet ACT Targets due to Heparin Resistance

Out of the 426 responses regarding the maximum heparin dose administered for unmet ACT targets due to heparin resistance before CPB commencement, 40.6% (173/426) of respondents administer 500 Units/Kg of heparin. 39.4% (168/426) use 600 Units/Kg as the maximum dose. The remaining responses included smaller percentages for doses such as 5000 units, 800 IU/kg, and combinations of 500-800 units/kg, along with some other options, though these account for a smaller proportion of responses.

What is the maximum heparin dose you administer for unmet ACT targets due to heparin resistance before CPB commencement?

426 responses

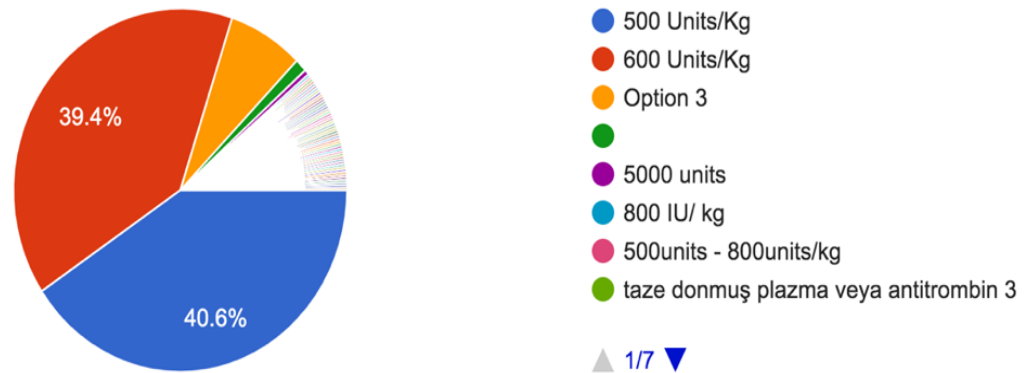


Figure 7: Maximum Heparin Dose for Heparin resistance before CPB

Reported maximum heparin doses administered to meet ACT targets in the presence of heparin resistance, with 40.6% using 500 Units/Kg and 39.4% using 600 Units/Kg.

Additives for Heparin Resistance Patients:

Among the 435 respondents, (72.9%, 317/435) reported using Fresh Frozen Plasma (FFP) to manage heparin resistance. 21.6% use Antithrombin (AT) supplementation as their preferred additive. The remaining 5.5% reported alternative approaches or have never needed any additives.

What additives do you use in cases of heparin resistance?

435 responses

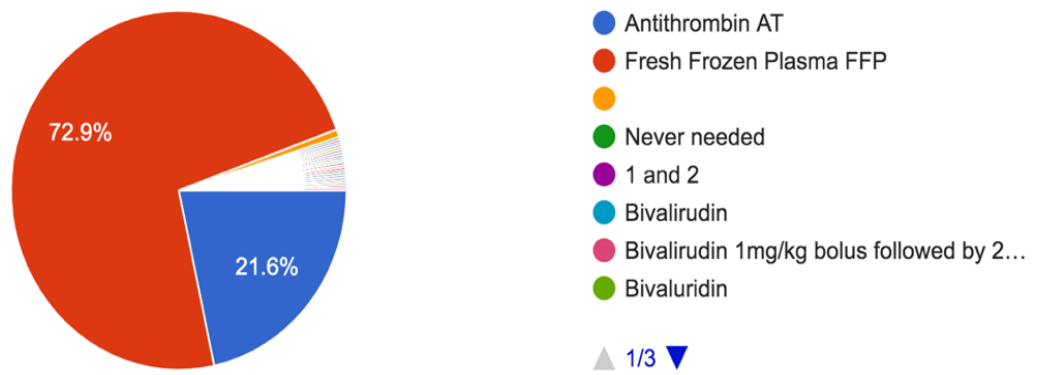


Figure 8: Additives used for Heparin Resistance

Types of additives used in managing heparin resistance, with 72.9% of respondents using Fresh Frozen Plasma (FFP) and 21.6% opting for Antithrombin (AT) supplementation.

Anticoagulation Reversal:

Please describe your protamine dose for reversing heparin post CPB?

Total 355 responses were received on this question with the summary below. Reversal of heparin after CPB is commonly performed using protamine sulphate, with the most frequently reported dosage being 1 mg of protamine per 100 IU of heparin administered, a 1:1 ratio. However, variations exist depending on institutional protocols, patient factors, and anaesthesiologist preference. Dosages range from 0.8 to 1.5 mg per 100 IU of heparin, with some

protocols adjusting based on Hepcon/HMS measurements or body weight (e.g., 3–5 mg/kg). Some centres also adopt strategies using 70–80% of the initial heparin dose for reversal or titrate based on ACT trends. Survey results showed that 1:1 ratio remains the most common standard, individualized approaches based on real-time monitoring and heparin pharmacodynamics are increasingly used to minimize protamine-related complications.

Type of ACT machines:

Out of 439 responses, (54.9%, 240/439) of participants reported using Hemochron as their primary ACT machine. I-STAT was the second most common, used by 19.6% of respondents.

The remaining 25.5% use a variety of other devices such as Medtronic, ActaLyke, and ACT Plus.

Which ACT machine do you use?

439 responses

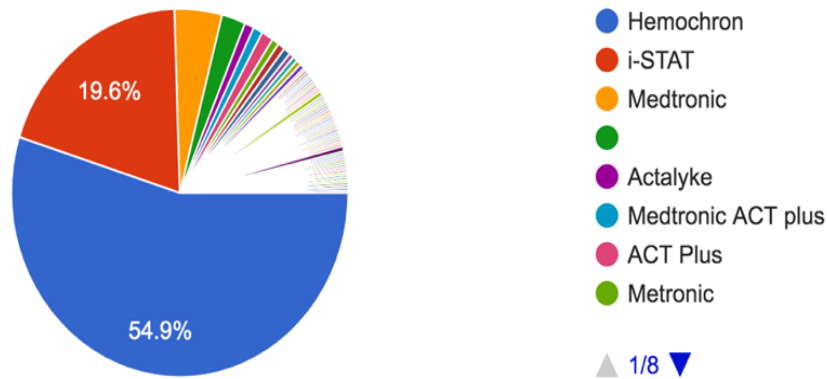


Figure 9: ACT Machine preferences

Distribution of ACT machines used, with 54.9% of respondents using Hemochron as their primary device, followed by I-stat (19.6%) and other devices such as Medtronic and ACT Plus

Anticoagulation Practices in ECMO

Heparin in Prime Solution for ECMO: Around (45.9%, 206/447) of respondents include heparin in the ECMO prime, demonstrating a strong preference for initiating anticoagulation prior to ECMO commencement.¹

Do you add heparin in the priming solution for ECMO circuit?

447 responses

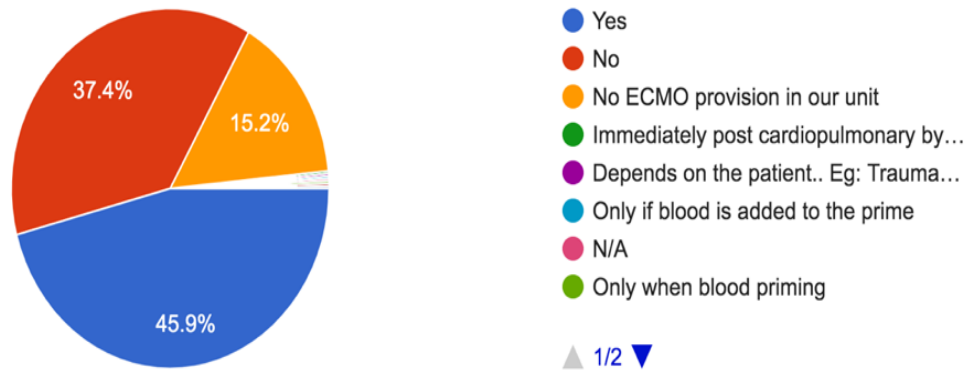


Figure 10: Heparin in Prime Solution for ECMO

Percentage of respondents including heparin in the ECMO prime solution, with 45.9% reporting its use.

Heparin in ECMO Prime Solution:

Out of the 279 responses to the question of how much heparin is added to the ECMO prime, (40.9%, 114/279) of respondents add 2000 Units of heparin, while (18.3%, 51/279) add 3000 Units. The remaining responses include various amounts, such as 5000 Units,

1000 Units, and none, though these categories are less prominent in the pie chart.

If yes, how much heparin do you add in the ECMO prime?

279 responses

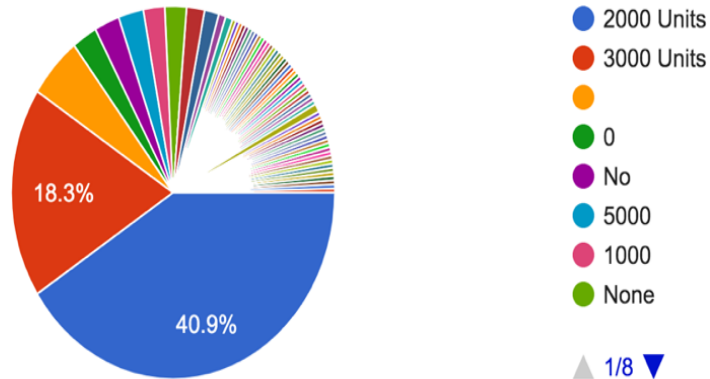


Figure 11: Typical Dose in ECMO Prime

Doses reported ranged from 2000 to 5000 Units, highlighting variability based on patient-specific factors and institutional protocols.

Heparin Administered Before Commencing ECMO:

Out of the 381 responses to the question of how much heparin is administered before commencing ECMO, (27.6%, 105/381) of respondents administer 2000 Units of heparin, while (18.9%, 72/381) administer 3000 Units. Additionally, (15%, 57/381) administer 5000 Units of heparin. A smaller portion of responses indicated the use of 1000 Units, 10,000 Units, or no heparin administration at all.

How much heparin do administer before commencing ECMO?

381 responses

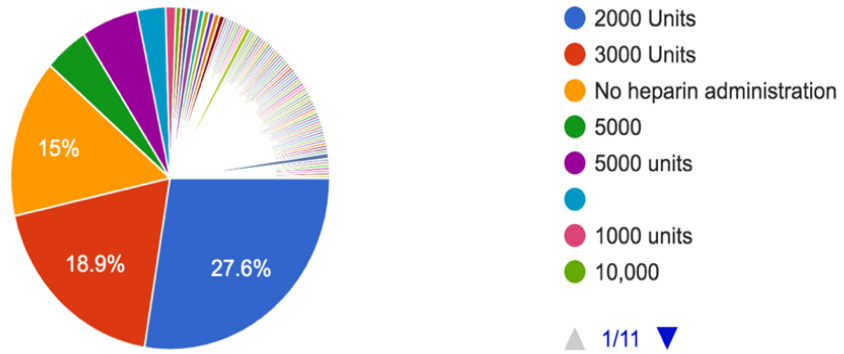


Figure 13: Initial Heparin Dose Before ECMO

Distribution of initial heparin doses before ECMO, with 2000 Units being the most common starting dose, followed by 3000 Units and 5000 Units.

Monitoring Techniques:

Out of the total responses, (54%, 237/439) of respondents prefer using ACT (Activated Clotting Time) for anticoagulation monitoring during ECMO. (14%, 61/439) prefer using Anti-Xa, while (5%, 22/439) use TEG (Thromboelastography). This data reflects the increasing adoption of TEG for real-time, comprehensive monitoring of haemostasis during ECMO.

What is your preferred method for monitoring anticoagulation during ECMO?

397 responses

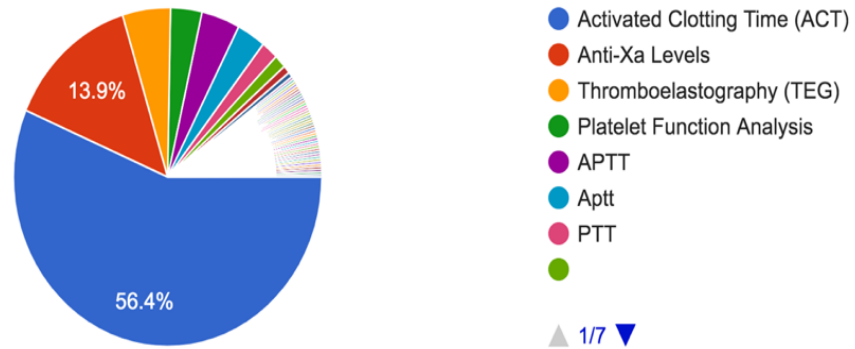


Figure 14: Monitoring techniques in ECMO

Preferences for anticoagulation monitoring methods during ECMO, with ACT being the most used technique (54%), followed by Anti-Xa (14%) and TEG (5%).

Alternative Anticoagulants for HIT:

Out of the 419 responses regarding the use of alternative anticoagulants for patients with Heparin-Induced Thrombocytopenia (HIT) during CPB or ECMO, (75.9%, 318/419) of respondents use Bivalirudin as the preferred alternative anticoagulant. (16%, 67/419) use Argatroban. The remaining responses include a mix of Warfarin, instances where anticoagulation was never needed, and a few other options, though these account for smaller proportions. This preference indicates a trend towards the use of direct thrombin inhibitors, which are perceived as safer and more effective in patients with HIT.

Which alternative anticoagulant do you use for patients with Heparin-Induced Thrombocytopenia (HIT) during CPB or ECMO?

419 responses

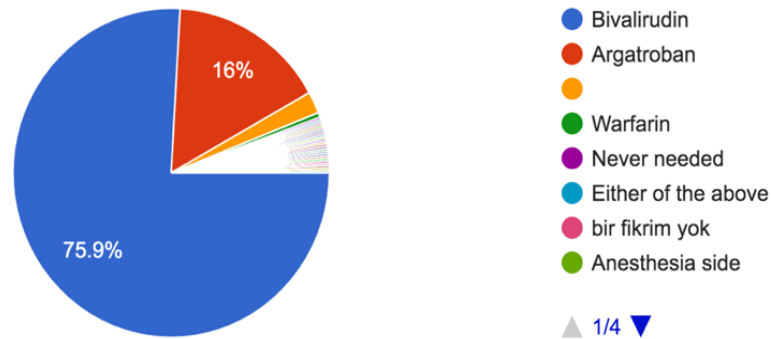


Figure 15: Alternative Anticoagulants for HIT

Frequency of alternative anticoagulants used for patients with Heparin-Induced Thrombocytopenia (HIT), with 76% preferring Bivalirudin and 16% using Argatroban.

Discussion

The results of this survey underscore significant variability in anticoagulation practices internationally, likely reflecting differences in local guidelines, resource availability, and training.

(8) While this study presents a valuable overview of anticoagulation practices across different regions and professional roles, we opted to refrain from conducting statistical tests due to concerns about the small sample sizes in certain groups and the potential for unreliable results from comparative tests. As a result, our findings are based solely on descriptive statistics. This approach ensures that we avoid over-interpreting the data and maintain a clear, transparent

presentation of the variations in practices. The choice of anticoagulant, primarily heparin, and its dosing strategies show a wide range of practices, even within the same regions. This indicates a lack of consensus or differing interpretations of best practices among healthcare professionals. Such diversity is particularly evident in the practices related to heparin usage for priming the ECMO circuit, ranging from no heparin to dosing up to 5000 Units. This highlights the clinical equipoise and individualized approaches taken in different settings. (9)

Beyond guideline variability, several structural and contextual factors likely underpin the heterogeneity observed in anticoagulation practices. Resource availability and cost constraints play a central role, particularly in accessing advanced anticoagulation monitoring modalities, such as anti-Xa assays and viscoelastic testing, which may be limited by laboratory infrastructure, reagent availability, and turnaround times in many regions. As a result, centres often rely on ACT-based monitoring despite known inter-device variability. Historical institutional practices and legacy protocols, usually developed in response to prior adverse events or older circuit technologies, continue to influence contemporary anticoagulation strategies, even as evidence and technology evolve. Differences in professional training, exposure to international guidelines, and institutional risk tolerance toward bleeding versus thrombosis further contribute to practice divergence. Collectively, these factors highlight why uniform numeric anticoagulation targets may be difficult to implement globally and support the adoption of principle-based, adaptable anticoagulation frameworks that can accommodate local resources while minimising unwarranted variability.

Similar heterogeneity in anticoagulation practices has been reported in previous national and international surveys of CPB and ECMO management, supporting the external validity of the variability observed in the present study.

Monitoring anticoagulation effectiveness and safety is critical in managing patients on CPB and ECMO, yet preferences for monitoring technologies are divided. While the majority rely on ACT, a significant number use TEG, which provides more comprehensive data on clot formation and stability. TEG directed transfusions also reduce the need for intraoperative transfusions. (10) Anti-Xa assays, despite strong supporting evidence, remain underutilized due to cost, limited availability, laboratory turnaround time, and logistical constraints. The choice of monitoring technique may be influenced by availability, staff training, and institutional policies, suggesting that standardization in this area could enhance patient safety and outcomes.

Variability among point-of-care ACT coagulometers and their correlation with Anti-Xa activity has been previously demonstrated, highlighting limitations in applying uniform numeric anticoagulation targets across institutions. (11,12)

The management of HIT presents a notable challenge, with survey respondents favouring direct thrombin inhibitors like Bivalirudin and Argatroban. This reflects a cautious approach to managing the risks associated with HIT, where the use of non-heparin anticoagulants can mitigate thrombotic risks without compromising anticoagulation efficacy. (9) The variability in the choice of alternative anticoagulants points to a need for more definitive guidance to help practitioners select the most effective and safest options based on the latest evidence. Recent expert consensus statements emphasize that heparin resistance and HIT remain variably defined

in clinical practice, further contributing to heterogeneity in anticoagulation management strategies. (13,14)

The diversity in anticoagulation practices observed suggests several implications for clinical practice and policy making. There is a clear need for updated, evidence-based international guidelines that address the full spectrum of anticoagulation management during CPB and ECMO, including heparin dosing, monitoring, and alternatives for HIT. However, complete standardization may be challenging given the heterogeneous nature of heparin, batch-to-batch variability, and differences among anticoagulation monitoring devices. Enhancing education and training programs to disseminate best practices and new technologies for anticoagulation monitoring could help reduce practice variability and improve patient outcomes. Accordingly, future guidance may be most effective if it adopts a principle-based framework rather than rigid numeric targets, allowing adaptation to local resources while reducing unwarranted variability. The variations and gaps identified also highlight areas where further research is needed, particularly in optimizing anticoagulation for complex cases and in the development of new anticoagulants that offer fewer risks than heparin.

While this survey provides valuable insights, it has limitations, including the reliance on self-reported data which may introduce bias as respondents might provide answers they perceive as favourable or based on recall rather than actual practice. Additionally, the demographic spread, while wide, may still not capture all the nuances of practice in different healthcare settings, particularly in underrepresented regions (3)

Limitations

A significant limitation of this survey is the overrepresentation of perfusionists in the respondent pool, comprising 88% of participants. As a result, the findings are likely more reflective of practices within the perfusionist community rather than a comprehensive view of the multidisciplinary team involved in CPB and ECMO management. The perspectives of other key healthcare professionals, such as cardiac surgeons, anaesthesiologists and intensivists, may not be fully captured. Future studies should aim to recruit a more diverse respondent pool to ensure a more representative sample of practices across all relevant healthcare professions. An additional limitation relates to the disproportionate representation of respondents from India, comprising 35% of the total sample. Although subgroup analysis demonstrated consistent directional trends between Indian and international respondents, certain practices, particularly ACT-based ECMO monitoring, were proportionally more common within the Indian subgroup. While this did not materially alter the overall conclusions regarding global heterogeneity in anticoagulation practices, it may have modestly amplified specific practice patterns. Future surveys would benefit from more proportionate geographic representation or stratified sampling strategies to further strengthen generalizability.

Conclusion

The international survey on anticoagulation practices highlights significant global variability in the management of CPB and ECMO. This diversity reflects the influence of local protocols, available resources, and varying levels of training across different regions. (15) Despite these differences, there is widespread agreement on the critical importance of effective anticoagulation management for improving patient outcomes.

The variability in practices, especially in areas like heparin dosing, anticoagulation monitoring, and the management of Heparin-Induced Thrombocytopenia (HIT), emphasizes the urgent need for updated, evidence-based international guidelines. Recent guidelines, such as the EACTS/EACTAIC Guidelines on Patient Blood Management in Adult Cardiac Surgery (4), provide a valuable framework for standardizing anticoagulation practices during CPB and ECMO. These guidelines highlight the importance of harmonizing treatment protocols to reduce practice variability, thereby improving patient safety and outcomes across diverse healthcare settings.

To address these challenges, ongoing international collaboration is essential to develop and disseminate guidelines that reflect the latest evidence and technological advancements. Moreover, enhanced education and training initiatives should be prioritized to bridge knowledge gaps and ensure consistent, high-quality care for patients undergoing CPB and ECMO worldwide.

In conclusion, standardizing anticoagulation practices, updating clinical guidelines, and fostering global collaboration are critical steps toward optimizing patient care. By addressing the variability identified in this survey, we can improve patient safety and clinical outcomes across diverse healthcare settings.

Statements:

Funding

The authors received no funding to complete this research.

Conflict of Interest

The authors declare no conflict of interest.

Data Availability

The data generated and/or analysed during the current study are available from the corresponding author upon reasonable request.

Ethical Considerations

As the study involved anonymous survey responses only, formal Institutional Review Board (IRB) approval was not required.

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