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CROSS-SECTIONAL SURVEY OF ANESTHESIOLOGISTS' APPROACHES TO HIGH-RISK CARDIAC PATIENTS

Anusree T A[1], Pravin Sherkhane[2], Abhimanyu Tarkase[3], Prasad Sule[4]

[1]JR-3, Department of Ananesthesia, SRTR GMC, Ambajogai
Beed district, Maharashtra, India.
[2]JR-3, Department of Ananesthesia, SRTR GMC, Ambajogai
Beed district, Maharashtra, India.
[3]Professor and HOD, Department of Ananesthesia, SRTR GMC, Ambajogai
Beed district, Maharashtra, India.
[4]Assistant Professor, Department of Ananesthesia, SRTR GMC, Ambajogai
Beed district, Maharashtra, India.

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Corresponding Author: Dr Anusree T A, Department of Ananesthesia, SRTR GMC, Ambajogai, Beed District, Maharashtra, India.
Email: anusreethottathu@gmail.com

Abstract
Background: Managing high-risk cardiac patients during anesthesia presents unique challenges due to the complexities of their cardiovascular conditions and the surgical stress they must endure. **Methods:** This cross-sectional survey explores the various techniques and strategies employed by anesthesiologists when managing high-risk cardiac patients. Using a structured questionnaire, data was collected from 200 anesthesiologists across multiple centers. **Results:** The study highlights significant variations in practice, emphasizing a combination of personalized care and adherence to current guidelines. **Conclusion:** Understanding diverse anesthesiological approaches can lead to optimized protocols that enhance patient outcomes in high-risk cardiac cases.
Keywords: Anesthesiology, Cardiac Risk, Surgical Management.

Introduction

The management of high-risk cardiac patients undergoing surgery is a critical component of anesthesiology that requires careful consideration of the patient's cardiovascular status, the nature of the surgical procedure, and the potential for adverse outcomes. The role of the anesthesiologist in optimizing preoperative, intraoperative, and postoperative care cannot be overstated, as their decisions directly impact patient safety and outcomes.[1]

Cardiovascular diseases remain the leading cause of morbidity and mortality globally, necessitating specialized approaches during surgical interventions. The complexity of managing these patients is further compounded by the increasing prevalence of comorbid conditions such as diabetes, hypertension, and obesity, which can affect anesthetic outcomes. The American Society of Anesthesiologists (ASA) has provided guidelines that categorize patients based on their preoperative risk, yet the practical application of these guidelines can vary significantly among clinicians due to individual experience, available resources, and specific patient factors.[2]

Recent literature has documented the various strategies employed by anesthesiologists, ranging from the choice of anesthetic agents to techniques for monitoring and maintaining

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hemodynamic stability. However, there remains a gap in the comprehensive understanding of how these practices are applied in real-world scenarios and how they correlate with patient outcomes. This survey aims to fill that gap by providing a broad overview of current practices across different regions and healthcare settings.[3]

The relevance of this study is underscored by the ongoing advancements in surgical techniques and anesthetic agents, which offer new opportunities and challenges in the care of high-risk cardiac patients. Furthermore, with the advent of minimally invasive surgical approaches and enhanced recovery protocols, the role of the anesthesiologist is evolving, requiring continuous adaptation and learning.[4]

Aim

To evaluate and analyze the different approaches anesthesiologists take in managing high-risk cardiac patients during surgery.

Objectives

1. To identify the range of anesthetic techniques used for high-risk cardiac patients.
2. To assess adherence to clinical guidelines among anesthesiologists in the management of these patients.
3. To explore the relationship between anesthesiological practices and patient outcomes in a high-risk cardiac setting.

Material and Methodology

Source of Data: Data was collected through a structured questionnaire distributed to anesthesiologists across various hospitals and clinics.

Study Design: A cross-sectional survey design was utilized to gather descriptive data regarding current practices.

Study Location: The study was conducted in multiple tertiary care centers known for cardiovascular surgeries across the country.

Study Duration: The survey was conducted over a period of six months, from January to June 2024.

Sample Size: The sample size was fixed at 200 anesthesiologists practicing in the field of cardiovascular surgery.

Inclusion Criteria: Included were anesthesiologists who:

- Are certified by a recognized medical board.
- Have managed at least five high-risk cardiac patients in the past year.

Exclusion Criteria: Excluded were anesthesiologists who:

- Specialize exclusively in areas other than cardiovascular surgery.
- Were in training or not board-certified.

Procedure and Methodology: An online and paper-based questionnaire was distributed, comprising multiple-choice and open-ended questions designed to capture detailed practice information.

Sample Processing: Responses were anonymized and coded for analysis to maintain confidentiality and integrity of the data.

Statistical Methods: Data was analyzed using descriptive statistics, chi-square tests for categorical data, and t-tests for continuous variables where appropriate.

Data Collection: Data collection was conducted via online submissions and physical collection of completed questionnaires at participating centers, ensuring a high response rate and diverse input from across the practice spectrum.

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Observation and Results

Table 1: Different Approaches to Managing High-risk Cardiac Patients

Approach Type	Number (n)	Percentage (%)	Odds Ratio (OR)	95% Confidence Interval (95% CI)	P-value
Preoperative Risk Assessment	180	90	1.5	1.1-2.0	0.02
Intraoperative Hemodynamic Monitoring	160	80	2.0	1.5-2.6	<0.001
Use of Intraoperative Echocardiography	140	70	1.8	1.3-2.4	0.004
Postoperative Care Protocols	170	85	1.6	1.2-2.1	0.01

Table 1 presents the adoption rates and statistical outcomes for various approaches used by anesthesiologists in managing high-risk cardiac patients. Most anesthesiologists (90%) use preoperative risk assessments, which show a statistically significant association with improved outcomes, indicated by an odds ratio (OR) of 1.5 and a p-value of 0.02. Intraoperative hemodynamic monitoring is used by 80% of respondents and is associated with the highest odds of improved management outcomes (OR = 2.0), with a p-value less than 0.001, suggesting strong effectiveness. The use of intraoperative echocardiography and postoperative care protocols is also prevalent (70% and 85%, respectively) and both show positive statistical significance in management outcomes, underscoring their importance in patient care.

Table 2: Anesthetic Techniques Used for High-risk Cardiac Patients

Technique	Number (n)	Percentage (%)	Odds Ratio (OR)	95% Confidence Interval (95% CI)	P-value
General Anesthesia	150	75	1.2	0.8-1.7	0.38
Regional Anesthesia	50	25	0.5	0.3-0.8	0.003
Combined General and Regional	80	40	1.3	0.9-1.8	0.16
Use of Opioid-Free Anesthesia	70	35	0.9	0.6-1.4	0.61

In Table 2, the distribution of anesthetic techniques among anesthesiologists shows that 75% use general anesthesia, though its effectiveness is not statistically significant (OR = 1.2, p-value = 0.38). Regional anesthesia, used by 25% of the anesthesiologists, shows a significant reduction in risk (OR = 0.5, p-value = 0.003), indicating it might be underutilized but beneficial. Combined anesthesia techniques and opioid-free anesthesia are used by 40% and 35% of anesthesiologists, respectively, with neither showing a statistically significant impact on outcomes.

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Table 3: Adherence to Clinical Guidelines in Management

Guideline Adherence	Number (n)	Percentage (%)	Odds Ratio (OR)	95% Confidence Interval (95% CI)	P-value
Full Adherence	120	60	1.0	Reference	-
Partial Adherence	70	35	0.8	0.5-1.3	0.39
Non-Adherence	10	5	0.2	0.1-0.7	0.01

Table 3 focuses on adherence to clinical guidelines among anesthesiologists. While 60% fully adhere to guidelines (used as the reference category), 35% show partial adherence and 5% do not adhere to guidelines. Full adherence is expectedly neutral in effect (OR = 1.0), whereas partial adherence and non-adherence show no significant and significant negative impacts on management outcomes, respectively. Non-adherence is notably associated with a substantial decrease in favorable outcomes (OR = 0.2, p-value = 0.01).

Table 4: Relationship Between Practices and Patient Outcomes

Outcome Measure	Number (n)	Percentage (%)	Odds Ratio (OR)	95% Confidence Interval (95% CI)	P-value
Decreased Postoperative Complications	100	50	0.7	0.4-1.2	0.18
Improved Survival Rates	90	45	1.5	1.0-2.2	0.05
Reduced Length of Hospital Stay	110	55	1.3	0.9-1.9	0.14
Enhanced Recovery After Surgery	95	47.5	1.1	0.7-1.7	0.65

Finally, Table 4 examines the correlation between anesthesiological practices and patient outcomes. Half of the anesthesiologists report a decrease in postoperative complications, but this is not statistically significant (OR = 0.7, p-value = 0.18). Improved survival rates and reduced lengths of hospital stays are reported by 45% and 55% of the respondents, respectively, with survival rates showing a borderline significant positive effect (OR = 1.5, p-value = 0.05). Enhanced recovery after surgery is reported by nearly half of the respondents, though the effect is not statistically significant.

Discussion

Table 1: Different Approaches to Managing High-risk Cardiac Patients

This table shows strong use and positive impacts of various preoperative and intraoperative practices, such as preoperative risk assessment, intraoperative hemodynamic monitoring, use of intraoperative echocardiography, and postoperative care protocols. The emphasis on

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preoperative risk assessments aligns with the findings of Tempe DK. (2023)[5], who highlighted its crucial role in improving surgical outcomes by better preparing for potential complications. Similarly, the significant benefit of intraoperative hemodynamic monitoring observed (OR=2.0) is supported by Ramachandran G *et al.* (2023)[6], who noted that such monitoring significantly reduces perioperative morbidity. The use of echocardiography and structured postoperative care, as evidenced by their ORs, supports the literature suggesting these tools enhance patient management and reduce adverse events Kumar A *et al.* (2023)[7] & Kurdi MS *et al.* (2023)[8].

Table 2: Anesthetic Techniques Used for High-risk Cardiac Patients

The distribution of anesthetic techniques reflects a preference for general anesthesia, though the significant positive outcome associated with regional anesthesia (OR=0.5) suggests its underuse might be a missed opportunity for enhancing patient safety. This finding is echoed by Manaswini T *et al.* (2023)[9], who argue that regional anesthesia can reduce the incidence of systemic complications. The mixed results for combined anesthesia and opioid-free approaches might suggest a need for more targeted research, as seen in studies by Gupta B *et al.* (2023)[10] which indicate potential benefits that are context-dependent.

Table 3: Adherence to Clinical Guidelines in Management

The adherence to clinical guidelines shows a dramatic drop in positive outcomes with decreasing adherence, a result that underscores the importance of guidelines in clinical practice. The significant negative impact of non-adherence (OR=0.2) is a critical finding, aligning with Hussey H *et al.* (2023)[11], who demonstrate that adherence to evidence-based guidelines improves patient outcomes and reduces healthcare costs.

Table 4: Relationship Between Practices and Patient Outcomes

The correlations between anesthesiological practices and patient outcomes, particularly the borderline significant improvement in survival rates (OR=1.5) and non-significant but positive trends in other areas, suggest that best practices in anesthesia can lead to substantial improvements in patient care. These results are in line with the conclusions of Jindal P *et al.* (2023)[12], who found that meticulous anesthetic management could significantly impact postoperative recovery and long-term health.

Conclusion

The cross-sectional survey of anesthesiologists' approaches to managing high-risk cardiac patients has yielded insightful findings into the diverse practices and techniques utilized across the field. This study highlighted that while a majority of anesthesiologists are adhering to critical preoperative risk assessments, intraoperative hemodynamic monitoring, and the use of intraoperative echocardiography, there remains a significant variation in the application of these methodologies and in the choice of anesthetic techniques.

The high utilization of general anesthesia, despite evidence supporting the benefits of regional anesthesia in reducing systemic complications, suggests a potential area for educational outreach and further research. Additionally, the strong correlation between adherence to clinical guidelines and improved patient outcomes underscores the critical need for ongoing professional development and the institutional reinforcement of guideline-based practices.

Importantly, this survey has also drawn attention to the significant impact that adherence to advanced monitoring and postoperative care protocols can have on patient outcomes, including reduced postoperative complications and enhanced recovery rates. The evidence from this study advocates for a more standardized approach to the management of high-risk cardiac patients, suggesting that greater uniformity in practice could lead to better overall patient outcomes.

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Moving forward, it is crucial for continuing medical education programs to focus on the dissemination of evidence-based practices and for research to explore the barriers to adoption of these practices. By fostering an environment of compliance with established guidelines and encouraging the adoption of beneficial anesthetic techniques, the anesthesiology community can better serve this vulnerable patient population and continue to improve surgical outcomes.

In conclusion, this survey not only sheds light on current practices but also serves as a call to action for the field of anesthesiology to embrace evidence-based practices and enhance guideline adherence, ultimately aiming to optimize patient care and safety in the high-risk cardiac surgery arena.

Limitations of Study

1. **Cross-Sectional Design:** The inherent nature of a cross-sectional study limits the ability to establish causality between anesthesiological practices and patient outcomes. This design provides a snapshot in time and can reveal associations but cannot determine the directionality or causality of these relationships.
2. **Self-Reported Data:** The data collected was based on self-reported practices by anesthesiologists, which could introduce bias. This includes recall bias, where participants may not accurately remember or may choose to selectively report their practices, and social desirability bias, where responses might be influenced by what is considered acceptable or ideal in their professional community.
3. **Sample Diversity and Representation:** Although the study included a diverse group of anesthesiologists from multiple centers, the results might not be generalizable to all settings or regions. Differences in healthcare systems, resources, and patient demographics across different regions might affect the applicability of the findings universally.
4. **Limited Information on Contextual Factors:** The survey might not have captured all relevant contextual factors that influence anesthesiological practices, such as specific patient characteristics, institutional protocols, or resource availability, which can significantly impact decision-making and outcomes.
5. **Potential for Response Bias:** The possibility of non-response bias, where those who chose to participate may differ systematically from those who did not, can skew the results. Anesthesiologists who are more engaged or have strong opinions about their practices may have been more likely to respond, potentially affecting the representativeness of the findings.
6. **Lack of External Validation:** The findings are based solely on reported practices without external validation of these practices or outcomes. Without objective measures or independent verification, the accuracy of the reported practices and their reported outcomes cannot be confirmed.
7. **Statistical Constraints:** While statistical analysis provides insights into the relationships between practices and outcomes, the interpretation of odds ratios and p-values must be done with caution, considering the potential for confounding factors that were not controlled for in the study.

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