

OPTIMIZACIÓN DE LA ATENCIÓN QUIRÚRGICA Y PERIOPERATORIA EN CIRUGÍA GENERAL, ANESTESIOLOGÍA Y TRAUMA OPTIMIZING SURGICAL AND PERIOPERATIVE CARE IN GENERAL SURGERY, ANESTHESIOLOGY, AND TRAUMA

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Resumen

El objetivo de esta investigación fue analizar la evidencia científica sobre la optimización de la atención quirúrgica y perioperatoria, con énfasis en cirugía general, anestesiología y trauma. Se adoptó un enfoque cualitativo y descriptivo mediante una revisión bibliográfica de artículos científicos disponibles en Scopus, PubMed, Springer, ProQuest y SciELO. La estrategia de búsqueda utilizó los operadores booleanos AND y OR. Los hallazgos mostraron una evolución significativa de las estrategias de optimización, especialmente de los protocolos de recuperación mejorada después de la cirugía, que combinan innovación tecnológica y atención centrada en el paciente. La profilaxis de infecciones, el manejo multimodal del dolor y la prehabilitación contribuyeron a reducir complicaciones y mejorar la recuperación funcional. Sin embargo, la heterogeneidad de la implementación y la disponibilidad limitada de recursos restringen su aplicación universal. La integración de herramientas digitales y la optimización de la gestión hospitalaria representan componentes relevantes para mejorar la eficiencia quirúrgica y ofrecer una atención más segura y personalizada. En conjunto, los estudios revisados indican que la optimización perioperatoria puede mejorar los resultados clínicos, mediante la reducción de la estancia hospitalaria, las complicaciones y los reingresos, y favorecer la eficiencia de los

sistemas sanitarios mediante un uso más adecuado de los recursos. Se concluye que su implementación requiere protocolos actualizados y una transformación hacia una atención quirúrgica integral, personalizada y colaborativa.

Palabras clave: Optimización, Atención quirúrgica, Atención perioperatoria, Cirugía general, Cirugía de trauma, Anestesiología.

Abstract

The aim of this research was to analyze scientific evidence on the optimization of surgical and perioperative care, with a focus on the fields of general surgery, anesthesiology, and trauma. A qualitative and descriptive approach was adopted through a literature review of scientific articles in databases such as Scopus, PubMed, Springer, ProQuest, and SciELO. Boolean operators "AND" and "OR" were used as the search strategy. The findings revealed that the optimization of surgical and perioperative care has evolved significantly through strategies such as enhanced recovery after surgery protocols, which enhance postoperative recovery through a combination of technological innovation and patient-centered care. Infection prophylaxis, multimodal pain management, and prehabilitation have been shown to reduce complications and improve functional recovery. However, heterogeneity in implementation and

limited resource availability restrict their universal application. The integration of digital tools and the optimization of hospital management are key to improving surgical efficiency and ensuring safer, more personalized care. Overall, the studies show that perioperative optimization not only improves clinical outcomes—such as reduced hospital stays, complications, and readmissions—but also enhances health system efficiency by lowering costs and optimizing resources. This requires not only the application of updated protocols but also a cultural shift towards more personalized, comprehensive, and collaborative surgical care.

Keywords: Optimization, Surgical care, Perioperative care, General surgery, Trauma surgery, Anesthesiology.

Sumário

O objetivo desta pesquisa foi analisar as evidências científicas sobre a otimização da assistência cirúrgica e perioperatória, com ênfase em cirurgia geral, anestesiologia e trauma. Adotou-se uma abordagem qualitativa e descritiva mediante revisão bibliográfica de artigos científicos disponíveis nas bases Scopus, PubMed, Springer, ProQuest e SciELO. A estratégia de busca utilizou os operadores booleanos AND e OR. Os resultados mostraram uma evolução significativa das estratégias de otimização, especialmente dos protocolos de recuperação melhorada após a cirurgia, que combinam inovação tecnológica e cuidado centrado no paciente. A profilaxia de infecções, o manejo multimodal da dor e a pré-habilitação contribuíram para reduzir complicações e melhorar a recuperação funcional. Entretanto, a heterogeneidade da implementação e a disponibilidade limitada de recursos restringem sua aplicação universal. A integração de ferramentas digitais e a otimização da gestão hospitalar constituem componentes relevantes para melhorar a eficiência cirúrgica e oferecer cuidados mais seguros e personalizados. Em conjunto, os estudos revisados indicam que a otimização perioperatória pode melhorar os resultados clínicos, mediante a redução do

tempo de internação, das complicações e das readmissões, e favorecer a eficiência dos sistemas de saúde por meio do uso mais adequado dos recursos. Conclui-se que sua implementação exige protocolos atualizados e uma transformação em direção a uma assistência cirúrgica integral, personalizada e colaborativa.

Palavras-chave: Otimização, Assistência cirúrgica, Assistência perioperatória, Cirurgia geral, Cirurgia de trauma, Anestesiologia.

Introduction

The goal of every medical team has always been to achieve optimal perioperative recovery, with fewer complications and benefiting the greatest number of patients. However, despite advances in surgical and anesthetic techniques, many patients still face an exaggerated metabolic and inflammatory response after major procedures, which increases the risk of complications, prolongs hospitalization, and affects functional recovery (Loughlin et al., 2021). Therefore, perioperative assessment aims to evaluate the patient's health status and their ability to tolerate the surgical procedure, with the goal of minimizing risks related both to anesthesia and the surgical intervention itself (Hübner et al., 2020).

According to Álvarez et al. (2023), approximately 234 million major surgeries are performed worldwide each year. However, postoperative outcomes do not always meet expectations. Depending on the country and institution, up to 4% of patients may die before hospital discharge, up to 15% may experience severe postoperative morbidity, and between 5% and 15% could be readmitted within 30 days. These percentages correspond to roughly 1,000 deaths and 4,000 major complications each hour, highlighting the magnitude of the problem and estimating that about 50% of these complications could be preventable,

emphasizing the urgent need to optimize surgical and perioperative care.

According to Fehlmann et al. (2022), general surgeries carry various risks that can affect patient recovery and prognosis. These include mortality at different time points—within the first 30 days, at 90 days, or up to one year after the procedure. Additionally, major postoperative complications may compromise the patient's progress. The length of hospital stay is another factor, which can be extended depending on the severity of the case and postoperative recovery. These risks underscore the importance of implementing safety measures and proper protocols to improve surgical outcomes.

Pico-Camacho and Vega (2023) discuss surgical risk and its distorted perception, which represents a key challenge in optimizing surgical and perioperative care. A lack of proper understanding of these risks can adversely affect decision-making, preoperative preparation, and adherence to postoperative recommendations, directly influencing clinical outcomes. In the context of a comprehensive review of general surgery, anesthesiology, and trauma, it is essential to address strategies to improve risk communication, reduce cognitive and emotional biases, and strengthen patient and medical team education.

From another perspective, Guerrero Rodríguez et al. (2023) affirm that intra- and postoperative mortality is closely related to the presence of the lethal triad, consisting of acidosis, hypothermia, and coagulopathy. The interaction of these three factors creates a vicious cycle that increases the risk of uncontrollable bleeding and serious complications, making their timely management crucial for optimizing perioperative and surgical care. For this reason,

collaboration among surgeons, anesthesiologists, and support staff is essential to detect potential risks, prevent complications, and ensure effective transition between the different phases of the surgical process.

On another note, Luna-Ortiz et al. (2024) explain in their research that oxidative stress (OS) and the perioperative complications arising from it pose a critical challenge in optimizing surgical and perioperative care. This phenomenon, triggered by surgical trauma and inflammatory imbalance, can worsen postoperative complications, especially in high-risk patients. Proper management of OS, through anesthetic strategies and antioxidant therapies, is vital to improve patient outcomes throughout the perioperative process.

Thus, at the intersection of general surgery, anesthesiology, and trauma, a comprehensive approach and collaboration among these fields are essential to effectively manage oxidative stress and other perioperative complications. Optimization of surgical and anesthetic procedures should focus not only on surgical technique but also on prevention and management of factors that could compromise patient safety, such as OS. Reviewing current practices and implementing new strategies to reduce complications caused by OS will significantly contribute to improving perioperative care in general surgery, anesthesiology, and trauma (Harrison, 2023; Hübner et al., 2020).

It is important to highlight that surgical and perioperative care represents a critical aspect of modern medicine, involving multiple disciplines and requiring a comprehensive approach to ensure patient safety and well-being. In this context, medical teams must work together to address the various challenges that

arise before, during, and after a surgical procedure (García Ríos et al., 2024). Optimizing care during these critical moments not only improves clinical outcomes but also reduces complications, shortens recovery times, and minimizes costs associated with prolonged treatments or reinterventions (Köhnenkamp & Maldonado, 2019).

Based on the above, this study aims to analyze scientific evidence regarding the optimization of surgical and perioperative care, focusing on general surgery, anesthesiology, and trauma. By reviewing previous studies, it seeks to identify the most effective approaches and best practices in surgical and perioperative management. Providing a detailed review of current practices and exploring new management strategies, this work intends to improve the quality of surgical care, decrease complications before, during, and after the medical process, and ultimately enhance clinical outcomes and patients' quality of life.

Materials and Methods

This research adopted a qualitative and descriptive approach, which allowed for an in-depth exploration of existing studies by analyzing their characteristics and results without directly intervening in the phenomena studied. The qualitative approach facilitated a thorough interpretation of the various practices and approaches used in general surgery, anesthesiology, and trauma, while the descriptive approach aimed to organize and present the collected information clearly and comprehensively, providing an overall and detailed view of the findings from the reviewed studies. A bibliographic search was conducted using scientific articles from databases such as Scopus, PubMed, Springer, ProQuest, and SciELO. The search strategy employed Boolean operators "AND" and "OR" to maximize the

number of relevant articles prior to exclusion. The search string used was:

((Optimization AND Surgical Assistance OR Perioperative Care AND General Surgery OR Trauma Surgery));

((Perioperative Care OR Surgical Care AND General Surgery OR Trauma Surgery OR Anesthesiology));

((Surgical Care AND Perioperative Care AND Anesthesia AND General Surgery)).

The selection process was conducted following the PRISMA statement. Using PRISMA provided a clear structure for each stage of the process, from the identification and screening of relevant studies to the synthesis and presentation of results (see Figure 1). Studies included in this systematic review were published between 2020 and 2025, available in both English and Spanish, and focused on the optimization of surgical and perioperative care, with a particular emphasis on general surgery, trauma surgery, and anesthesiology. The selected studies consisted of primary research, systematic reviews, meta-analyses, observational studies, and descriptive research providing evidence on best practices, interventions, and outcomes related to perioperative care, surgical management, and anesthetic practices. Complete access articles were prioritized for inclusion. Studies were excluded if they were published outside the 2020-2025 window, unavailable in English or Spanish, or focused solely on surgical procedures not related to general surgery, trauma, or anesthesiology, or did not address aspects of surgical and perioperative care. Publications with inaccessible information or those not meeting the methodological quality standards for this review—such as opinion articles, conference abstracts, or case studies

lacking a sufficiently representative sample—were also excluded.

Data analysis employed the narrative synthesis method due to the diversity and heterogeneity of available research on optimizing surgical and perioperative care. The reviewed studies covered different technical perspectives and applied contexts within general surgery, anesthesiology, and trauma surgery. This method enabled thorough identification, organization, and contextualization of the main practices and strategies for optimization, highlighting common patterns, discrepancies, and emerging themes in improving safety and effectiveness in perioperative care.

The study selection process for the review began with the identification of 50 records in the databases. Of these, 7 were removed due to duplication prior to screening. Next, 43 records were examined, of which 5 were excluded for not meeting the initial criteria. Subsequently, 38 studies were evaluated for eligibility, resulting in the exclusion of 23: 5 due to age, 4 because of language other than Spanish or English, 8 for lack of relevance to the topic, and 6 due to restricted access to the full text. Finally, 15 studies were included in the review, focusing on the optimization of surgical and perioperative care across key areas such as general surgery, anesthesiology, and trauma.

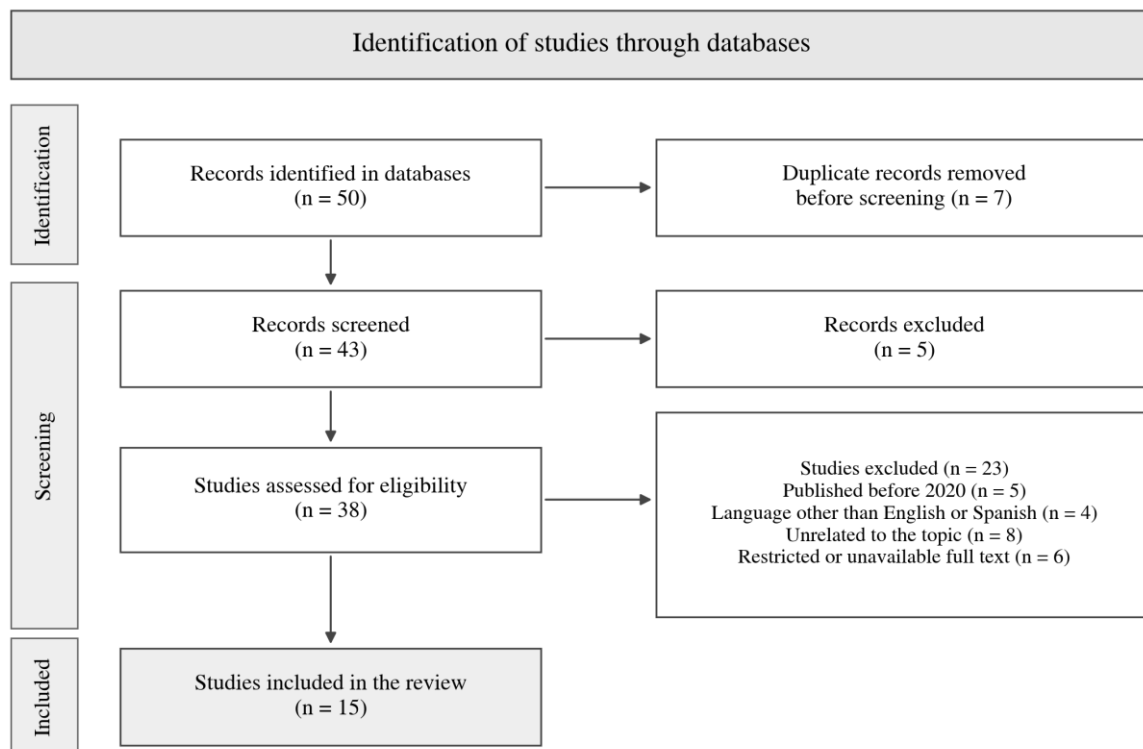


Figure 1. PRISMA flow diagram

Source: Authors' elaboration.

Results and Discussion

The 15 included studies are presented in Table 1, which summarizes their authors, objectives,

methodological approaches, and principal findings.

Table 1. Surgical and perioperative care in general surgery, anesthesiology, and trauma

Author(s), Year	Title	Methods	Results
Velázquez Gutiérrez & Vargas Useche (2021)	Enhanced Recovery After Surgery: A Paradigm Shift in Perioperative Care	Systematic Review	Velázquez and Vargas discuss ERAS (Enhanced Recovery After Surgery) protocols, which represent a groundbreaking innovation in contemporary surgical medicine. They are characterized by integrating three essential elements: technological innovation, advanced physiological understanding, and a humanized, patient-centered approach. The core of these protocols relies on meticulous nutritional and physiological management, such as early feeding, precise fluid control, and comprehensive metabolic care. Scientific evidence supports interventions like early oral feeding, which not only ensures safety but also significantly accelerates recovery (Velázquez Gutiérrez & Vargas Useche, 2021).
Scott et al. (2023)	Consensus Guidelines for Perioperative Care for Emergency Laparotomy: Recommendations Part 2—Intra- and Postoperative Care	Systematic Review	Scott et al. emphasize that perioperative practices such as antibiotic administration, proper cutaneous antisepsis, use of fascial wound protectors, and glove changes during abdominal closure are recommended to significantly reduce infection risk. Antibiotic prophylaxis given within 60 minutes before incision has proven effective in decreasing postoperative infections, especially in emergency abdominal surgeries. Additionally, practices like glove changes and the use of new instruments after abdominal irrigation, as recommended by the American College of Surgeons, are effective in reducing surgical site infections (SSIs). These strategies, incorporated into perioperative optimization packages, contribute to enhanced patient safety, reduced complications, and promote faster, safer recovery (Scott et al., 2023).
Ceresoli, Braga, et al. (2023)	Enhanced Perioperative Care in Emergency General Surgery: The WSES Position Paper	Literature Review	Ceresoli et al. show that perioperative care in general surgery, especially during emergency procedures, focuses on optimizing patient recovery and minimizing postoperative risks. They recommend a multimodal approach for preventing postoperative nausea and vomiting (PONV), including using antiemetic medications such as dopamine and serotonin antagonists, and anesthesia that minimizes opioid and volatile anesthetic use. Monitoring anesthesia depth and neuromuscular blockade is essential to prevent side effects like postoperative delirium and morbidity associated with residual neuromuscular blockade. Multimodal analgesia, combining systemic and regional approaches, is key to pain control and reducing opioid dependence, thereby improving recovery and decreasing complication risks (Ceresoli, Braga, et al., 2023).
Ceresoli, Biloslavo, et al. (2023)	Implementing Enhanced Perioperative Care in Emergency General Surgery: A Prospective Multicenter Observational Study	Descriptive and observational study	This study revealed notable adherence to recovery milestones in the early postoperative days: the first day for nasogastric tube removal, the second for mobilization and urinary catheter removal, and the third for oral feeding and discontinuation of IV fluids. These accelerated protocols fostered faster recovery, especially in patients undergoing laparoscopic surgery, who showed earlier improvements compared to open surgery. However, factors such as preoperative hyperglycemia, fluid overload, abdominal drainage, surgical duration, and major morbidity were associated with delayed recovery, underscoring the importance of optimizing perioperative management to minimize these risks and promote efficient recovery (Ceresoli, Biloslavo, et al., 2023).
Mihalj et al. (2022)	Managing Bottlenecks in the Perioperative Setting: Optimizing Patient Care and Reducing Costs	Literature Review	Managing bottlenecks in the perioperative environment is crucial to improving efficiency and patient outcomes. It requires a multidisciplinary approach involving strategic planning, team coordination, and operational adjustments. Factors like infrastructure, supply chain, and communication can cause disruptions affecting both cost and patient safety. To optimize the system, proactive planning of procedures and resources, trained staffing, and fostering hospital collaboration—especially during crises—are essential. This will enable a more efficient and sustainable perioperative workflow (Mihalj et al., 2022).
Schwenk (2022)	Optimized perioperative management (fast-track, ERAS) to enhance postoperative recovery in elective colorectal surgery	Systematic Review	Schwenk et al. demonstrate that preoperative education, which includes both written and face-to-face information, can reduce anxiety, improve patient knowledge, and accelerate recovery, especially in procedures like colorectal surgery. Prehabilitation, involving quitting alcohol and nicotine use along with physical training, is also key to optimizing patient health before surgery. Quitting smoking and drinking 4-6 weeks prior significantly reduces postoperative complications. Although benefits vary, moderate aerobic exercise has been shown to improve cardiopulmonary function and reduce hospital stay in high-risk patients. Additionally, a structured risk assessment approach using checklists or calculators can replace clinical judgment and improve postoperative outcomes (Schwenk, 2022).
López et al. (2023)	Recovery begins before surgery	Systematic Review	The optimization of perioperative care has evolved to focus not only on improving postoperative mobility and nutrition under the ERAS (Enhanced Recovery After Surgery) protocol but also on attenuating the surgical stress response to reduce negative effects like catabolism and maintain homeostasis. While interventions like fast-track protocols offer benefits, a more comprehensive approach that includes preoperative optimization of modifiable patient factors appears crucial for better outcomes. This involves enhancing the patient's physical, nutritional, and psychological condition, as these are key to postoperative recovery. The medical community increasingly recognizes the importance of addressing the entire perioperative process, including evaluating and managing comorbidities, planning hospital discharge in collaboration with primary care, using surgical checklists, advanced intraoperative monitoring, and ensuring proper transition to intensive care when needed (López et al., 2023).
Uchino et al. (2023)	Enhanced recovery protocols in trauma and emergency abdominal surgery: a scoping review	Systematic Review	This scoping review offers relevant evidence on optimizing surgical and perioperative care, especially for emergency abdominal surgery (EAS) and trauma, with clear implications for general surgery, anesthesiology, and comprehensive patient management. The author highlights that despite limited literature, there is a rising interest in implementing ERPs, with studies from both low- and high-income countries. A positive trend in clinical outcomes, particularly in reducing hospital stays, reinforces the effectiveness of ERPs as an optimization strategy. Specific preoperative components like early prophylactic antibiotics and patient/family education are emphasized, as are preanesthetic preparations such as anxiolysis and analgesia. Early recognition of physiological instability and risk assessment enable timely, safe interventions, especially in vulnerable populations like trauma patients (Uchino et al., 2023).
Ramanujam et al. (2023)	Thromboelastography in the perioperative period: a literature review	Literature Review	Ramanujam et al. find that thromboelastography (TEG) is a valuable monitoring tool during the perioperative period, particularly in general surgery patients. It is effective in predicting bleeding, identifying hypercoagulability, and detecting thrombotic events, which are crucial for individualized patient management. Its application is especially useful when precise assessment of hemostatic status is needed, such as in patients on clopidogrel, helping guide therapy and avoiding unnecessary treatment suspension. Although some studies show no significant differences in bleeding prediction or mortality between conventional and TEG-guided protocols, TEG provides better control over blood product use and improved survival prediction (Ramanujam et al., 2023).
Darnall et al. (2025)	Upskilling pain relief after surgery: a scoping review of perioperative behavioral intervention efficacy and practical considerations for implementation	Literature Review & Meta-Analysis	The authors highlight significant advances in perioperative care through behavioral interventions focused on pain management. Strategies like cognitive-behavioral therapy (CBT), mindfulness, and psychoeducational skills are effective non-pharmacological options that complement traditional anesthesia and help reduce postoperative opioid use. From anesthesiology, these approaches can improve pain control, decrease anxiety, and promote patient self-regulation, leading to faster recovery with fewer complications. While most studies focus on elective surgeries like knee arthroplasty or spine surgery, principles are highly applicable to trauma and emergency procedures, where multimodal approaches and emotional stability are crucial (Darnall et al., 2025).
Rama et al. (2023)	Perioperative Management of Incidental Pulmonary Embolisms on Trauma CT Scans: A Narrative Review	Literature Review	From an anesthesiology and surgical perspective, the use of anticoagulants such as low molecular weight heparin (LMWH) or fondaparinux is an effective tool for thromboprophylaxis, although it must be carefully adjusted due to bleeding risk—especially in patients with brain trauma or requiring urgent intervention. Mechanical prophylaxis is considered the safest initial alternative in these cases. Managing surgical timing is also crucial; elective procedures are generally postponed until at least three months of anticoagulation therapy are completed, which directly impacts surgical planning. These findings highlight the importance of a personalized, interdisciplinary, and dynamic strategy, with continuous monitoring and clinical follow-up between three and six months to prevent sequelae and adjust treatment. Overall, this evidence reinforces the need for adaptive, risk-based protocols to optimize outcomes in surgery and trauma without compromising patient safety (Rama et al., 2023).
Agosta et al. (2024)	Perioperative Mechanical Circulatory Support for Cardiac Assistance in Thoracic Surgery: A Scoping Review Protocol	Systematic Review	Findings on the perioperative implantation of temporary mechanical circulatory support (tMCS) demonstrate an emerging approach to optimizing surgical care, especially in thoracic surgery patients with high cardiovascular risk. The possibility of using these devices either individually or in combination represents a feasible and safe alternative, particularly in contexts where surgical complications could lead to acute heart failure—a critical situation that jeopardizes both anesthetic and surgical outcomes. From the anesthetic perspective, using tMCS allows for more stable hemodynamic management, which is key to preventing intra- and postoperative adverse events. Additionally, having a planned circulatory support system can expand the surgical eligibility of

Author(s), Year	Title	Methods	Results
			complex patients without postponing necessary procedures due to cardiac comorbidities. This approach suggests a promising move toward more personalized, technologically advanced surgical care focused on preventing critical events aligned with continuous improvement principles in surgery, anesthesiology, and perioperative medicine (Agosta et al., 2024).
Hayat et al. (2024)	The Role of Mobile Health Technology on Perioperative Spinal Care: A Systematic Scoping Review and Narrative Synthesis	Systematic Review and Narrative Synthesis	The evidence underscores the critical importance of physiotherapy as a core component of postoperative recovery, especially in spinal and orthopedic surgery patients, many of whom have fragility conditions requiring carefully optimized treatment strategies. In this context, the inclusion of mobile health applications is an innovative tool that enhances patient adherence to rehabilitation programs, facilitating access to guided exercises via videos, which reduces logistical barriers like travel and improves continuity of care. From a surgical and anesthesiology standpoint, these digital solutions contribute to more efficient functional recovery, enabling shorter interventions and reducing risks related to prolonged immobility such as chronic pain or neuromuscular decline. Additionally, in trauma cases where physiotherapy is vital for restoring function, these apps could be instrumental in maintaining muscle activity and preventing sequelae in patients with spinal injuries or fragility fractures (Hayat et al., 2024).
Samaniego Brambilla et al. (2024)	Comprehensive Management of the Surgical Patient: Preoperative Optimization and Postoperative Care in General Surgery	Systematic Review	The findings highlight the importance of adopting a comprehensive management approach as a key strategy to optimize clinical outcomes in general surgery. This holistic approach covers both the preoperative and postoperative phases and involves coordinated intervention by multidisciplinary teams, which is essential for ensuring safe and efficient care. Preoperative optimization in surgery allows for risk reduction by identifying and managing comorbidities, strengthening nutritional and physical status, and providing emotional support, all of which contribute to more controlled surgeries with fewer complications. In anesthesiology, this approach enables more precise planning of anesthetic management, reducing hemodynamic risks and facilitating better postoperative recovery. In trauma care, where conditions can change rapidly, this model offers more adaptable, patient-centered care focused on stability. Additionally, postoperative care emphasizing pain control, complication prevention, rehabilitation, and emotional support is fundamental for accelerating recovery and improving the patient experience (Samaniego Brambilla et al., 2024).
Cambisaca López et al. (2024)	Optimization of Surgical Care: The Role of Internal Medicine in Preoperative Evaluation, Anesthesiology in Intraoperative Management, and Imaging in Diagnostic Imaging	Systematic Review	Cambisaca et al. demonstrate that the coordinated role of internal medicine and anesthesiology in perioperative care is a fundamental axis for ensuring patient safety and improving clinical outcomes. From internal medicine, preoperative assessment allows early identification and proactive management of cardiovascular, metabolic, and systemic comorbidities, which are essential to reduce complications during and after surgery. This evaluation provides a solid basis for risk stratification and supports more informed surgical decisions, strengthening team collaboration and generating a more patient-centered approach. Anesthesiology plays a strategic role in intraoperative management, ensuring not only patient comfort but also hemodynamic, respiratory, and metabolic stability through rigorous monitoring and immediate clinical responses to critical situations. Together, both professionals serve as pillars in preventing adverse events and establishing a modern, comprehensive, and evidence-based surgical care model (Cambisaca López et al., 2024).

Source: Authors' elaboration.

The review of the literature on optimizing surgical and perioperative care reveals significant evolution in strategies aimed at improving outcomes for patients undergoing general surgery, anesthesiology, and trauma care. Among the most relevant findings is the implementation of ERAS (Enhanced Recovery After Surgery) protocols, which have revolutionized perioperative recovery by combining technological innovation, precise nutritional management, and a patient-centered approach. Findings reported by Briceño Torralba (2021) reinforce the effectiveness of ERAS protocols as key tools for optimizing surgical and perioperative management, demonstrating that their implementation is associated with a significant reduction in hospital stay duration without increasing readmission rates, morbidity, or mortality.

In the realm of prophylaxis and prevention of postoperative infections, the reviewed studies confirm the efficacy of perioperative antibiotic administration within 60 minutes before incision, as well as proper skin antisepsis and

measures such as glove changes during abdominal closure. These practices have been shown to significantly lower the risk of surgical site infections (SSIs), contributing to patient safety. Aldas Ibujes et al. (2024) mention the fundamental role of antibiotic prophylaxis in surgery as a key strategy to prevent infections and perioperative complications, which is essential for optimizing clinical results in general surgery and in highly vulnerable contexts such as trauma.

Another key aspect identified is the management of perioperative pain and the reduction of opioid use through multimodal strategies. Combined analgesia with regional techniques and non-pharmacological therapies such as cognitive-behavioral therapy and mindfulness have shown promising results in decreasing opioid dependence and improving patients' functional recovery. In contrast, Bolívar et al. (2024) conducted a study in general surgery, confirming that early recovery and early ambulation are critical objectives. Minimizing opioid use can reduce side effects

such as nausea, drowsiness, or postoperative ileus, thereby improving patient experiences and recovery times.

Preoperative education and prehabilitation emerge as essential tools to optimize recovery, especially in colorectal surgery patients. The suspension of tobacco and alcohol consumption weeks before surgery, along with physical training, has demonstrated to reduce complications and improve cardiopulmonary function. Ubré (2020) provides solid evidence on the clinical effectiveness of prehabilitation in high-risk patients undergoing major abdominal surgery. The intervention, centered on a supervised physical resistance and daily activity promotion program, indicates that preparing the patient before surgery is not only feasible but also highly beneficial in reducing postoperative complications. From the perspective of general surgery, this approach allows for early intervention in the patient's functional status, enhancing their capacity to cope with surgical stress.

The use of advanced monitoring tools, such as thromboelastography (TEG), has proven valuable for optimizing perioperative management, allowing for precise assessment of the patient's hemostatic status and facilitating personalized therapeutic decisions. Hernández-Pérez et al. (2022) highlight the clinical and operational value of TEG as an advanced tool in preanesthetic evaluation and intraoperative hemostatic management, positioning it as a key resource to optimize surgical care. For anesthesiology, the real-time data provided by TEG enable rapid adaptation of transfusion strategies in cases of intraoperative bleeding, reducing the need for empirical transfusions and limiting the risk of complications related to excessive transfusion,

such as volume overload or immunosuppression.

Conclusions

The reviewed scientific evidence demonstrates that optimizing surgical and perioperative care requires a comprehensive, proactive, and multidisciplinary approach, especially within the fields of general surgery, anesthesiology, and trauma. Strategies such as the implementation of ERAS protocols, prehabilitation in high-risk patients, effective drug management, and the use of advanced tools like thromboelastography (TEG) represent substantial advances toward safer, more efficient, and patient-centered care. From an anesthesiology perspective, the importance of multimodal pain management focusing on reducing opioid use, individualized hemodynamic monitoring, and anticipatory risk management is emphasized.

In general surgery, preoperative interventions that improve functional status and reduce postoperative complications are beneficial, while in trauma, applying these principles must be tailored to the urgency and complexity of each case, without losing sight of structured, evidence-based interventions. Collectively, the analyzed studies show that perioperative optimization not only improves clinical outcomes such as shorter hospital stays, reduced readmissions, and fewer complications—but also contributes to the sustainability of the healthcare system by rationalizing resources and lowering costs. Ultimately, establishing an optimized perioperative care model involves not only updating clinical protocols but also fostering a cultural shift toward more personalized, multidimensional, and collaborative surgical care.

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Contribución de los autores (Taxonomía CRediT). Dayana Carolina Carrión Prado: conceptualización de la investigación, diseño metodológico, desarrollo del proceso investigativo, análisis formal de los datos, redacción del borrador original del manuscrito, revisión crítica del contenido científico y supervisión general del estudio. Paul Alexander Orellana Añazco: curación y organización de los datos, participación en la recolección de información, validación de los resultados obtenidos y elaboración de representaciones gráficas y visualización de los datos.
Declaración de conflicto de intereses Los autores declaran que no existe conflicto de intereses en relación con la investigación presentada, la autoría del manuscrito ni la publicación del presente artículo.
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