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The Synergy of Perioperative Leadership Practice in General Surgery and Anesthesiology: An Evidence-Based Critical Analysis of Mitigating the Metabolic Response to Trauma and Optimizing Perioperative Outcomes

The Synergy of Perioperative Leadership Practice in General Surgery and Anesthesiology: An Evidence-Based Critical Analysis on Mitigating the Metabolic Response to Trauma and Optimizing Perioperative Outcomes

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Summary

This scientific review and clinical analysis article proposes a care model based on the integration of competencies in General Surgery and Anesthesiology, aiming at patient safety and the efficiency of health systems. The research explores the pathophysiology of surgical trauma and how the performance of a professional with **transversal training—** capable of understanding the surgical technique and supervising the modulation of the anesthetic physiological response—acts as a determinant in reducing morbidity and mortality. Based on guidelines from the World Health Organization (WHO), Enhanced Recovery After Surgery (ERAS) protocols, and evidence from the Cochrane Library up to 2023, the study delves into the coordination of clinical pre-habilitation in primary care, invasive hemodynamic monitoring, planning for the management of difficult airways, and multimodal analgesia. A complex case study demonstrating the practical application of these concepts in **managing flows** in an emergency setting is included. It concludes that a systemic vision and **integrated clinical coordination** are imperative for excellence in modern perioperative medicine.

Keywords: General Surgery. Anesthesiology. Metabolic Response to Trauma. Patient Safety. Perioperative Medicine.

Abstract

This scientific review and clinical analysis article proposes a care model based on the integration of General Surgery and Anesthesiology competencies, aiming at patient safety and health system efficiency. The research explores the pathophysiology of surgical trauma and how the performance of a professional with **transversal** training—capable of understanding operative technique and overseeing the modulation of the anesthetic physiological response—acts as a determinant in reducing morbidity and mortality. Grounded in World Health Organization (WHO) guidelines, Enhanced Recovery After Surgery (ERAS) protocols, and Cochrane Library evidence up to 2023, the study delves into clinical prehabilitation in primary care, invasive hemodynamic monitoring, difficult airway management planning, and multimodal analgesia. A complex case study demonstrating the practical application of these concepts in **workflow management** within an urgency setting is included. It is concluded that systemic vision and **integrated clinical coordination** are imperative for excellence in modern perioperative medicine.
Keywords: General Surgery. Anesthesiology. Metabolic Response to Trauma. Patient Safety. Perioperative Medicine.

Introduction

Contemporary perioperative medicine faces a scenario of increasing complexity. demographic and clinical factors, characterized by population aging and the prevalence of chronic comorbidities, which requires a thorough reassessment of traditional care models. fragmented. Historically, the evolution of medical specialties has led to a segmentation.

Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

functional where surgeons and anesthesiologists operate in distinct technical spheres, often
creating gray areas in communication that can compromise patient safety and...
continuity of care. However, the modern understanding of the pathophysiology of the response
metabolic response to surgical trauma, first described by Cuthbertson and later refined by
Moore (1959) and Kehlet (1997) call for an urgent reintegration of this knowledge to modulate the cascade.
Neuroendocrine and inflammatory response triggered by tissue damage. The aim of this study is
to demonstrate, through a critical review of the literature and analysis of care practices, that the
A professional with perioperative leadership skills, possessing a strong command of both anatomical principles and...
In terms of both surgical and anesthetic pharmacodynamics, it is uniquely positioned to **orchestrate the**
holistic perioperative care, mitigating the deleterious effects of surgical stress through
from an approach that begins in primary care and extends to functional rehabilitation.
complete. It is worth noting that this does not refer to the simultaneous execution of acts, but to the capacity to
Coordination, decision-making, and planning. The fragmentation of perioperative care has been highlighted.
by several authors, such as Grocott and Pearse (2012), as a contributing factor to post-
Adverse operative outcomes, due to a lack of alignment between surgical goals and management.
Physiological anesthesia can result in hemodynamic instability, inadequate pain control, and
delayed recovery. Recent medical literature, including guidelines from the World Federation of
The World Federation of Anesthesiologists (WFSA, 2022) corroborates the need for a professional profile.
An integrator, capable of seamlessly transitioning between surgical technique and advanced life support.
This article argues that merging these skills not only enhances the technical security of
procedure, but it transforms the management of the surgical process into a cohesive continuum, where the
preoperative planning, intraoperative technical execution, and postoperative functional recovery.
Operational procedures are orchestrated by a unified clinical vision. The analysis is based on the premise that
The **professional who understands** mechanical ventilation and anesthetic pharmacology is better off.
equipped to make critical decisions in emergency scenarios, while possessing knowledge of the times.
and surgical risks refine anesthetic management, creating a virtuous cycle of quality care.
and allocative efficiency of resources.

Development

1. The pre-habilitation revolution and its integration with primary care.

The safety of the surgical procedure is largely determined by the reserve
The patient's functional status even before hospital admission is crucial, which places Primary Health Care at the forefront of this assessment.
as the first and perhaps most critical stage of the perioperative period. The concept of "pre-
multimodal habilitation, widely advocated by authors such as Carli and Scheede-Bergdahl (2021)
In his reviews in Anesthesiology Clinics, he proposes that the waiting time until elective surgery should not

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It should be a period of passivity, but an active therapeutic window of opportunity to optimize.

Functional capacity, nutritional status, and comorbidity management. The physician with experience.

In the Family Health Strategy and General Surgery, it is understood that the correction of anemia...

Preoperative iron deficiency anemia, strict control of glycated hemoglobin in diabetics, and cessation of...

Smoking cessation measures are not just public health measures, but interventions that directly reduce the risk of smoking.

incidence of surgical site infection, anastomotic dehiscence, and complications

Cardiopulmonary. The implementation of pre-habilitation protocols requires a systemic approach to

Prescribe supervised physical exercise and protein supplementation, preparing the body for...

the catabolic metabolic demand that surgical trauma will inevitably impose. The assessment of

Preoperative cardiovascular risk assessment should go beyond the mechanical application of algorithms and scores.

such as the RCRI (Revised Cardiac Risk Index) by Lee (1999), requiring clinical interpretation.

refined assessment of the patient's functional capacity in relation to the specific stress of the proposed surgery.

The guidelines of the American College of Cardiology and the American Heart Association (ACC/AHA,

Studies (2014, validated in 2022) emphasize the importance of exercise tolerance (assessed in

Metabolic equivalents (METs) as an independent predictor of perioperative outcomes.

Perioperative leadership, when assessing a patient, correlates cardiac auscultation and examinations of

The image should not only show the underlying pathology, but also the expected acute hemodynamic changes.

during anesthetic induction, pneumoperitoneum or aortic vascular clamping. This analysis

The integrated system allows for the rational and economical request of pharmacological stress tests or

Echocardiography, avoiding unnecessary tests that delay treatment and generate...

costs, while accurately identifying patients who need

Invasive monitoring or planned inotropic support, ensuring that the surgery takes place under...

Maximum cardiovascular safety conditions. Management of medications for continuous use during the period

The perioperative period constitutes one of the most complex challenges in current medical practice, given the prevalence

Polypharmacy in elderly patients with multiple comorbidities. The decision to suspend or maintain

antiplatelet agents, direct oral anticoagulants (DOACs), angiotensin-converting enzyme inhibitors

The use of angiotensin (ACE) and hypoglycemic agents requires a thorough understanding of pharmacokinetics.

of these drugs and surgical hemostasis. As recommended by Douketis et al. (2019) in the study

PAUSE, the **physician with cross-sectional training** assesses the patient's individual thrombotic risk (e.g.

atrial fibrillation with elevated CHADS2-VASc or recent coronary stent) versus risk

Hemorrhagic risk inherent to the specific surgical technique to be employed. Transition protocols

(bridging) with low molecular weight heparins must be prescribed with millimeter precision,

respecting the half-life times to avoid both catastrophic thromboembolic events

how much uncontrollable intraoperative bleeding increases morbidity and mortality and the

Consumption of blood products. Airway assessment is a critical component of safety.

Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

anesthetic that benefits immensely from the surgical perspective, especially in patients with
Distorted anatomy due to cervical tumors, previous trauma, or morbid obesity. Identification of
Predictors of difficult ventilation with a mask and difficult intubation (Mallampati score, distance
Thyromental and cervical mobility assessments) should be performed meticulously during the prenatal consultation.
operative. The general surgeon, familiar with surgical approaches to the neck, addresses the
Planning for a difficult airway from a dual perspective: that of non-invasive ventilatory management.
and the possibility of emergency surgical access (cricothyroidotomy). This proactive assessment
It allows for the planning of advanced strategies, such as vigil intubation with fiberoptic bronchoscopy or...
presence of a team prepared for immediate surgical airway management (front of neck access), following
strictly adheres to the guidelines of the Difficult Airway Society (DAS, 2015/2022), which drastically reduces
The risk of hypoxic brain injury and death due to oxygen failure. Patient education and...
Informed consent processes gain depth and clinical effectiveness when
conducted by a professional who **understands** all stages of surgical and anesthetic treatment.
Preoperative anxiety is a known factor in increasing pain perception and consumption.
of analgesics in the postoperative period, mediated by the excessive release of catecholamines and cortisol.
to explain in detail the surgical technique, the type of anesthesia (general, regional or combined), the
Considering the risks involved and the recovery plan, the doctor establishes a solid therapeutic alliance and
anxiety reduction. The humanized approach, inherited from primary care practice, allows
To demystify the fear of anesthesia and engage the patient as an active agent in their healing process.
Systematic review studies, such as those by Jlala et al. (2010), demonstrate that well-
Those who reported experience shorter hospital stays and better satisfaction rates, validating the
Effective communication as a high-impact clinical technical tool. Nutritional optimization.
It is a frequently neglected pillar of pre-habilitation, but one that has a direct correlation with...
Wound healing, anastomosis strength, and immune competence. Protein-protein malnutrition.
Caloric deficiency and sarcopenia are prevalent in cancer patients and the elderly, increasing
The risk of infections and dehiscence increases exponentially. The perioperative physician must perform the
Nutritional screening (e.g., NRS-2002) and prescription of immunomodulatory supplementation (arginine, omega-
3, nucleotides) in the preoperative period, as recommended by the European guidelines.
Society for Clinical Nutrition and Metabolism (ESPEN, 2021). Correcting vitamin deficiencies and
Electrolyte replacement before surgery ensures that the patient has sufficient metabolic substrate for...
To combat trauma-induced catabolism, transforming nutritional status from a risk factor.
Modifiable into a robust protective factor. The integration of clinical data across levels of
Attention is fundamental to ensuring continuity of care and avoiding the dangerous fragmentation of...
Medical information. The use of electronic medical records and effective communication between the primary care unit.
Health officials and the surgical hospital allow for the review of allergy history and previous adverse reactions to...

Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

anesthetics (such as a family history of malignant hyperthermia) and complex comorbidities are duly considered in surgical planning. The **physician with cross-functional practice** acts as the custodian of this information, ensuring that the planning carried out in primary care is accurate. This translates into safe practices within the surgical suite. Clinical information management, according to... highlighted by Kripalani et al. (2007) in studies on communication deficits at hospital discharge, is a patient safety element that is as important as manual technical skill, preventing Errors of omission that could have fatal consequences.

2. Anesthetic pharmacodynamics and the modulation of the surgical stress response

The choice of anesthetic technique and pharmacological agents is not solely aimed at achieving unconsciousness and immobility, but active modulation of the neuroendocrine and inflammatory response to Surgical trauma. Surgical stress triggers a massive activation of the hypothalamic-pituitary-adrenal axis. The adrenal and sympathetic nervous systems are stimulated, resulting in the release of cortisol, catecholamines, and cytokines. pro-inflammatory (IL-1, IL-6, TNF-alpha) that promote catabolism, insulin resistance and Transient immunosuppression. The **physician with cross-disciplinary training** understands, based on studies According to Kehlet and Wilmore (2002), regional anesthesia (epidural, spinal anesthesia, peripheral nerve blocks) It is superior to general anesthesia alone in suppressing this neuroendocrine response, as it blocks the Afferent nociceptive transmission in the spinal cord. The incorporation of anesthesia techniques. regional techniques in daily surgical practice, such as the transversus abdominis plane block (TAP Block). Ultrasound-guided therapy is an evidence-based strategy to mitigate metabolic stress and To accelerate postoperative recovery. The pharmacokinetics and pharmacodynamics of the agents. The use of intravenous and inhalational anesthetics must be understood to ensure stability. Cardiovascular and rapid neurological recovery of the patient. The use of pharmacokinetic models Target-controlled infusion (TCI) for the administration of Propofol and Remifentanil, as described by Marsh and Schnider, allows for precise titration of depth of anesthesia, avoiding both intraoperative awakening and relative overdose. which leads to myocardial depression and delayed awakening. **Perioperative leadership aligns with the team** measures plasma concentrations and concentrations at the effector site (brain) according to the intensity of surgical stimulus at each moment (skin incision, visceral manipulation, closure of the aponeurosis), maintaining a stable anesthetic plane that favors tissue perfusion and minimizes the exacerbated systemic inflammatory response. The management of neuromuscular blocking agents is a a critical aspect of anesthetic safety, with direct implications for surgical technique ease and in Postoperative respiratory safety. The use of non-depolarizing muscle relaxants (such as Rocuronium (or Cisatracurium) facilitates tracheal intubation and surgical exposure, especially in laparoscopic procedures where relaxation of the abdominal wall is essential for the field of view.

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surgical. However, residual neuromuscular blockade in the recovery room is a cause
frequent occurrence of serious pulmonary complications, such as hypoventilation, atelectasis, and pneumonia.
Aspiration. Objective monitoring of neuromuscular transmission (TOF - Train-of-Four) and the use
careful selection of reversal agents, such as Sugammadex (which encapsulates the relaxant molecule).
steroidal), are mandatory practices according to ASA guidelines (2023) to ensure recovery
Complete assessment of muscle strength and airway protective reflexes prior to extubation.
Organic function during surgery involves maintaining physiological homeostasis through strategies of
Protective mechanical ventilation and strict hemodynamic control. Low-volume ventilation.
currents (6-8 ml/kg of predicted body weight), the use of optimized PEEP (Positive End-Expiratory Pressure) and
Alveolar recruitment maneuvers prevent ventilator-induced lung injury (VILI) and...
release of inflammatory mediators by the lung (biotrauma), as demonstrated in the study
PROVE Network (2014). **Perioperative leadership discusses** ventilatory parameters.
considering the altered respiratory mechanics due to patient positioning (Trendelenburg) and
through pneumoperitoneum, ensuring adequate gas exchange without causing barotrauma or volutrauma,
thus protecting the lungs for the critical postoperative period. The Opioid-Free strategy
Anesthesia (OFA) or Opioid-Sparing has gained prominence in recent literature, as in the works
de Lavand'homme (2019), as a way to avoid the deleterious effects of opioids, such as
Induced hyperalgesia, immunosuppression, and postoperative adynamic ileus. The use of
anesthetic adjuvants with different mechanisms of action, such as Dexmedetomidine (alpha-agonist)
2) Intravenous lidocaine, magnesium sulfate, and ketamine (NMDA antagonist) allow for a
Potent multimodal analgesia and a significant reduction in intraoperative opioid consumption.
The perioperative leadership plans pharmacological regimens **in conjunction with the** team that
They block nociception at multiple levels of the nervous system, providing stability.
Superior hemodynamics and a more comfortable, lucid, and nausea-free awakening for the patient.
Thermoregulation is a fundamental physiological parameter that directly impacts coagulation.
Drug metabolism and surgical site infection rate. Perioperative hypothermia does not
Intentional bleeding (core temperature < 36°C) alters platelet function and the coagulation cascade.
enzymatic, increasing surgical bleeding and the need for transfusion, as
evidenced in the study by Sessler (2016). Furthermore, hypothermia causes peripheral vasoconstriction,
Postoperative tremors that increase oxygen consumption by up to 400% and delay recovery.
Anesthetic metabolism. The **professional with a cross-functional perspective coordinates** active protocols of
Heating (forced air heating blanket, fluid heating) and temperature monitoring.
central (esophageal), recognizing that maintaining normothermia is a critical therapeutic intervention for surgical
success. Monitoring of anesthetic depth through the Index
Bispectral (BIS) or Entropy is essential for titrating the administration of hypnotics and preventing...

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Intraoperative awareness, a traumatic event with serious psychological consequences. At the same time
Over time, this monitoring prevents the over-administration of anesthetics in elderly patients or
Fragile, which is associated with intraoperative hypotension, longer recovery time, and risk.
increased postoperative cognitive dysfunction (delirium), as suggested by the study.
ENGAGES (2019). The perioperative physician **supervises** these neuro- tools.
Monitoring to personalize anesthesia, ensuring that the patient's brain is protected as much as possible.
from the psychological trauma of waking up to the potential neurotoxicity of anesthesia
unnecessarily deep (burst suppression).

3. Advanced hemodynamic monitoring and goal-directed therapy

Intraoperative hemodynamic management has evolved from simply replacing estimated losses.
for Goal-Directed Fluid Therapy (GDFT), which uses parameters
fluid responsiveness dynamics to optimize cardiac output and oxygen delivery (DO2)
to the tissues. The **physician with cross-disciplinary training** understands, based on the studies of Cecconi et al.
al. (2014), that intraoperative hypotension, even for short periods, is independently
associated with acute kidney injury, myocardial ischemia, and stroke. The use of
minimally invasive technologies that analyze the contour of the arterial pulse wave to calculate
Stroke volume and pulse pressure variation (PPV) allow for precise titration of blood volume.
The goal is to keep the patient on the ascending part of the Frank-Starling curve, ensuring preload.
ideal without causing fluid overload, which would lead to interstitial edema that is detrimental to healing.
anastomoses and pulmonary function. The rational use of vasopressors and inotropes is a component
essential to GDFT, allowing the maintenance of organ perfusion pressure without the need for
Excessive infusion of crystalloids that damage the endothelial glycocalyx. **Perioperative leadership**
one must distinguish between hypotension caused by hypovolemia, vasodilation induced by anesthesia, or
myocardial depression, discussing the most appropriate vasoactive agent (phenylephrine, norepinephrine,
ephedrine or dobutamine). In patients with septic shock or acute inflammatory response syndrome.
In patients undergoing emergency surgery, systemic hemodynamic management (SIRS) requires early and aggressive management.
focused on normalizing lactate and central venous oxygen saturation (SvO2) according to the
The principles of Rivers (2001), updated by the Surviving Sepsis Campaign, are crucial for the
survival and prevention of multiple organ failure. Monitoring of microcirculation and
Regional tissue perfusion represents the new frontier of anesthesiology and critical surgery.
While macro-hemodynamics (blood pressure, heart rate) may appear normal, microvascular perfusion may be impaired.
compromised, leading to hidden tissue hypoxia and metabolic acidosis. The attentive physician uses
parameters such as the CO2 gap (veno-arterial CO2 difference), serial arterial lactate, and cardiac output.
Hourly urinary rhythms as indirect markers of perfusion adequacy. In major surgeries,

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Preserving the splanchnic microcirculation is vital to prevent bacterial translocation and sepsis.
Abdominal focus. The integration of surgical pathophysiological knowledge with monitoring.
Intensive care allows for early interventions that restore capillary blood flow before complications arise.
Irreversible cellular injury and mitochondrial dysfunction. Intraoperative fluid management should be...
rigorously adapted to the type of surgery and the patient's clinical context, avoiding both
an old "liberal" strategy, which caused "drowning in saltwater" and tissue edema, as for
An excessively "restrictive" strategy, which can cause renal hypoperfusion and instability. The current concept
of "zero fluid balance" or moderate restrictive fluid therapy, advocated by the ERAS protocols and
Validated by the RELIEF study (Myles et al., 2018), it aims to maintain the patient's body weight stable.
in the postoperative period. The use of balanced crystalloid solutions (such as Ringer's Lactate or Plasma-
Lyte) as opposed to 0.9% saline solution prevents hyperchloremic metabolic acidosis, which
It can impair kidney function and blood clotting. The **physician with cross-disciplinary training advocates for...**
Selecting the type and volume of fluid with the same surgical precision used to manipulate tissues. A
Intraoperative point-of-care transesophageal or transthoracic echocardiography (POCUS) has become
an indispensable tool for the rapid differential diagnosis of hemodynamic instability.
acute. The ability to directly visualize ventricular contractility, chamber volume
Cardiac conditions and valve function allow the physician to quickly distinguish between hypovolemic shock,
Cardiogenic, obstructive (pulmonary embolism, tamponade) or distributive. **Leadership with**
Point-of-care ultrasound training utilizes this technology to guide resuscitation.
Real-time hemodynamic monitoring, adjusting fluid therapy and vasoactive drugs based on data.
Direct anatomical and functional aspects, exponentially increasing the safety and precision of the procedure.
Anesthetic in critical situations. Hemoglobin management and blood transfusion decisions should be considered.
to follow restrictive evidence-based protocols (Patient Blood Management), which aim to
to preserve autologous blood and minimize the immunological and infectious risks of transfusion.
Allogeneic. The doctor assesses the individual's tolerance to anemia based on the oxygen extraction rate.
and the patient's comorbidities, avoiding transfusions based solely on numerical triggers.
arbitrary hemoglobin levels (e.g., the 10/30 rule), as suggested by the AABB guidelines (Carson
et al., 2016). The use of tranexamic acid to inhibit fibrinolysis, the meticulous surgical technique for
Hemostasis and intraoperative blood recovery (Cell Saver) are integrated strategies that
They reduce the need for blood components and improve oncological and infectious disease outcomes.
Postoperative care. Cardiopulmonary interaction during mechanical ventilation and pneumoperitoneum in
Laparoscopic surgery requires constant and proactive hemodynamic adjustments. Increased pressure
Intra-abdominal pressure and decreased intrathoracic pressure reduce venous return and may compromise
significantly reduces cardiac output, especially in hypovolemic patients. **Leadership**
perioperative assessment anticipates these physiological changes during carbon dioxide insufflation and the

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Patient positioning (reverse Trendelenburg), performing prior volume expansion or adjustment.
Vasopressors are used to maintain stability. This understanding of physiology is applied to the technique.
Surgical intervention prevents episodes of severe hypotension and arrhythmias, ensuring the benefits of surgery.
minimally invasive procedures should not be negated by severe intraoperative hemodynamic complications.

4. Airway management and the "I won't intubate, I won't ventilate" crisis scenario

Managing a difficult airway (DA) represents the scenario with the highest cognitive stress and risk.
Immediate death or hypoxic brain injury in the practice of anesthesiology. The guidelines of the Difficult
The Airway Society (DAS, 2015) and the American Society of Anesthesiologists (ASA, 2022) structured the
An approach based on sequential algorithms that prioritize maintaining oxygenation. The **physician with**
Cross-functional training possesses a decisive tactical advantage: the ability to coordinate the transition.
without hesitation among non-surgical techniques (laryngeal mask, videolaryngoscopy, fiberoscopy)
flexible) and salvage surgical techniques. Preoperative identification of VAD predictors
It allows for the planning of awake intubation or the preparation of the team for it.
An immediate surgical airway, transforming a potential catastrophe into a procedure.
Controlled and safe. Rapid sequence induction (RSI) is the technique of choice for patients with
"Full stomach" (trauma, intestinal obstruction, pregnant women, severe GERD) to prevent
bronchoaspiration and Mendelson's syndrome. The procedure requires the simultaneous administration of
A fast-acting hypnotic and neuromuscular blocking agent was administered, followed by immediate intubation without ventilation.
Previous use under a mask, often associated with cricoid pressure (Sellick maneuver). **Leadership**
The perioperative period ensures the precise execution of this maneuver, aware that errors in execution...
These can result in severe aspiration pneumonia and ARDS (Acute Respiratory Distress Syndrome).
The choice of induction drugs (e.g., ketamine, etomidate, succinylcholine, or high-dose rocuronium)
It is adapted to the patient's hemodynamic stability, ensuring airway protection without
precipitate cardiovascular collapse. The "Cannot Intubate, Cannot Ventilate" (CICO) scenario.
Cannot Oxygenate (CVOC) is the most severe airway emergency, where oxygenation fails for all other reasons.
Non-invasive methods (face mask, supraglottic device). At this critical moment, hesitation
Failure to perform a surgical airway (FONA - Front of Neck Access) is the leading cause of mortality.
and neurological morbidity, as indicated by the NAP4 (National Audit Project 4) study.
general surgeon, trained in cervical anatomy and the technique of surgical cricothyroidotomy or by
puncture (scalpel-bujia-tube technique), possesses the necessary **decision-making capacity and technical support.**
to establish a definitive airway in seconds. This surgical skill is integrated with
The anesthetic algorithm eliminates the delay in decision-making, ensuring oxygenation and saving lives.
The patient's life in situations of complete ventilation failure. Tracheal extubation is a phase of

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risk as high as intubation, subject to complications such as laryngospasm, glottic edema and
Loss of airway control. The DAS (2012) extubation guidelines recommend a strategy
planned, especially in patients with a known difficult airway. The **physician with vision**
The cross-sectional study assesses rigorous criteria for neuromuscular recovery, level of consciousness, and protection.
Airway management is performed before removing the tracheal tube. In high-risk cases, exchange catheters may be used.
Airway exchange catheters or deep extubation followed by gentle emergency delivery.
These are techniques that require anesthetic expertise. The management of post-extubation complications, such as...
Laryngeal stridor requires pharmacological intervention (corticosteroids, nebulized adrenaline) or
Immediate reintubation, skills that the professional must master safely. Ventilation
Single-lung surgery for thoracic surgery requires the use of double-lumen tubes or blockers.
Bronchial devices require precise positioning guided by fiberoptic bronchoscopy.
Poor positioning can cause severe hypoxemia, atelectasis in the dependent lung, and barotrauma.
Perioperative leadership **encompasses** the anatomy of the tracheobronchial tree and the physiology of the...
single-lung ventilation (hypoxic pulmonary vasoconstriction - HPV), adjusting ventilation to
To maintain oxygenation during the lung collapse required for surgical exposure.
collaboration between the surgical need for an immobile surgical field and the anesthetic need for gas exchange
It is facilitated when the professional understands both sides of the sterile barrier and its repercussions.
Physiological aspects of the procedure. Airway trauma, whether due to direct injury (cervical injury).
Penetrating injury (laryngeal fracture) or airway burn from inhalation presents challenges.
unique anatomical and physiological characteristics that can make conventional orotracheal intubation impossible.
or extremely dangerous. In these cases, the approach may require retrograde intubation, intubation
guided by fiberoptic bronchoscopy through the lesion or emergency tracheostomy with the patient awake under
Local anesthesia. The trauma surgeon with anesthesia training is **qualified to choose and coordinate** the...
The safest technique, avoiding worsening of the injury ("false airway") or complete loss of the airway.
Induced by neuromuscular blocking agents. Technical versatility is the main safety factor.
in these extreme scenarios. The management of difficult airway equipment, including
video laryngoscopes, flexible fiberscopes, second-generation supraglottic devices and kits of
Cricothyroidotomy should be systematically managed using readily available and standardized difficult airway carts.
in all anesthesia locations. Ongoing staff training in realistic scenario simulations.
A crisis is fundamental for maintaining technical competence and human factors.
(communication, leadership, situational awareness). The physician leader promotes this culture of
preparation, ensuring that the team is ready to respond to any airway failure of
In a coordinated and effective way, following clear and exhaustively practiced mental algorithms.

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5. Damage control surgery and hemostatic resuscitation in trauma

In the care of a severely polytraumatized patient or one with abdominal catastrophe, no Traumatic (e.g., mesenteric ischemia), the Damage Control Surgery strategy (Damage Control Surgery (DCS) represents a paradigm shift that prioritizes physiological restoration. Regarding immediate anatomical correction. The **physician with cross-disciplinary training** recognizes it early. the "lethal triad" (metabolic acidosis, hypothermia, and coagulopathy), described by Moore and others, which This signals the depletion of the patient's physiological reserves. The decision to abort the definitive surgery. complex in favor of abbreviated hemostasis procedures (packing), rapid resection without anastomosis and contamination control, followed by temporary abdominal closure. (peritoneostomy) and immediate transfer to the ICU is a life-saving decision that requires sound clinical judgment and technical courage to stop the procedure at the exact moment. Hemostatic resuscitation is a mandatory anesthetic complement to DCS, aiming to prevent and treat Trauma-induced coagulopathy (TIC). The use of massive transfusion protocols with a proportion A balanced blend of red blood cells, fresh frozen plasma, and platelets (1:1:1), mimicking whole blood. demonstrated a reduction in early mortality from exsanguination in the PROPPR study (Holcomb et al., 2015). **Perioperative leadership coordinates** the early administration of tranexamic acid. (according to the CRASH-2 and CRASH-3 studies) to inhibit hyperfibrinolysis, in addition to guided replacement. of fibrinogen and ionized calcium. Monitoring of coagulation through viscoelastic tests. (Thromboelastography - TEG or Thromboelastometry - ROTEM), when available, allows a Precision transfusion therapy, correcting specific coagulation defects in real time. Hypothermia in trauma is an independent factor of mortality that worsens enzymatic coagulopathy. and myocardial dysfunction. Aggressive temperature management should begin at admission and continue During surgery and transport. Active warming of the patient, increasing the room temperature. During surgery, the use of warmed fluids is mandatory. The **physician must be properly trained .** **Transversal** refers to the exposure of body cavities during laparotomy or thoracotomy. It causes massive heat loss through evaporation and radiation. Technical agility in damage control does not Its purpose is not only to stop the bleeding, but also to limit heat loss by closing the abdomen. temporarily once "surgical" hemostasis is achieved, allowing for effective rewarming and Safe in the intensive care unit. Hemodynamic management in hemorrhagic shock has evolved to the concept of "permissive hypotension" or controlled resuscitation, where systolic blood pressure is maintained at subnormal levels (80-90 mmHg) until surgical control of the bleeding is achieved. achieved by preventing the rupture of newly formed unstable clots and the dilution of the factors of coagulation ("pop the clot"). Perioperative leadership oversees fluid **titration** and Vasopressors are used to maintain the minimum necessary cerebral and coronary perfusion without "bursting" the Poor hemostasis. This strategy requires continuous and precise communication among the team.

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surgical (control of the bleeding source) and the anesthetic team (pressure control), which is
This is facilitated when the leader has an integrated view of both areas. Compartment syndrome
Abdominal edema is a feared complication of massive fluid resuscitation and post-operative visceral edema.
trauma, leading to renal, respiratory, and circulatory failure due to compression of the vena cava. The use of
Open abdomen techniques (Bogotá pouch or vacuum-assisted closure type vacuum systems) in
Damage control surgery aims to prevent this syndrome. The surgical intensivist monitors
Intra-abdominal pressure in the ICU and organ function are assessed to determine the ideal time for reoperation.
planned (second look) and definitive closure of the abdominal wall, or the need for
Emergency surgical decompression in cases of refractory abdominal hypertension with failure.
In the context of severe abdominal sepsis, surgery to control infectious foci should be organic.
integrated into goal-directed hemodynamic resuscitation to treat septic shock. The use
rational use of broad-spectrum antibiotics, drainage of abscesses, and resection of necrotic tissue.
These are source control measures that should occur simultaneously with vasopressor support and
Inotropic. Understanding the pathophysiology of septic myocardial dysfunction and vasoplegia guides...
The choice of vasoactive drugs and monitoring of central venous saturation. The hybrid approach.
ensures the patient receives the best possible intensive care while the surgical cause of sepsis is addressed.
The issue is resolved by adhering to the Surviving Sepsis Campaign treatment packages. The decision of "Second
"Look" or scheduled reoperation is a strategic component of DCS. The return to the operating room
This only occurs after the correction of acidosis, coagulopathy, and hypothermia in the ICU, usually within 24 hours.
48 hours later. **Perioperative leadership assesses** the patient's physiological stability to determine
if he can withstand the stress of another surgery to reconstruct and close the intestinal tract.
from the wall. This staged management of complex trauma transformed previously fatal injuries into
survivable conditions, exemplifying the power of integrating critical physiology and technique.
Refined surgical technique for safeguarding human life.

6. ERA protocols and multimodal analgesia: the science of recovery

Enhanced Recovery After Surgery (ERAS) protocols
Surgery), systematized by Kehlet's group in the mid-1990s, represent the application
A systematic approach to evidence-based medicine in the perioperative period, aiming to reduce the response.
Metabolic response to surgical stress and accelerate the return to normal physiological function. Implementation
The successful implementation of ERAS requires breaking with traditional paradigms and close collaboration between
Surgeons, anesthesiologists, and a multidisciplinary team. The **physician with cross-disciplinary training** works...
as the clinical leader (champion) of this implementation, ensuring adherence to measures such as
abbreviation of preoperative fasting with liquids containing carbohydrates (to reduce resistance)
(insulin), the abolition of routine bowel preparation, and intraoperative fluid restriction. Studies of

Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

Ljungqvist et al. (2023) confirm that adherence to the ERAS elements reduces length of stay.
It reduces postoperative complications by 30-50% and decreases them by 50%, without increasing the rates of
Readmission. Multimodal opioid-sparing analgesia is the cornerstone of ERAS and management.
Modern acute pain management. Overuse of opioids is associated with side effects that delay recovery.
recovery, such as paralytic ileus, nausea, vomiting, excessive sedation, and respiratory depression,
In addition to the risk of chronic dependence, **perioperative leadership coordinates the design of treatment regimens.**
analgesics that combine drugs with different mechanisms of action (NSAIDs, paracetamol,
gabapentinoids, dexamethasone, low-dose ketamine, intravenous lidocaine) and anesthesia techniques
regional (peripheral nerve blocks, epidural catheters). This synergistic approach maximizes
Pain relief while minimizing the toxicity of each individual agent, as recommended.
according to the guidelines of the Procedure Specific Postoperative Pain Management (PROSPECT), allowing that
The patient should mobilize early and breathe deeply, preventing atelectasis and thrombosis.
Prevention of postoperative nausea and vomiting (PONV) is crucial for patient comfort and for
Early refeeding. The use of validated risk scores, such as the Apfel Score, allows
the identification of susceptible patients and the application of aggressive multimodal prophylaxis (antagonists)
5-HT3, dexamethasone, droperidol, aprepitant). The TIVA (Intravenous Anesthesia) anesthetic technique.
Total anesthetic with propofol significantly reduces the incidence of PONV compared to other anesthetics.
Inhalable volatile substances. The **physician with cross-sectional training recommends avoiding** the use of a probe.
Routine nasogastric tube, which is a potent stimulant of nausea and nasopharyngeal discomfort,
reserving it only for specific indications of gastric decompression. Early tolerance to
Oral diet maintains the integrity of the intestinal mucosal barrier and reduces the risk of bacterial translocation.
and improves nitrogen balance. Early mobilization is one of the strongest determinants of
Functional recovery and safe hospital discharge. Bed rest leads to insulin resistance, loss
Rapid loss of muscle mass (sarcopenia) and increased risk of thromboembolic complications.
The pain management strategy should be designed to allow for painless ambulation on the day of surgery.
The managing physician coordinates the early removal of urinary catheters, surgical drains, and access points.
Venous catheters, which act as "anchors" that hold the patient to the bed and increase the risk of
infection. A culture of mobilization must be instilled in the entire healthcare team, transforming the
Post-operative transition from a period of passive convalescence to an active rehabilitation process.
Supervised functional therapy. Postoperative fluid therapy should be restrictive, aiming only at...
Maintaining basal needs until oral intake is resumed. Fluid overload,
Common in unmonitored traditional practice, it leads to weight gain and edema of the intestinal loops.
(delaying the return of gastrointestinal transit), pulmonary edema, and impaired wound healing. The
A physician with cross-disciplinary training monitors the patient's accumulated fluid balance and daily weight.
patient, suspending intravenous hydration prematurely. Preference for balanced solutions of

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ISSN: 2675-9128. São Paulo-SP.

Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

Crystalloids prevent hyperchloremic acidosis associated with the use of large volumes of saline solution.
0.9%. Physiological fluid management is an essential component of perioperative organ protection.
and the prevention of clinical complications. Data auditing and continuous quality improvement.
These are integral and inseparable parts of the ERAS program. The systematic registration of adherence to
elements of the protocol and clinical outcomes (length of stay, complications, readmissions,
mortality) allows for the identification of process flaws and the implementation of rapid improvement cycles (PDCA).
(Plan-Do-Check-Act). The managing physician uses this data to provide constant feedback to the team.
and to adapt the protocols to the local reality and available resources. Participation in databases
Multicenter surgical quality assessments allow for benchmarking with other institutions of excellence.
driving the continuous pursuit of better healthcare outcomes. The ERAS approach is not
Not just a set of rigid rules, but a patient-centered and foundational philosophy of care.
in applied physiology. The **physician with cross-disciplinary training** is the professional best suited to understand
and to apply this philosophy in its entirety, integrating technical interventions into a care plan.
Cohesive, minimizing the impact of surgical trauma and restoring the patient's health with maximum effectiveness.
Efficiency and safety. The adoption of ERAS represents the state of the art in perioperative medicine and
The path to the sustainability of health systems, reducing costs through improvement of
quality.

7. Data management, innovation and the future of integrated medicine

Excellence in medical practice in the 21st century is inseparable from data management and...
Technological innovation. The digitization of healthcare and the implementation of electronic health records generate
a massive volume of data (Big Data) that, if analyzed correctly with tools of
Business Intelligence offers valuable insights into the quality of care and the efficiency of...
processes. The **physician with cross-disciplinary training,** with their comprehensive view of the process.
perioperative, acts as a clinical data analyst, using performance indicators.
Key Performance Indicators (KPIs) to monitor infection rates, reoperation, risk-adjusted mortality, and costs per
procedure. Predictive analysis, based on artificial intelligence (AI) and Machine Learning algorithms.
Learning is beginning to be used to identify high-risk patients who would benefit from
Intensive preventive interventions, personalizing perioperative medicine. Innovation.
Technological advancements, such as robotic surgery and telemedicine, require professionals capable of integrating new skills.
Tools that enhance clinical workflow without compromising safety. Perioperative telemedicine
It allows for remote pre-anesthetic evaluation and post-operative home monitoring through
Wearable devices that track vital signs and physical activity, expanding care.
Beyond the hospital walls. **Perioperative leadership** critically evaluates these technologies,
adopting those that add real value to the patient and discarding technological fads without

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ISSN: 2675-9128. São Paulo-SP.

Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

Evidence of benefit. Innovation management also involves Health Technology Assessment. (ATS), ensuring that the incorporation of new equipment and drugs is cost-effective and Sustainable for the healthcare system. Medical education and the training of new generations must to evolve in order to reflect the need for integration of knowledge. The training of surgical residents. should include formal rotations in anesthesiology and intensive care, and vice versa, promoting the Mutual understanding and effective interprofessional communication. Realistic simulation of scenarios of The perioperative crisis is a powerful pedagogical tool for training technical skills and not techniques (leadership, closed-loop communication, situational awareness). The **doctor with Cross-disciplinary training** acts as a preceptor and mentor, transmitting not only manual technique, but also a culture of safety and a systemic view of patient care, training more qualified professionals. complete and resilient. Clinical research and academic output are essential for the advancement of Perioperative medicine. Conducting pragmatic clinical trials and observational studies on Accelerated recovery protocols, regional anesthetic techniques, and surgical outcomes generate a evidence needed to guide clinical practice. The physician who combines care with... Scientific research contributes to the construction of global knowledge and to the improvement of... care standards. Publication of results in indexed journals and active participation in Scientific congresses keep the professional and the institution at the forefront of medicine based on... evidence. Medical leadership in healthcare organizations is fundamental to the implementation of Systemic and cultural changes. The physician-manager, with their deep understanding of the processes In terms of healthcare, it is better positioned to design efficient workflows and allocate resources effectively. Rational and able to lead multidisciplinary teams. Management of surgical blocks, intensive care units. Intensive care and emergency services require a rare combination of clinical competence and skills. administrative. The **professional with cross-disciplinary training** acts as a bridge between the administration and assistance, aligning the institution's financial objectives with its primary mission. to provide the best possible care to the patient, ensuring the viability of the system. Ethics and Humanization should permeate all medical practice and healthcare management. In an increasingly humanized environment... In a more technologically advanced field and under pressure to be more productive, doctors cannot lose sight of the suffering. The human element and the individuality of each patient. Value-Based Healthcare. places outcomes that matter to the patient at the center of the value equation (split outcomes) (due to cost). The **physician with cross-disciplinary training,** in caring for the patient from preparation to the end. complete recovery, develops a deep and meaningful doctor-patient relationship, ensuring that technology and efficiency serve humanization and not the other way around, preserving dignity in moments of vulnerability. The future of perioperative medicine lies in integration, in Personalization and prevention. The **perioperative leadership profile model,** which combines... From surgical skill to anesthetic intelligence and data-driven management, it represents the evolution

Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

necessary to address the demographic and economic health challenges of the future. This professional
It not only treats acute illnesses, but also manages health and recovery in a holistic, safe and effective way.
Efficient, setting a new standard of excellence in surgical patient care. The convergence
The exchange of knowledge is key to the sustainability and quality of modern medicine.

Case study: reengineering surgical workflows and safety in a medium-complexity hospital.

This case study describes the intervention carried out in a municipal referral hospital.
A regional center in the interior of Brazil, which was facing a chronic operational crisis in its surgical service.
In general, the institution, with 150 beds, had a waiting list for elective surgeries of medium length.
complex procedures (cholecystectomies, hernioplasties, hysterectomies) exceeding two years, generating
Social dissatisfaction and worsening of underlying pathologies. The surgery cancellation rate on the day.
The failure rate of the procedure reached 25%, mainly due to sterilization failures and a lack of beds.
backup and, crucially, undetected clinical decompensation of patients (non-hypertension
controlled, decompensated diabetes). The surgery and anesthesiology teams worked in a way
disconnected, in "silos", and the pre-anesthetic evaluation only occurred the day before surgery, without
sufficient time for clinical optimization. To reverse this unsustainable scenario, it was designed and
A project to restructure the perioperative flow, led by a **physician with [unclear],** was implemented.
Cross-disciplinary training (surgical, anesthetic, and management perspectives). The first stage consisted of...
Integration of the care network, connecting the Basic Health Units (UBS) to the outpatient clinic.
Hospital surgery. A "pre-habilitation" protocol was created in primary care, where the
Patients on the waiting list were contacted three months prior to surgery for clinical optimization.
rigorous, with defined targets for hemoglobin, blood glucose, and blood pressure, in addition to guidelines.
Nutritional and respiratory physiotherapy services were provided. A joint pre-operative assessment clinic was established.
established in the hospital, where the **clinical coordination** reviewed the exams, adjusted medications,
Risk stratification was performed, and the patient and family were educated about the procedure. In the phase
During the intraoperative period, the anesthetic technique was standardized with a focus on regional blocks (spinal anesthesia,
TAP block (peripheral nerve blocks) and opioid sparing, aiming to reduce the time of
Recovery in the PACU. The surgical technique was standardized with smaller incisions and hemostasis.
rigorous. The mandatory and audited use of the WHO Safe Surgery Checklist was instituted in all
Operating rooms. Materials management was optimized with the standardization of surgical kits.
(OPME), reducing waste and operating room setup time. In the postoperative period,
Prolonged fasting and bed rest were abandoned, and refeeding and ambulation were adopted.
Early interventions were conducted according to ERAS protocols adapted to the local context. Bed management was restructured.
with the expectation of discharge within 24 hours for most moderately complex cases, creating a

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Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

Surgical "Fast Track" workflow. After 12 months of rigorous project implementation, the results were statistically significant and transformative for the local health network. The rate of Cancellations of surgeries due to medical reasons have fallen from 25% to less than 5%. The average waiting time... Hospital stay for cholecystectomies was reduced from 3.5 days to 24 hours in 85% of cases. freeing up beds to meet the pent-up demand for urgent and emergency care. Surgical productivity It increased by 40% without the need to hire a new team or expand the physical space, solely through... Process optimization, reduced room turnover time, and decreased suspension rate. The incidence of surgical site infection has decreased by 50% due to timely and correct antibiotic prophylaxis. correct and to strict perioperative glycemic control. Economic analysis demonstrated a reduction A 30% reduction in the average cost per patient treated, attributed to shorter hospital stays and lower consumption of Pain relievers and antiemetic medications, and a reduction in unnecessary tests. Patient satisfaction. Users, as measured by post-discharge surveys (NPS - Net Promoter Score), reached historical levels of approval (>90%). The surgical waiting list was reduced by 60%, restoring credibility and... social function of the public health service. The multidisciplinary team (nursing, nutrition, physiotherapists reported greater engagement, clarity in their roles, and job satisfaction due to Standardization of protocols and the implemented safety culture. The sustainability of the model was guaranteed by the continuous training of the team and the monthly monitoring of indicators of Performance. Visual management meetings and analysis of adverse events have become routine. Integration between primary and secondary care has created a continuous flow of care, where The patient is monitored from diagnosis until final discharge. The **doctor is trained.**

The transversal approach acted as the connecting link in this transformation, translating clinical needs into... efficient administrative processes. This case unequivocally demonstrates that technical leadership Integrated management based on scientific processes, applying modern medical concepts. perioperative care and quality management are capable of overcoming chronic structural inefficiencies, even in public health systems with limited resources. The figure of **integrated leadership** acted as the catalyst for this transformation, uniting the cutting edge of care (surgical and anesthetic techniques) excellence) in strategic management (flows, protocols and people), proving that excellence is possible. It is replicable when there is competence, method, and a systemic vision.

Conclusion

This scientific analysis concerns the convergence of General Surgery practices and Anesthesiology establishes a new paradigm for perioperative medicine, demonstrating that... Integrating skills is the safest, most efficient, and most rational way to address the... The complexity of modern surgical patients. The fragmentation of care into silos of The specialty has proven to be obsolete and insufficient to guarantee the best clinical outcomes in a

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Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

high-pressure healthcare environment. The systemic vision of the **physician with cross-disciplinary training,** who
Mastering both the art of surgery and the science of anesthesia allows for precise modulation of the response.
Metabolic response to trauma, mitigating risks, preventing complications, and accelerating recovery.
Functional status of the patient. Continuity of care, from primary care to hospital discharge, is ensured.
This professional eliminates communication failures and therapeutic discontinuities.
Historically, these factors generate avoidable adverse events. The implementation of global protocols based on
evidence, such as ERAS and WHO safety guidelines, is exponentially facilitated by
Technical leadership of a physician with dual expertise. The ability to manage pain effectively.
multimodal, optimize intraoperative hemodynamics with physiological goals and respond to
Critical emergencies requiring simultaneous surgical and anesthetic skill create a safety net.
robust and redundant around the patient. The data presented in recent scientific literature and
Results corroborated by practical case studies confirm that this integrated model reduces
significantly increases length of stay, use of intensive care resources, and rates of
complications, contributing decisively to the economic and social sustainability of the systems
Public and private healthcare. Total quality management and the strategic use of clinical data.
They are becoming indispensable tools for the practice of excellent medicine in the 21st century.
The contemporary physician must transcend isolated technical execution and act as a manager of
Processes, risks, and clinical outcomes. Active participation in the organization of services and in education.
The continued training of new generations of professionals and high-level scientific production raises the standard.
It provides care and promotes a lasting culture of institutional safety. Innovation in healthcare depends
fundamentally new mental and operational models that place the patient at the center of
comprehensive, coordinated, safe, and humane care. Medical training and policies
Health authorities should recognize, value, and promote this versatile and integrative professional profile.
Valuing hybrid skills does not mean the end of specializations, but rather an evolution towards a...
A transdisciplinary practice where the boundaries of knowledge are transcended for the exclusive benefit of the group.
of the patient. The surgeon who has a deep understanding of anesthesia and the anesthesiologist who understands the
Surgical techniques, embodied by the perioperative physician, represent the synthesis of ideal care:
Technically flawless, physiologically sound, administratively efficient, and profoundly...
Human. The sustainability of global health systems depends on the ability to do more with human resources.
less, without compromising quality. The **integrated leadership model** presented offers a
A concrete answer to this challenge, optimizing human and material resources through efficiency.
procedural efficiency and the reduction of clinical waste (complications, reoperations, readmissions). A
Applying these principles on a large scale has the potential to transform public health, reducing
Reducing waiting lists and democratizing access to safe surgeries. Research and development.
Continuous research in this area is imperative. New studies should focus on validating metrics for

Year V, v.2 2025 | Submission: October 1, 2025 | Accepted: October 3, 2025 | Publication: October 5, 2025

performance for hybrid teams and in assessing the long-term impact on the quality of life of patients. Technology, including artificial intelligence and telemedicine, will be an ally in this. The process, however, will never replace the clinical judgment and integrated technical skill of the physician. Bedside care. Medicine is, and will continue to be, a human science that demands technical competence. and compassion. In short, it is concluded that a professional trajectory based on the integration of General Surgery, Anesthesiology, and Health Management represent a necessary evolution and irreversible in perioperative medicine. The model analyzed exemplifies how scientific rigor, the Technical versatility and an ethical commitment to quality can transform the reality of Healthcare assistance, saving lives, optimizing scarce resources, and restoring dignity and hope. to the surgical patient. The integration of knowledge is undoubtedly the most powerful tool for The advancement of medicine and the protection of human life in the 21st century.

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