

# Consensus Guidelines on Perioperative Care in Primary Retroperitoneal Sarcoma Surgery

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*on Behalf of the Spanish Society of Surgeons and the Portuguese Sarcoma  
Group · Under Review (ASO)*

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# Introduction

Enhanced Recovery After Surgery (ERAS) protocols are well -established in colorectal, gynecologic, and urologic oncology.

However, the histologic and anatomic diversity of RPS poses a distinctive challenge to developing a disease -specific perioperative pathway.

No formal ERAS Society guidelines for RPS

# Consensus Methodology

## Approach

Modified Delphi consensus methodology led by a multidisciplinary panel representing the **Spanish Society of Surgeons** and the **Portuguese Sarcoma Group**.

Group included surgical oncologists, anesthesiologists, medical oncologists, internal medicine specialists, nutritionists, psycho-oncologists, and perioperative care specialists.

Conducted January – June 2025 with fourth and final round at the Spanish –Portuguese Update Meeting on the Treatment of Sarcomas with voters who were not initially involved

## Three-Phase Process

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### Literature Review

Systematic appraisal of existing perioperative evidence

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### Subgroup Synthesis

Dedicated working groups for preoperative, intraoperative, and postoperative domains — each multidisciplinary in composition

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### Consensus Voting

Panel-wide voting to finalize recommendations; consensus defined as  $\geq 80\%$  agreement

# Literature Review

## Search Strategy

Comprehensive search of PubMed/MEDLINE through May 2025 using terms including "retroperitoneal sarcoma," "perioperative care," and "enhanced recovery after surgery."

Soft tissue sarcomas of the extremities, trunk, and thorax were excluded. Given limited RPS-specific evidence, high-quality data from analogous settings — major oncologic, abdominal, and multivisceral resections — were incorporated.

Quality of evidence was graded and recommendation strength determined by the full panel.

## Evidence & Recommendation Framework

<p><b>Evidence Grades</b></p> <p>⊕⊕⊕⊕ High</p> <p>⊕⊕⊕□ Moderate</p> <p>⊕⊕□ □ Low</p> <p>⊕□ □ □ Very low</p>	<p><b>Strong Recommendation</b></p> <p>Benefits clearly outweigh risks across most patients and contexts</p>
<p><b>Weak / Conditional</b></p> <p>Balance of effects uncertain or context-dependent;</p> <p>individualization warranted</p>	<p><b>Consensus Threshold Threshold</b></p> <p>≥80% panel agreement required for adoption</p>

PREOPERATIVE

# Preoperative Recommendations: Preop Counseling

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## Psycho-Oncological Support

Routine preoperative psychological support should be offered to all RPS surgery candidates.

*Evidence: Low · Recommendation: Strong*

# Preoperative Recommendations: Preop Optimization

## Alcohol Cessation

Cessation recommended for  $\geq 4$  **weeks** preoperatively, particularly for patients consuming  $> 5$  drinks/day.

*Evidence : Moderate* ·  
*Recommendation : Strong*

## Smoking Cessation

Intensive interventions advisable **4–8 weeks** prior to surgery to reduce pulmonary and wound complications.

*Evidence : Moderate* ·  
*Recommendation : Strong*

## Anemia Screening & Correction

Preoperative screening required; correction with iron, folic acid, and/or vitamin B12 supplementation as indicated.

*Evidence : Moderate* ·  
*Recommendation : Strong*

# Physical Exercise and Prehabilitation

## Prehabilitation

All surgical candidates should undergo structured prehabilitation addressing three domains: aerobic and resistance exercise, nutritional optimization, and psychological counseling. This multimodal approach improves functional reserve and postoperative resilience.

*Evidence: High*

*Recommendation: Strong*

## Nutritional Care

Validated screening using tools (e.g., NRS-2002, MUST). High-protein oral diet >1 –1.5 g/kg/day with individualized dietary counseling. **Preoperative immunonutrition (e.g., arginine, omega-3 FA) considered in malnourished patients.**

*Evidence: Low*

*Recommendation: Strong*

## Multi-D Preanesthetic Evaluation (Rec. 5)

A comprehensive evaluation should encompass cardiovascular, pulmonary, renal, and hematologic function, along with frailty assessment.

*Evidence: Graded by component*

*Recommendation: Strong*

# Preoperative Recommendations

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## PONV Risk & Prophylaxis

Assess risk using validated scores. High-risk patients: goal-directed fluid optimization, opioid-sparing analgesia, and avoidance of inhalational anesthetics.

*Evidence: Moderate*

*Recommendation: Strong*

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## Anxiolytic Premedication

Individualize based on patient profile and context. Routine benzodiazepine use is **not appropriate** for elderly patients due to delirium risk.

*Evidence: Low*

*Recommendation: Strong*

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## Bowel Prep

Patients undergoing RPS surgery with **planned colectomy** should receive **mechanical and antibiotic bowel preparation**.

*Evidence: Moderate*

*Recommendation: Strong*

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## Fasting & Carb Loading

Short fasting: clear liquids up to 2 hrs, solids up to 6 hrs pre -induction. **Carbohydrate loading (e.g., maltodextrin) the evening before and 2 –3 hrs prior to surgery**, unless aspiration risk present.

*Evidence: Moderate* · *Recommendation: Strong*

# Intraoperative Recommendations

## Antimicrobial Prophylaxis & Skin Preparation

- **Antibiotic Timing & Redosing**

Prophylactic antibiotics must be administered **within 60 minutes** of incision. Intraoperative redosing required if procedure exceeds 2 half-lives of the agent or estimated blood loss exceeds 1,500 cc.

*Evidence: Moderate* ·  
*Recommendation: Strong*

- **Hair Removal & Bathing**

Preoperative bathing is acceptable; no specific product preference. **Clipping is preferred over shaving** to minimize microabrasions and infection risk.

*Evidence: Moderate* · *Recommendation: Weak*

- **Skin Antisepsis**

**Alcohol-based antiseptic solutions** are the preferred agent for surgical site skin preparation.

*Evidence: Moderate* ·  
*Recommendation: Strong*



# Intraoperative Recommendations

## Standard Anesthetic Protocol

- **Thoracic Epidural Analgesia**

Low-dose local anesthetic + opioid combinations recommended for **>72 hours** postoperatively as primary analgesic strategy.

*Evidence: High ·*

*Recommendation: Strong*

- **Multimodal Adjuncts**

Dexmedetomidine, magnesium sulfate, IV lidocaine, or ketamine may be considered for opioid-sparing pain and inflammatory control.

*Evidence: Moderate ·*

*Recommendation: Weak*

- **Protective Ventilation**

Low tidal volumes, patient-specific PEEP adjustments, and lung recruitment maneuvers when clinically indicated.

*Evidence: High ·*

*Recommendation: Strong*

- **Neuromuscular Monitoring**

Quantitative neuromuscular monitoring required throughout; maintain appropriate depth of blockade and reverse residual neuromuscular block as indicated.

*Evidence: High · Recommendation: Strong*

# Intraoperative Recommendations

## Perioperative Fluid Management

Fluid management must be **individualized and goal -directed** , using dynamic parameters such as stroke volume variation (SVV) and cardiac output monitoring rather than fixed volume targets.

**Balanced crystalloids** (e.g., lactated Ringer's, Plasma -Lyte) are preferred over normal saline to reduce hyperchloremic acidosis risk.

Routine colloid use is not recommended. If colloids are required, **albumin is preferred** over synthetic agents.

*Evidence: Low–Moderate · Recommendation: Strong across components*

# Intraoperative Recommendations

## Transfusion & Management of Coagulopathy

- **Minimize Blood Loss**

Appropriately discontinue anticoagulants and antiplatelets preoperatively. Administer **tranexamic acid (TXA)** unless contraindicated. Give fibrinogen concentrate when levels  $<2$  g/L; consider PCC for urgent coagulopathy reversal.

*Evidence: Moderate*

*Recommendation: Strong*

- **Normothermia & Hemostasis**

Maintain normothermia with active warming devices and warmed IV fluids throughout the case. **Permissive hypotension** may be applied selectively in appropriate patients to reduce intraoperative hemorrhage.

*Evidence: Moderate*

*Recommendation: Strong*

- **Restrictive Transfusion**

Restrict pRBC transfusion to Hgb threshold of  **$>7$  g/dL** in hemodynamically stable, non-bleeding patients without cardiovascular or neurologic disease.

*Evidence: Moderate*

*Recommendation: Strong*

# Intraoperative Recommendations

## Abdominal Drains

Routine drain placement is **not recommended**. Selective use may be warranted in the following scenarios:

- Pancreatic resection with risk of fistula
- Extensive lymphadenectomy
- Deep pelvic dissection with concern for fluid collection

When placed, **early removal** is strongly encouraged to reduce infectious and motility complications.

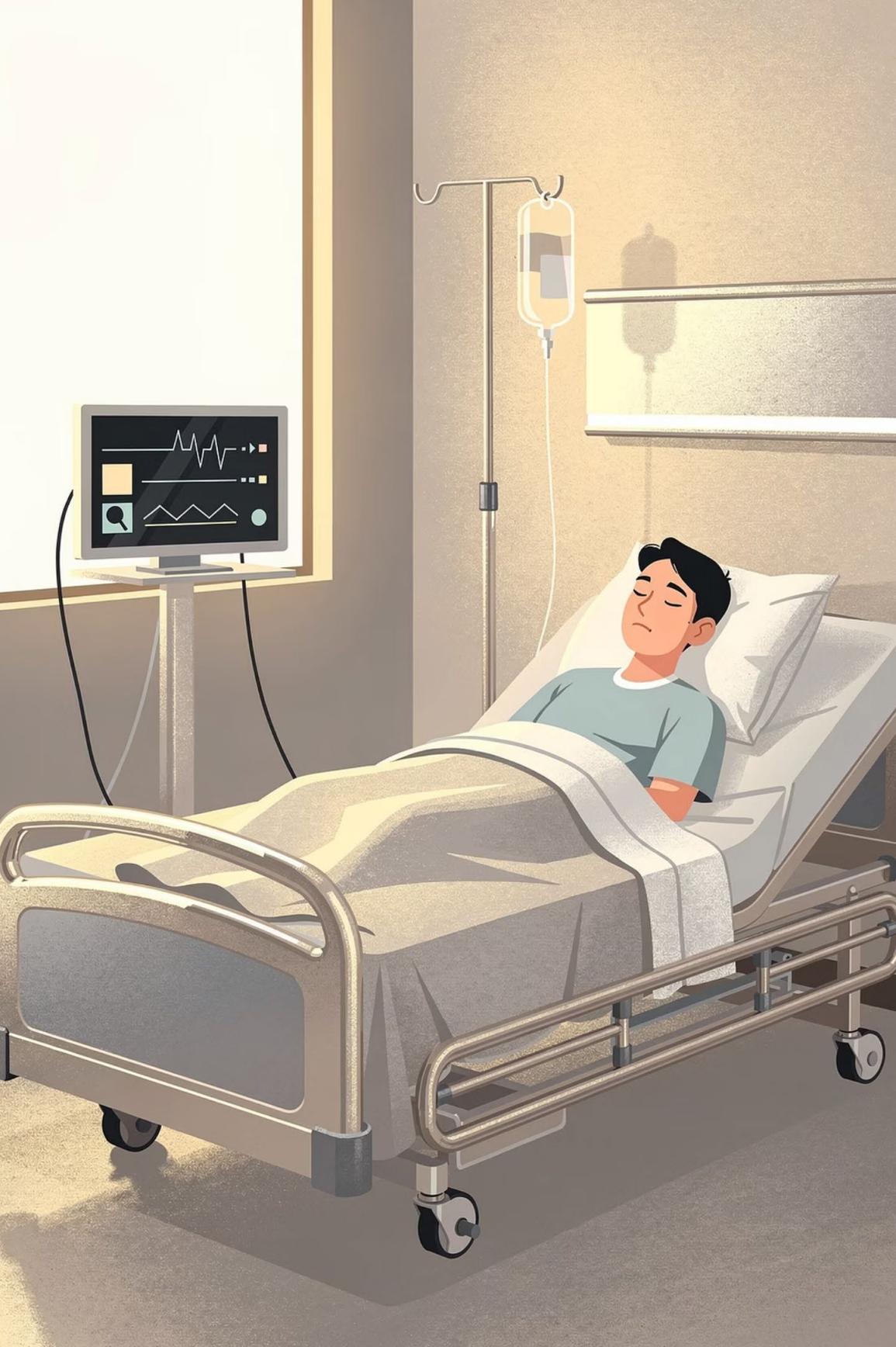
*Evidence: Moderate · Recommendation: Weak*

## Early Extubation

Following multidisciplinary discussion among the surgical, anesthetic, and critical care teams, **extubation in the operating room** should be considered when the patient demonstrates clinical stability

This strategy supports early mobilization and reduces ICU resource utilization.

*Evidence: Moderate · Recommendation: Strong*



## POSTOPERATIVE

# Postoperative Recommendations

### Nasogastric Drainage

Routine NGT use is **not recommended**. Clear indications for placement include: massive gastric distension, high -risk anastomoses, or radiologically confirmed gastroparesis. Early removal is the default when placed.

*Evidence: Moderate* ·  
*Recommendation: Strong*

### Urinary Catheterization

- **Selective Placement**

Reserve for procedures >180 minutes or involving pelvic dissection. Target removal within **24 hours**, even in the setting of thoracic epidural analgesia.  
*Evidence: Moderate* ·  
*Recommendation: Strong*

- **Urinary Retention Risk**

Patients with retention risk factors (BPH, prior retention, pelvic nerve involvement) may be considered for **α-blocker therapy** (e.g., tamsulosin).  
*Evidence: Moderate* ·  
*Recommendation: Strong*

# Postoperative Recommendations

## Prevention of Postoperative Ileus

A comprehensive, multimodal ileus prevention strategy is recommended, integrating:

- Multimodal, opioid -sparing analgesia
- Goal-directed fluid therapy to avoid over- and under-resuscitation
- Avoidance of routine nasogastric tube decompression
- Early oral feeding initiated on the day of surgery

*Evidence: Moderate · Recommendation: Strong*

## Postoperative Analgesia

Thoracic epidural analgesia (T5–T11 level) using local anesthetics combined with short-acting opioids is recommended for a minimum of 72 hours postoperatively as the primary analgesic modality.

Following epidural removal, transition to a combination of acetaminophen, NSAIDs, and opioids as needed for breakthrough pain.

*Evidence: High ·*

*Recommendation: Strong across components*

# Postoperative Recommendations

## Perioperative Nutritional Care

- **Early Oral Intake**

Clear liquids on the day of surgery; advance to solid food by **POD1**. Routine implementation unless contraindicated.

*Evidence: Moderate*

*Recommendation: Weak*

- **Protein Supplementation**

Protein - rich nutritional supplements should be considered during the first **5 postoperative days** to support anabolic recovery.

*Evidence: Low*

*Recommendation: Weak*

- **Daily Intake Monitoring**

Daily assessment of oral nutritional intake is essential to detect insufficiency early and direct timely dietitian -guided interventions.

*Evidence: Low*

*Recommendation: Weak*

- **Preemptive EN/PN**

Enteral or parenteral nutrition should be initiated proactively in patients at risk for poor oral intake, guided by nutritional status, surgical complexity, and recovery trajectory.

*Evidence: Low* · *Recommendation: Strong*

# Postoperative Recommendations

## VTE Prophylaxis

- **Pharmacologic Initiation**

Begin **12 hours prior to surgery** ; resume postoperatively when hemostasis permits.

*Evidence: Moderate · Recommendation: Strong*

- **Extended Duration**

Continue pharmacologic prophylaxis for **4 weeks** postoperatively given the elevated VTE risk in RPS patients.

*Evidence: Moderate · Recommendation: Strong*

- **Mechanical Prophylaxis**

Intermittent pneumatic compression devices used routinely until full patient mobilization is achieved.

*Evidence: Low · Recommendation: Weak*

## Early Mobilization

Early mobilization initiated on the **day of surgery** . Structured targets: **>2 hours** of physical activity by POD2, progressing to **>6 hours per day** thereafter.

*Evidence: Moderate · Recommendation: Strong*

# Conclusion

**Flexible, evidence -informed framework** — acknowledging the wide anatomic, histologic, and procedural heterogeneity inherent to RPS surgery.

## Interventions That Did Not Reach Consensus ( $\geq 80\%$ )

### Preoperative

- Immunonutrition
- Bowel preparation
- Preoperative carbohydrate loading

### Intraoperative

- Routine thoracic epidural analgesia
- Discouragement of routine drain placement

### Postoperative

- Discouragement of routine nasogastric tube use

These areas of non -consensus reflect ongoing clinical equipoise and underscore opportunities for prospective RPS -specific research.

# Strengths & Limitations

## Strengths

- Rigorous Evidence Base
- Transparent Multidisciplinary Process

## Limitations

- Geographic Homogeneity
- Data Extrapolation
- No Patient Voice
- Resource Constraints