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23 - 25 MAGGIO 2024
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ERABS: QUALI ITEMS?

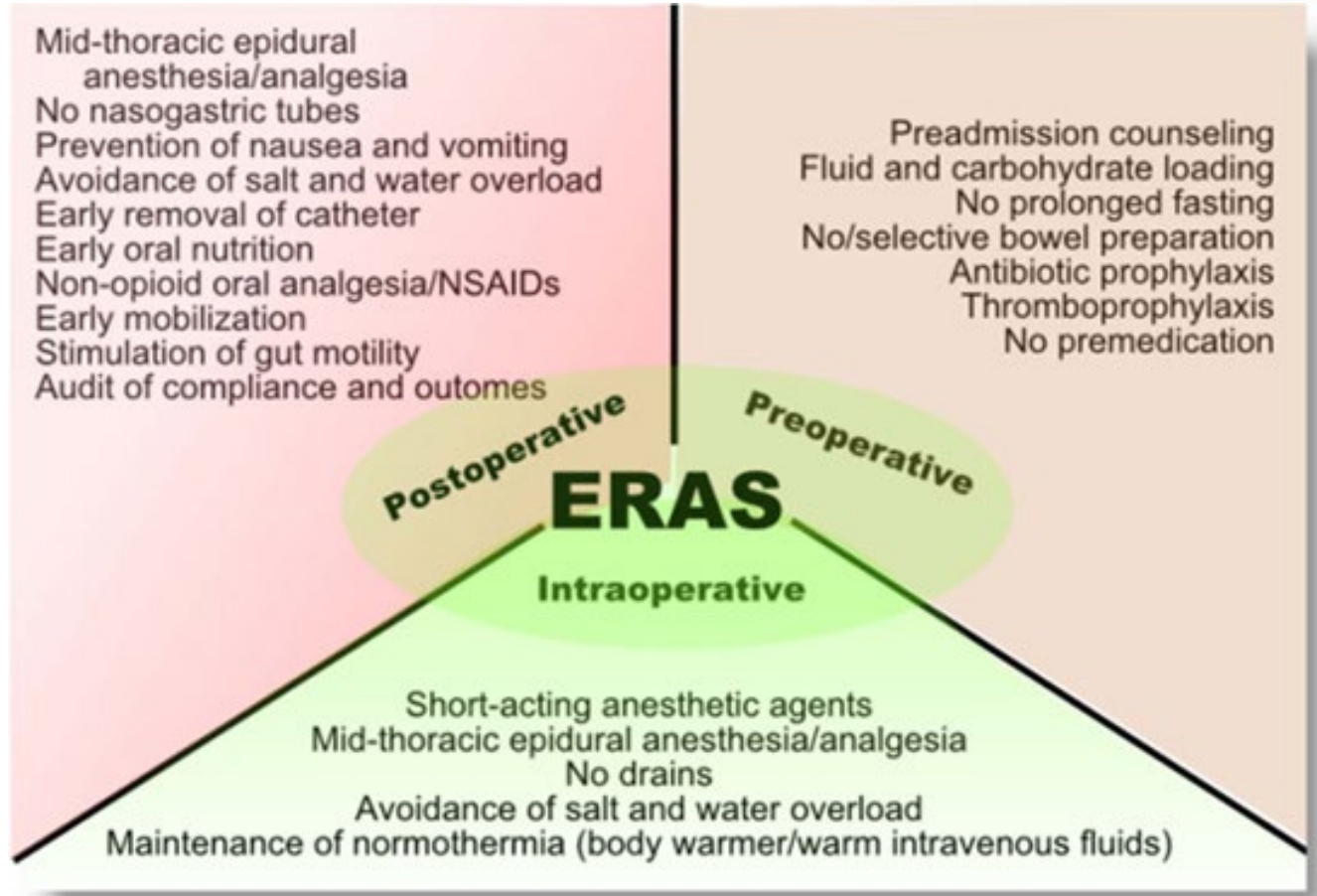
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World Journal
of Surgery



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SCIENTIFIC REVIEW

Guidelines for Perioperative Care in Bariatric Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations

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22 items



SCIENTIFIC REVIEW

Guidelines for Perioperative Care in Bariatric Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations: A 2021 Update

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Table 1 ERAS recommendations for preadmission care in bariatric surgery

Element	Recommendation	Level of evidence	Recommendation grade
1. Information, education and counselling	<i>Preoperative information and education, adapted to the individual requirements, should be given to all patients</i>	Low	Strong
2. Indications and contraindications for surgery	<i>Indications for bariatric surgery should follow updated global and national guidelines</i>	Moderate	Strong
3a. Smoking and alcohol cessation	<i>All patients should be screened for alcohol and tobacco use. Tobacco smoking should be stopped at least 4 weeks before surgery. For patients with alcohol abuse, abstinence should be strictly adhered to for 1–2 years. Moreover, the risk for relapse after bariatric surgery should be acknowledged</i>	Smoking: Moderate Alcohol: Low	Strong Strong
3b. Preoperative weight loss	<i>Preoperative weight loss using very low or low-calorie diet prior to bariatric surgery should be recommended</i>	Postoperative complications: Moderate	Strong
	<i>While feasible, patients with diabetes and treatment with glucose-lowering drugs should closely monitor treatment effects, and be aware of the risk for hypoglycaemia. Very low calorie diet improves insulin sensitivity in patients with diabetes</i>	Postoperative weight loss: Low Diabetes: Low	Strong Strong
4. Prehabilitation and exercise	<i>Although prehabilitation may improve general fitness and respiratory capacity, there is insufficient data to recommend prehabilitation before bariatric surgery</i>	Low	Weak

Table 2 ERAS recommendations for preoperative care in bariatric surgery

Element	Recommendation	Level of evidence	Recommendation grade
5. Supportive pharmacological intervention	<i>8 mg intravenous dexamethasone should be administered preferably 90 min prior to induction of anaesthesia for reduction of PONV as well as inflammatory response</i>	Glucocorticoids: Low	Weak
	<i>There is insufficient evidence to support perioperative statins for statin-naive patients in bariatric surgery. Patients on statins can safely continue the treatment during the perioperative phase</i>	Statins: Very low	Weak
	<i>Beta-adrenergic blockade does not influence the risk for adverse outcomes in bariatric surgery, but can be safely continued during the perioperative phase for patients at high risk of cardiovascular events</i>	Beta-adrenergic blockade: Low	Weak
6. Preoperative fasting	<i>Solids until 6 h before induction and clear liquids until 2 h before induction for elective bariatric surgery assuming no contraindications (e.g., gastroparesis, bowel obstruction)</i>	Low	Strong
	<i>Patients with diabetes should follow these recommendations, but further studies are needed for patients with additional risk factors such as gastroparesis</i>	Low	Strong
7. Carbohydrate loading	<i>There is insufficient evidence to make a recommendation about preoperative carbohydrate loading in bariatric surgery</i>	Low	Weak
8. PONV	<i>A multimodal approach to PONV prophylaxis should be adopted in all patients</i>	High	Strong



PONV Postoperative nausea and vomiting

Table 3 ERAS recommendations for intraoperative care in bariatric surgery

Element	Recommendation	Level of evidence	Recommendation grade
8. Perioperative fluid management	<i>The goal of perioperative fluid management is to maintain normovolemia and optimize tissue perfusion and oxygenation. Individual goal-directed fluid therapy is the most effective strategy, avoiding both restrictive or liberal strategies</i>	Moderate	Strong
	<i>Colloid fluids do not improve intra- and postoperative tissue oxygen tension compared with crystalloid fluids and do not reduce postoperative complications</i>	Low	Weak
9. Standardized anaesthetic protocol	<i>The current evidence does not allow recommendation of specific anaesthetic agents or techniques</i>	Low	Weak
	<i>Opioid-sparing anaesthesia using a multimodal approach, including local anaesthetics, should be used in order to improve postoperative recovery</i>	High	Strong
	<i>Whenever possible, regional anaesthetic techniques should be performed to reduce opioid requirements. Thoracic epidural analgesia should be considered in laparotomy</i>	Low	Weak
	<i>BIS monitoring of anaesthetic depth should be considered where ETAG monitoring is not employed</i>	Low	Strong
10. Airway management	<i>Anaesthetists should recognize and be prepared to handle the specific challenges in airways in patients with obesity</i>	Moderate	Strong
	<i>Endotracheal intubation remains the main technique for intraoperative airway management</i>	Moderate	Strong
11. Ventilation strategies	<i>Lung protective ventilation should be adopted for all patients undergoing elective bariatric surgery with avoidance of high PEEP values</i>	Moderate	Strong
	<i>Increases in driving pressure resulting from adjustments in PEEP should ideally be avoided</i>	Low	Strong
	<i>PCV or VCV can be used for patients with obesity with inverse respiratory ratio (1.5:1)</i>	Low	Strong
	<i>Positioning in a reverse Trendelenburg, flexed hips, reverse- or beach chair positioning, particularly in the presence of pneumoperitoneum, improves pulmonary mechanics and gas exchange</i>	Low	Weak
12. Neuromuscular blockade	<i>Deep neuromuscular blockade improves surgical performance</i>	Low	Strong
	<i>Ensuring full reversal of neuromuscular blockade improves patient recovery</i>	Moderate	Strong
	<i>Objective qualitative monitoring of neuromuscular blockade improves patient recovery</i>	Moderate	Strong
14. Surgical technique, volume and training	<i>Laparoscopic approach whenever possible</i>	High	Strong
	<i>During the learning curve phase, all operations should be supervised by a senior surgeon with significant experience in bariatric surgery</i>	Training: Low	Strong
	<i>There is a strong association between hospital volume and surgical outcomes at least up to a threshold value</i>	Hospital volume: Low	Strong
15. Abdominal drainage and nasogastric decompression	<i>Nasogastric tubes and abdominal drains should not be used routinely in bariatric surgery</i>	Weak	Strong

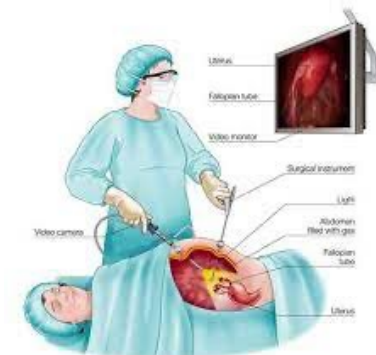
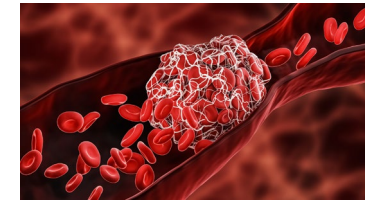


Table 4 ERAS recommendations for postoperative care in bariatric surgery

Element	Recommendation	Level of evidence	Recommendation grade
16. Postoperative oxygenation	<i>Patients without OSA or with uncomplicated OSA should be supplemented with oxygen prophylactically in a head-elevated or semi-sitting position. Both groups can be safely monitored in a surgical ward after the initial PACU stay. A low threshold for non-invasive positive pressure ventilation should be maintained in the presence of signs of respiratory distress</i>	Oxygen supplementation: Low Position in the postoperative period: High	Strong
	<i>Patients with OSA on home CPAP therapy should use their equipment in the immediate postoperative period</i>	Moderate	Strong
	<i>Patients with obesity hypoventilation syndrome (OHS) are at higher risk of respiratory adverse events. Postoperative BiPAP/NIV should be considered liberally during the immediate postoperative period, in particular in the presence of hypoxemia</i>	Low	Strong
17. Thromboprophylaxis	<i>Thromboprophylaxis should involve mechanical and pharmacological measures. Doses and duration of treatment should be individualized</i>	High	Strong
18. Early postoperative nutritional care	<i>A clear liquid meal regimen can usually be initiated several hours after surgery</i>	Moderate	Strong
	<i>All patients should have access to a comprehensive nutrition and dietetic assessment with counselling on the macronutrient and micronutrient content of the diet based on the surgical procedure and the patient's nutritional status</i>	Moderate	Strong
	<i>Patients and healthcare professionals should be aware of the risks of thiamine deficiency, especially in the early postoperative periods</i>	Low	Strong
19. Supplementation of vitamins and minerals	<i>A regimen of life-long vitamin and mineral supplementation and nutritional biochemical monitoring is necessary</i>	High	Strong
20a. PPI prophylaxis	<i>PPI prophylaxis should be considered for at least 30 days after Roux-en-Y gastric bypass surgery</i>	RYGB: Moderate	Strong
	<i>There is not enough evidence to provide a recommendation of PPI prophylaxis for sleeve gastrectomy, but given the high numbers of patients with gastroesophageal reflux after this procedure, it may be considered for at least 30 days after surgery</i>	SG: Very Low	Weak
20b. Gallstone prevention	<i>Ursodeoxycholic acid should be considered for 6 months after bariatric surgery for patients without gallstones at the time of surgery</i>	Moderate	Strong

OSA Obstructive sleep apnoea; PACU post-anaesthesia care unit; CPAP continuous positive airway pressure; OHS obesity hypoventilation syndrome; BiPAP bilevel positive airway pressure; NIV non-invasive ventilation; LMWH Low molecular weight heparin; PPI Proton pump inhibitor; RYGB Roux-en-Y gastric bypass; SG sleeve gastrectomy



CONSENSUS STATEMENT

STATEMENT SICOB-SIAARTI
SU ERAS IN CHIRURGIA BARIATRICA
(ERABS)



Enhanced recovery after bariatric surgery: an Italian consensus statement

Giuseppe Marinari¹ · Mirto Foletto² · Carlo Nagliati³ · Giuseppe Navarra⁴ · Vincenzo Borrelli⁵ · Vincenzo Bruni⁶ · Giovanni Fantola⁷ · Roberto Moroni⁸ · Luigi Tritapepe⁹ · Roberta Monzani¹⁰ · Daniela Sanna¹¹ · Michele Carron¹² · Rita Cataldo¹³

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Table 4 Effectiveness, safety, and items of Enhanced Recovery after Bariatric Surgery (ERABS) compared to standard approach





	Evidence		Strength of Recommendation	Expert task force statement
	Level	Quality		
<i>Effectiveness and safety of ERABS</i>				
Length of hospital stay	1	A	A	ERABS reduces the duration of hospital stays
Risk of complications	1	A	A	ERABS is a safe approach for obese patients
Cost of surgery	2	B	A	Adopting an ERABS protocol does not increase the cost of surgery
<i>Items ERABS. Preoperative care</i>				
Information and counseling	2	B	A	The information provided to the patient should not be limited to what is required for informed consent for both surgery and anesthesia; it should be adequate to provide realistic expectations of the ERABS approach
 Patient optimization	1	A	A	Pre-operative optimization through smoking cessation, weight loss, blood glucose control, and the use of non-invasive ventilation (when indicated) is recommended in ERABS
 Fasting	1	A	A	Clear liquids and solid food are recommended up to 2 h and 6 h, respectively, prior to the induction of anesthesia in ERABS
 PONV prophylaxis	1	A	A	Strategies aimed at minimizing the risk of post-operative nausea and vomiting after general anesthesia are recommended for better patient outcomes in ERABS
Venous thromboembolism prophylaxis	2	B	A	Multimodal venous thromboembolism prophylaxis, including early patient mobilization, is recommended in ERABS
Antibiotic prophylaxis	2	B	A	Pre-operative intravenous antibiotic prophylaxis is recommended in ERABS
 <u>Monitoring</u>	1	A	A	Proper perioperative monitoring is recommended in ERABS



Table 4 Effectiveness, safety, and items of Enhanced Recovery after Bariatric Surgery (ERABS) compared to standard approach

	Evidence	Strength of	Expert task force statement	
<i>Items ERABS. Intraoperative care</i>				
Standardized anesthesia protocol	1	A	A	A standardized anesthesia approach is recommended in order to optimize outcomes in ERABS
1-Airways management	1	A	A	A careful airways assessment is recommended in ERABS
2-Preoxygenation	1	A	A	An adequate preoxygenation performed in ramped position is recommended in ERABS
3-Tracheal intubation	1	A	A	Proper airway management in order to minimize difficulties is recommended in ERABS
4-General anesthesia	1	A	A	General anesthesia is the anesthesiologic approach of choice in ERABS
5-Neuromuscular blockade	1	A	A	Proper neuromuscular blockade management is recommended in ERABS
6-Analgesia opioid sparing	1	A	A	Opioid-sparing or opioid-free anesthesia is recommended in ERABS
7-Multimodal analgesia	1	A	A	Multimodal analgesia is recommended in ERABS to optimize pain control after surgery and to reduce or eliminate the use of opioids in the post-operative period
8-Locoregional anesthesia	1	A	A	Locoregional anesthesia supports and complements general anesthesia in ERABS
9-Protective lung ventilation	1	A	A	Protective mechanical lung ventilation during general anesthesia is recommended in ERABS
10-Goal-directed fluid therapy	3	B	A	Proper perioperative fluid management is recommended. Goal-directed fluid therapy should be considered in ERABS
11-Protected extubation	1	A	A	Extubation should be performed on an awake patient in the ramped position in ERABS

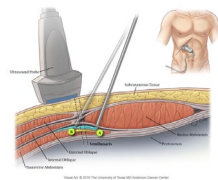
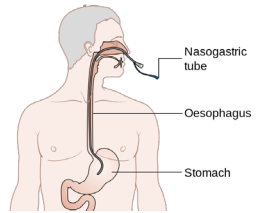


Table 4 Effectiveness, safety, and items of Enhanced Recovery after Bariatric Surgery (ERABS) compared to standard approach

	Evidence		Strength of Recommendation	Expert task force statement
	Level	Quality		
<i>Items ERABS. Postoperative care</i>				
Nasogastric tube	1	A	A	Routine placement of the SNG does not improve outcomes in ERABS
Abdominal drainage	2	B	A	Routine use of abdominal drainage should be discontinued in ERABS
Bladder catheter	4	C	A	Routine use of bladder catheters should be abandoned in ERABS
Early mobilization	3	B	A	Early post-operative mobilization is recommended in ERABS
Early re-feeding	1	A	A	Early post-operative resumption of oral feeding is recommended in ERABS
Early discharge	1	A	A	Early discharge of the patient is recommended in ERABS. Adoption and verification of a discharge checklist upon discharge are recommended in ERABS



High level of evidence

ERAS[®] Society

PONV
Opioid sparing
Laparoscopy
Early mobilization
Tromboprophylaxis
Mineral and vitamin supplementation



S.I.C.OB.



SIAARTI
PRO VITA CONTRA DOLOREM SEMPER

Preoperative Patient optimization
Fasting
PONV
Monitoring
Standardized anaesthetic protocol
Nasogastric tube
Early re-feeding
Laparoscopy?



Medium level of evidence



Stop Smoking
Preoperative weight loss
Goal directed fluid management
Airway management
Reversal and monitoring of neuromuscular blockade
Early postoperative nutritional care
CPAP
PPI in RYGB
Ac. Ursodeoxicholic



SIAARTI
PRO VITA CONTRA DOLOREM SEMPER

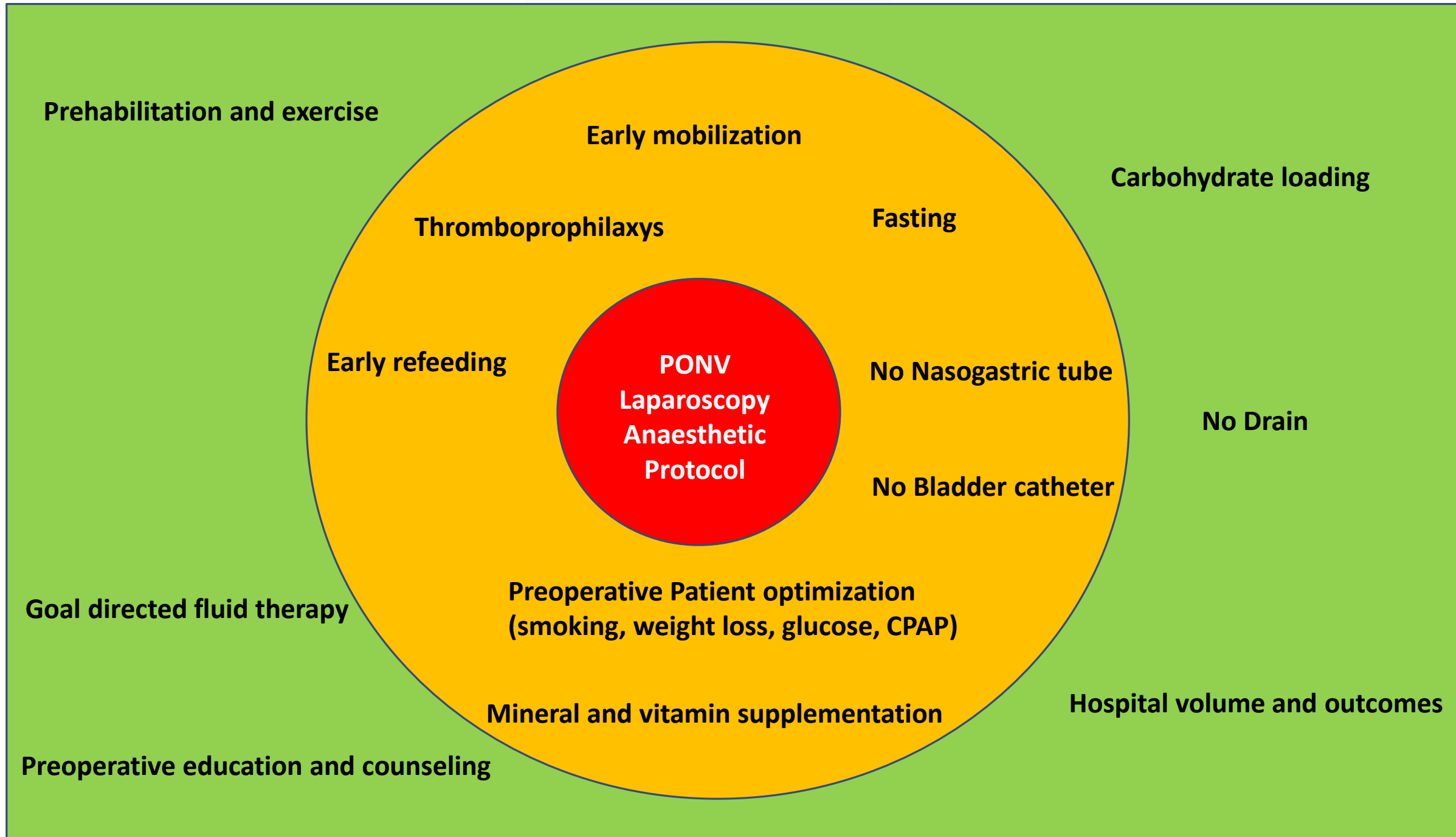
Information and counseling
Tromboprophylaxys
Antibiotic prophylaxis
Abdominal drain

Counseling
Alcohol cessation
Preoperative weight loss in diabetes
Prehabilitation
Perioperative statins, glucocorticoids, beta adrenergic blockade
Preoperative fasting
Carbohydrate loading
No recommendation on specific anaesthetic agent
Tap block
BIS
Avoid increase in driving pressure
Reverse trendelenburg improved gas exchange
Deep neuromuscular blockage
Hospital volume and outcomes
Nasogastric tube and abdominal drain
Oxygen supplementation
PPI in SG



Goal directed fluid therapy
Bladder catheter
Early mobilization

ERABS ITEMS



Original article

Employing Enhanced Recovery Goals in Bariatric Surgery (ENERGY): a national quality improvement project using the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program

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The overall rates of ELOS for pre- and postintervention were 8.1% and 4.5%

18,048 cases including 8946 from the 2016 calendar year and 9102 from the ENERGY LIVE period.

Table 4
Unadjusted associations between protocol measures and extended LOS, for ENERGY LIVE (intervention period)

Question/field	Variable	All (n = 9102)	Extended LOS		P value
			No (n = 8690)	Yes (n = 412)	
Was the patient ambulating within 8 hr of surgery?	No/missing	1505 (16.5%)	1372 (15.8%)	133 (32.3%)	<.01
	Yes*	7597 (83.5%)	7318 (84.2%)	279 (67.7%)	
Did the patient stop ACE inhibitors and/or angiotensin receptor blockers?	No/missing	1006 (11.1%)	952 (11.0%)	54 (13.1%)	.17
	Yes or N/A*	8096 (88.9%)	7738 (89.0%)	358 (86.9%)	
Did the patient perform a bowel preparation?	Yes/missing	358 (3.9%)	344 (4.0%)	14 (3.4%)	.57
	No*	8744 (96.1%)	8346 (96.0%)	398 (96.6%)	
Did the patient drink clear liquids within 8 hr of surgery?	No/missing	1723 (18.9%)	1593 (18.3%)	130 (31.6%)	<.01
	Yes*	7379 (81.1%)	7097 (81.7%)	282 (68.4%)	
Were any abdominal drains in place after surgery?	Yes/missing	733 (8.1%)	672 (7.7%)	61 (14.8%)	<.01
	No*	8369 (91.9%)	8018 (92.3%)	351 (85.2%)	
Was patient education provided regarding enhanced recovery?	No/missing	511 (5.6%)	491 (5.7%)	20 (4.9%)	.49
	Yes*	8591 (94.4%)	8199 (94.3%)	392 (95.1%)	
Was a baseline glucose obtained before surgery?	No/missing	1254 (13.8%)	1188 (13.7%)	66 (16.0%)	.18
	Yes*	7848 (86.2%)	7502 (86.3%)	346 (84.0%)	
Was a urinary Foley catheter placed?	Yes/missing	1154 (12.7%)	1074 (12.4%)	80 (19.4%)	<.01
	No*	7948 (87.3%)	7616 (87.6%)	332 (80.6%)	
Did the patient have a follow-up clinic appointment scheduled?	No/missing	627 (6.9%)	591 (6.8%)	36 (8.7%)	.13
	Yes*	8475 (93.1%)	8099 (93.2%)	376 (91.3%)	
Was blood glucose obtained intraoperative and insulin infusion protocol followed?	No/missing	2155 (23.7%)	2047 (23.6%)	108 (26.2%)	.22
	Yes or N/A*	6947 (76.3%)	6643 (76.4%)	304 (73.8%)	
Were IV fluids limited to ≤2.5 L during the case?	No/missing	767 (8.4%)	716 (8.2%)	51 (12.4%)	<.01
	Yes*	8335 (91.6%)	7974 (91.8%)	361 (87.6%)	
Was a low-lipid soluble volatile anesthetic used?	No/missing	612 (6.7%)	584 (6.7%)	28 (6.8%)	.95
	Yes*	8490 (93.3%)	8106 (93.3%)	384 (93.2%)	
Did the patient receive a nonnarcotic pain regimen?	No/missing	1652 (18.1%)	1568 (18.0%)	84 (20.4%)	.23
	Yes or N/A*	7450 (81.9%)	7122 (82.0%)	328 (79.6%)	
Did the patient receive ≥2 antiemetic prophylaxis medications before and during surgery?	No	623 (6.8%)	587 (6.8%)	36 (8.7%)	.12
	Yes*	8479 (93.2%)	8103 (93.2%)	376 (91.3%)	
Were opioids used for induction of anesthesia?	Yes/missing	6695 (73.6%)	6375 (73.4%)	320 (77.7%)	.05
	No*	2407 (26.4%)	2315 (26.6%)	92 (22.3%)	
Were opioids used during the case?	Yes/missing	6094 (67.0%)	5780 (66.5%)	314 (76.2%)	<.01
	No*	3008 (33.0%)	2910 (33.5%)	98 (23.8%)	
Did the patient receive any opioids postoperatively?	Yes/missing	6803 (74.7%)	6447 (74.2%)	356 (86.4%)	<.01
	No*	2299 (25.3%)	2243 (25.8%)	56 (13.6%)	
Did the patient receive prescriptions before surgery or discharge?	No/missing	340 (3.7%)	323 (3.7%)	17 (4.1%)	.67
	Yes*	8762 (96.3%)	8367 (96.3%)	395 (95.9%)	
Was a regional block or lidocaine drip used?	No/missing	1738 (19.1%)	1664 (19.1%)	74 (18.0%)	.55
	Yes or N/A*	7364 (80.9%)	7026 (80.9%)	338 (82.0%)	
Was normal saline used for the IV fluid replacement?	No/missing	1216 (13.4%)	1156 (13.3%)	60 (14.6%)	.46
	Yes*	7886 (86.6%)	7534 (86.7%)	352 (85.4%)	
Did the patient stop smoking before surgery?	No/missing	399 (4.4%)	378 (4.3%)	21 (5.1%)	.47
	Yes or N/A*	8703 (95.6%)	8312 (95.7%)	391 (94.9%)	
Did the patient have a sports drink or juice the evening before surgery?	No/missing	2369 (26.0%)	2232 (25.7%)	137 (33.3%)	<.01
	Yes*	6733 (74.0%)	6458 (74.3%)	275 (66.7%)	
Did the patient have a sports drink or juice the morning of surgery?	No/missing	2736 (30.1%)	2590 (29.8%)	146 (35.4%)	.01
	Yes*	6366 (69.9%)	6100 (70.2%)	266 (64.6%)	
Was the patient's temperature ≥36.5°C throughout the case?	No/missing	6762 (74.3%)	6482 (74.6%)	280 (68.0%)	<.01
	Yes*	2340 (25.7%)	2208 (25.4%)	132 (32.0%)	
Were any esophageal tubes in place after surgery?	Yes/missing	214 (2.4%)	204 (2.3%)	10 (2.4%)	.92
	No*	8888 (97.6%)	8486 (97.7%)	402 (97.6%)	
Did the patient receive acetaminophen/celecoxib or acetaminophen/ketorolac?	No/missing	1928 (21.2%)	1805 (20.8%)	123 (29.9%)	<.01
	Yes*	7174 (78.8%)	6885 (79.2%)	289 (70.1%)	

LOS = length of stay; ENERGY = Employing Enhanced Recovery Goals in Bariatric Surgery; N/A = not available; IV = intravenous.

Missing ranges from 2.0%–7.3% for yes/no protocol measures.

* Indicates optimal response. Missing is categorized as “nonoptimal”.

Ambulation within 8 hr
 Drink within 8 hr
 Drain
 Foley
 Iv fluid < 2.5 L
 Opioid
 Opioid post op
 Drink evening before
 T > 36.5
 NSAIDs

Table 5
Unadjusted and adjusted model results for the effect of adherence score (categorized) on extended LOS* among ENERGY (intervention) cases (n = 9102)

Main effect	Levels	Crude extended LOS rate (%)	Unadjusted model results			Adjusted model results†		
			Odds ratio estimates	95% confidence interval	P value	Odds ratio estimates	95% confidence interval	P value
Adherence score categories	0–18‡	7.0	-	-	-	-	-	-
	19–20	5.4	.76	.57, 1.0	.05	.71	.54, .92	.01
	21	4.7	.66	.49, .88	<.01	.65	.49, .85	<.01
	22–26	2.3	.32	.22, .44	<.01	.29	.19, .43	<.01

LOS = length of stay; ENERGY = Employing Enhanced Recovery Goals in Bariatric Surgery.

* Extended LOS is defined as any hospital LOS ≥ 4 days.

† Adherence Score Categories Adjusted Model adjusted for therapeutic anticoagulation, limited ambulation, procedure type, chronic obstructive pulmonary disease, race, age (yr), body mass index (continuous), previous cardiac surgery, renal insufficiency, venous stasis, sex, and American Society of Anesthesia class.

‡ Indicates referent group.

Employing Enhanced Recovery Goals in Bariatric Surgery (ENERGY): a national quality improvement project using the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program

Stacy A. Brethauer, M.D.^{a,*}, Arielle Grieco, M.P.H.^b, Teresa Fraker, M.S., R.N.^b, Kimberly Evans-Labok, B.A.^b, April Smith, Pharm.D., B.C.P.S.^c, Matthew D. McEvoy, M.D.^d, Alan A. Saber, M.D.^e, John M. Morton, M.D.^f, Anthony Petrick, M.D.^g

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across a large number of centers in the United States. The interventions employed in ENERGY were associated with significant reduction in ELOS without increasing readmission rates, reoperation rates, or overall morbidity. There



Higher Adherence to ERAS Society® Recommendations is Associated with Shorter Hospital Stay Without an Increase in Postoperative Complications or Readmissions in Bariatric Surgery: the Association Between Use of Enhanced Recovery After Surgery Protocols and Postoperative Complications after Bariatric Surgery (POWER 3) Multicenter Observational Study

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1419 patients
24 ERAS Items
74 centers
ERAS group
Non ERAS Group

Table 2 Adherence data

	All patients	No ERAS	ERAS	OR	<i>p.</i> ratio	<i>p.</i> overall
Preoperative information, education and counseling, <i>n</i> (%)	512 (36.08%)	49 (6.16%)	463 (74.20%)	43.5 [31.2;61.8]	0.000	<0.001
Prehabilitation and exercise, <i>n</i> (%)	241 (17.28%)	48 (6.15%)	193 (31.43%)	6.97 [5.01;9.88]	0.000	<0.001
Smoking and alcohol cessation, <i>n</i> (%)	65 (24.25%)	30 (21.28%)	35 (27.56%)	1.40 [0.80;2.48]	0.236	0.291
Preoperative weight loss, <i>n</i> (%)	905 (64.05%)	417 (52.45%)	488 (78.96%)	3.40 [2.68;4.32]	0.000	<0.001
Glucocorticoids, <i>n</i> (%)	1143 (81.24%)	602 (75.82%)	541 (88.25%)	2.39 [1.79;3.23]	<0.001	<0.001
Preoperative fasting, <i>n</i> (%)	646 (45.53%)	227 (28.55%)	419 (67.15%)	5.11 [4.07;6.42]	0.000	<0.001
Carbohydrate loading, <i>n</i> (%)	176 (12.44%)	12 (1.51%)	164 (26.45%)	23.1 [13.3;44.5]	0.000	<0.001
Laparoscopic approach, <i>n</i> (%)	1411 (99.44%)	790 (99.37%)	621 (99.52%)	1.28 [0.30;6.68]	0.738	1.000
Airway management, <i>n</i> (%)	1290 (91.04%)	725 (91.19%)	565 (90.84%)	0.96 [0.66;1.38]	0.813	0.888
Lung protective ventilation, <i>n</i> (%)	1229 (86.92%)	656 (82.62%)	573 (92.42%)	2.56 [1.82;3.66]	<0.001	<0.001
Deep neuromuscular block, <i>n</i> (%)	778 (55.10%)	478 (60.13%)	300 (48.62%)	0.63 [0.51;0.78]	<0.001	<0.001
Monitoring of anesthetic depth, <i>n</i> (%)	1291 (91.30%)	694 (87.52%)	597 (96.14%)	3.53 [2.27;5.71]	<0.001	<0.001
Avoid nasogastric tube, <i>n</i> (%)	917 (100.00%)	489 (100.00%)	428 (100.00%)	Ref.	Ref.	.
Avoid abdominal drainage, <i>n</i> (%)	826 (100.00%)	370 (100.00%)	456 (100.00%)	Ref.	Ref.	.
Multimodal systemic analgesia, <i>n</i> (%)	1104 (77.97%)	592 (74.47%)	512 (82.45%)	1.61 [1.24;2.09]	<0.001	<0.001
Perioperative fluid management, <i>n</i> (%)	152 (10.73%)	85 (10.69%)	67 (10.79%)	1.01 [0.72;1.42]	0.951	1.000
PONV prophylaxis, <i>n</i> (%)	1352 (95.55%)	751 (94.58%)	601 (96.78%)	1.71 [1.01;3.01]	0.046	0.063
Early postoperative nutrition, <i>n</i> (%)	512 (36.13%)	318 (40.00%)	194 (31.19%)	0.68 [0.54;0.85]	0.001	0.001
Postoperative oxygenation, <i>n</i> (%)	851 (73.81%)	419 (69.49%)	432 (78.55%)	1.61 [1.23;2.10]	<0.001	0.001
Non-invasive positive pressure ventilation, <i>n</i> (%)	229 (19.23%)	111 (17.54%)	118 (21.15%)	1.26 [0.94;1.68]	0.116	0.132
Thromboprophylaxis, <i>n</i> (%)	1366 (96.26%)	759 (95.47%)	607 (97.28%)	1.68 [0.95;3.11]	0.075	0.101
Antibiotic prophylaxis, <i>n</i> (%)	1366 (96.26%)	759 (95.47%)	607 (97.28%)	1.68 [0.95;3.11]	0.075	0.101
Prevention of hypothermia, <i>n</i> (%)	1296 (91.40%)	751 (94.47%)	545 (87.48%)	0.41 [0.28;0.60]	<0.001	<0.001
Early mobilization, <i>n</i> (%)	1284 (91.58%)	695 (88.65%)	589 (95.31%)	2.59 [1.70;4.06]	<0.001	<0.001
Early feeding, <i>n</i> (%)	608 (43.34%)	199 (25.32%)	409 (66.29%)	5.79 [4.60;7.31]	0.000	<0.001
ERAS adherence, median [IQR]	63.16 [55.00;72.22]	57.89 [50.00;65.00]	70.00 [61.11;77.78]	1.10 [1.09;1.11]	<0.001	<0.001
POWER3 Adapted adherence, median [IQR]	66.67 [58.33;73.91]	60.87 [54.55;68.18]	73.91 [65.22;79.17]	1.12 [1.10;1.14]	<0.001	<0.001

- Counseling
- Prehabilitation
- Pre op weight loss
- Glucocorticoids
- Pre op fasting
- Carbo loading
- Lung protective ventil
- Deep neuromuscular block
- BIS
- Multim. Analgesia
- Prevention hypothermia
- Early mobilization
- Early feeding

Conclusion

In **conclusion**, the POWER3 study shows that higher adherence to ERAS Society® recommendations was associated with a decrease in hospital stay without an increase in post-operative complications or readmission.

ERAS, enhanced recovery after surgery; PONV, postoperative nausea and vomiting



Evaluating the Impact of Enhanced Recovery After Surgery Protocols on Surgical Outcomes Following Bariatric Surgery—A Systematic Review and Meta-analysis of Randomised Clinical Trials

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Six RCTs including 740 patients

systematic review and meta-analysis of randomised clinical trials (RCTs) to evaluate the impact of ERAS protocols on outcomes following bariatric surgery compared to standard care (SC)

Table 2 Components of the enhanced recovery after surgery protocols for each randomised clinical trial included in this study

Study	Preoperative counselling	Reduce fasting times	Optimise operating schedule times	Optimise anaesthesia protocols	Multimodal analgesia	Avoidance of NGT and intra-abdominal drains	Avoidance of high IAP during leak testing	Early mobilisation
Geubbels	No	No	Yes	Yes	Yes	Yes	No	Yes
Pimenta	No	Yes	No	No	No	No	No	No
Lemanu	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Papasavas	No	Yes	No	Yes	Yes	No	No	No
Prabhakaran	Yes	No	No	Yes	Yes	No	No	Yes
Ruiz-Tovar	Yes	Yes	No	Yes	Yes	Yes	No	Yes
	Analgesia	Anti-emetic	PPI/H2 agonists	Early enteral feeding	Rigorous glycaemic control	Discharge planning	Virtual appt. day-1–2 post discharge	In-person appt. 2 weeks post discharge
Geubbels	Yes	No	No	Yes	No	Yes	No	Yes
Pimenta	Yes	Yes	No	No	No	Yes	No	No
Lemanu	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Papasavas	Yes	Yes	No	Yes	Yes	No	No	No
Prabhakaran	Yes	Yes	No	No	Yes	No	No	No
Ruiz-Tovar	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

NGT nasogastric tube, IAP intra-abdominal pressure, PPI proton pump inhibitors, H2 histamine-2, appt appointment

Table 4 Descriptive statistical analysis of outcomes for patients randomised to enhanced recovery after surgery and standard care protocols after bariatric surgery

Parameter	ERAS	SC	<i>P</i> -value
Overall complications	11.9% (44/371)	11.7% (43/369)	1.000, †
Major complications	3.6% (10/281)	3.2% (9/279)	1.000, †
Anastomotic leaks	1.5% (3/196)	1.5% (3/196)	1.000, †
Bleeding	1.5% (3/196)	1.5% (3/196)	1.000, †
Nausea and vomiting	6.4% (10/156)	13.5% (21/156)	0.056, †
Reoperation rates	0.5% (1/221)	0.9% (2/221)	1.000, †
30-day readmission rates	11.9% (15/371)	11.7% (13/369)	0.848, †

† denotes Fisher's exact test

In conclusion, this systematic review and meta-analysis of RCT data demonstrates the clinical utility of ERAS protocols in reducing post-operative nausea and vomiting, time to ambulation, ICUS, FHS, and THS. Based on the results

- Intensive care unit stay — time measured in hours from the end of the surgery until discharge criteria from the ICU were met.
- Functional hospital stay — time measured in hours from the end of the surgery until discharge criteria had been met, as described by Geubells et al. .
- Total hospital stay — time measured in hours from the end of the surgery until actual time of discharge from hospital, as described by Geubells et al.



ORIGINAL INVESTIGATION

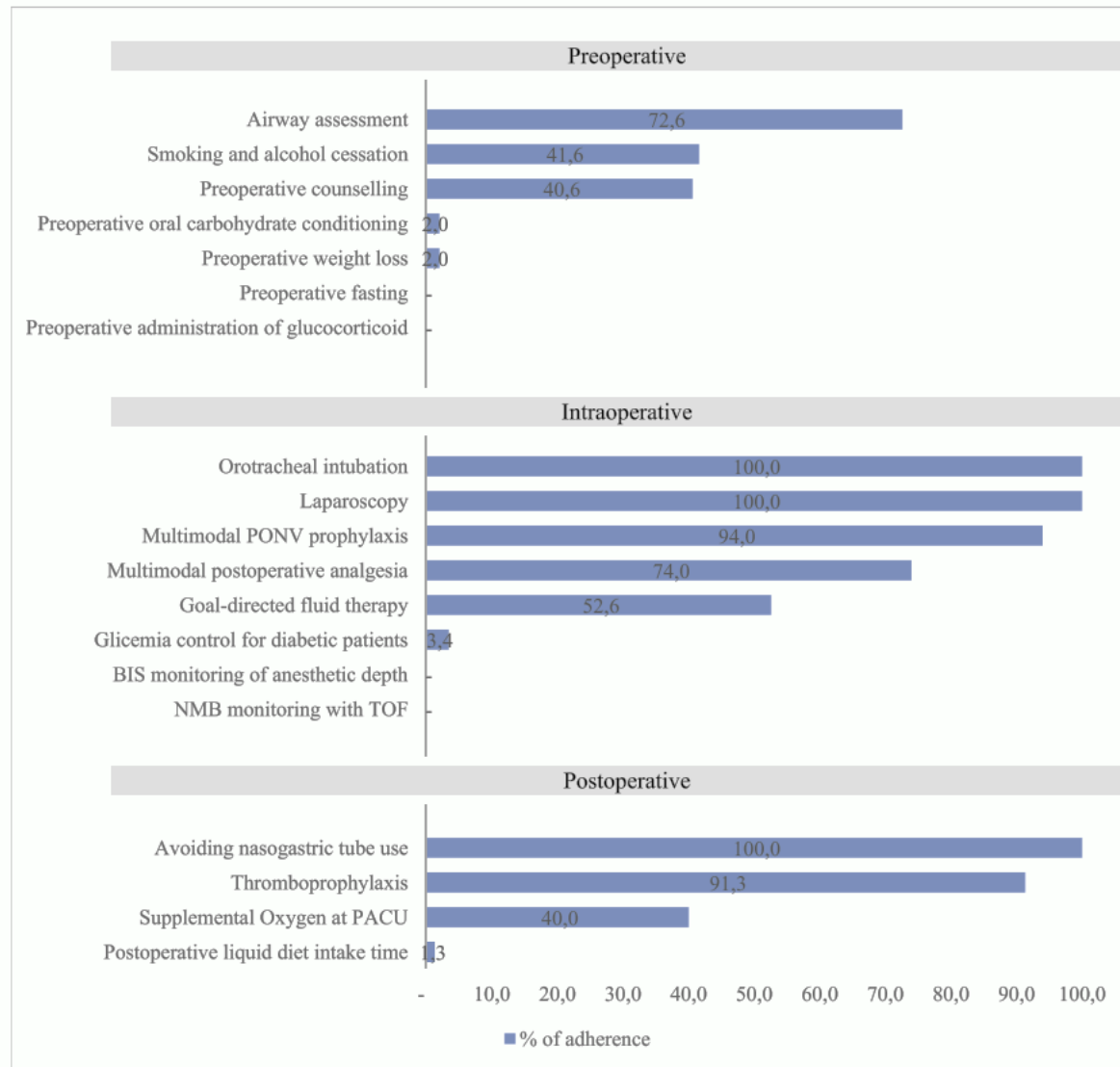
Compliance with Enhanced Recovery After Surgery (ERAS) protocol recommendations for bariatric surgery in an obesity treatment center



Júlia Gonçalves Zandomenico *, Fabiana Schuelter Trevisol , Jean Abreu Machado

The aim of this study was to assess patient compliance with the recommendations of an ERAS protocol for Bariatric Surgery (ERABS) at a hospital certified as an International Center of Excellence in Bariatric and Metabolic Surgery by the Surgical Review Corporation.

patients submitted to bariatric surgery using gastric bypass or sleeve gastrectomy techniques in 2019, totaling 150 patients



Mean compliance with the recommendations per participant was 42.8%, with a maximum of 55.5%


- 22.6% of compliance with preoperative recommendations
- 60% to intraoperative recommendations,
- 58.1% to postoperative recommendations.

The anesthesiologist is the professional who provides most measures for the perioperative optimization of bariatric surgery patients. In our study we found that anesthesiologists complied with only 39.5% of ERABS recommendations.

Figure 1 Compliance to measures strongly recommended in the ERAS protocol for bariatric surgery. PONV, Postoperative Nausea and Vomiting; BIS, Bispectral Index; NMB, Neuromuscular Blockade; TOF, Train-Of-Four; PACU, Postanesthetic Care Unit.



Impact of Adherence to the ERAS[®] Protocol on Short-term Outcomes after Bariatric Surgery

Piotr Małczak^{1,2}  · Michał Wysocki^{1,2} · Hanna Twardowska¹ · Alicja Dudek¹ · Justyna Tabiś¹ · Piotr Major^{1,2} · Magdalena Pisarska^{1,2} · Michał Pędziwiatr^{1,2}

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15-element protocol used in our department was analyzed, and compliance was calculated based on pre- and peri-operative elements.

We gathered data on recovery parameters, complications, and length of hospital stay. Patients were divided into two groups according to their compliance: group 1 < 80%, group 2 > 80%

764 patients operated in between 2009 and 2017

Table 1 ERAS® protocol used in our department

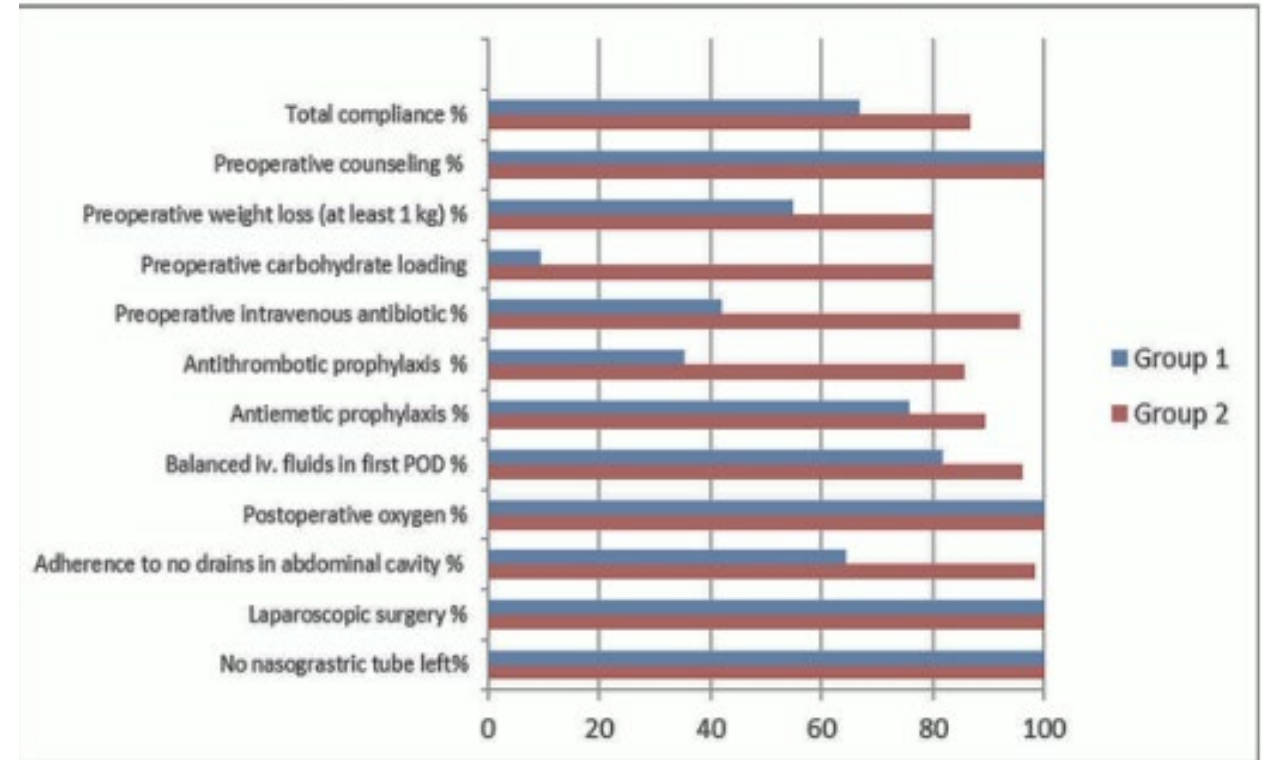
1. Preoperative counseling and patient's education (additional daily movement, smoking, and alcohol cessation)
2. Preoperative weight loss (at least 1 kg)
3. Pre-operative carbohydrate loading (400 ml of Nutricia preOp® 2 h prior surgery)
4. Antithrombotic prophylaxis (Clexane 40 mg sc. starting in the evening prior surgery)
5. Antibiotic prophylaxis (preoperative 2 g of Ceftriaxone iv 30–60 min prior to surgery)
6. Laparoscopic surgery
7. Balanced intravenous fluid therapy (< 2500 ml intravenous fluids during the day of surgery, less than 150 mmol sodium)
8. No nasogastric tubes postoperatively
9. No drains left routinely in the abdominal cavity
10. No urinary catheter
11. Avoiding opioids, multimodal analgesia (paracetamol 4 × 1 g, ibuprofen 2 × 200 mg, metamizole 2 × 500 mg, or ketoprofen 2 × 100 mg)
12. Prevention of postoperative nausea and vomiting (PONV) (dexamethasone 8 mg iv, ondansetron 8 mg iv, metoclopramide 10 mg iv)
13. Postoperative oxygenation therapy (4–6 l/min)
14. Early oral feeding (200 ml of yogurt)
15. Full mobilization on the first postoperative day (getting out of bed, going to the toilette, walking along the corridor, at least 4 h out of bed)

Compliance was calculated as the number of achieved preoperative and intraoperative elements. Our target compliance was 80%. Patients whose adherence to the protocol was below 80% were assigned to group 1, whereas patients whose adherence level reached at least 80% were assigned to group 2.

	Group 1	Group 2	<i>P</i> value
<i>n</i> (%)	148 (19.4%)	616 (80.6%)	n/a
Male/Females, <i>n</i> (%)	58/90 (39%/61%)	224/392 (36%/64%)	0.52
Median age, years (IQR)	42 (34.5–49)	43 (35–51)	0.41
ASA			0.05
	I	6 (4.1%)	11 (1.8%)
	II	91 (61.5%)	443 (91.9%)
	III	51 (34.5%)	162 (26.3%)
Median preoperative BMI, kg/m ² (IQR)	46.3 (41.6–51.6)	44.98 (41.4–49.61)	0.07
Type of procedure, <i>n</i> (%)			0.12
	LSG	86 (57.8%)	497 (65.1%)
	LRYGB	62 (42.2%)	119 (34.9%)
Compliance with ERAS® protocol	68.1%	92.7%	
	87.9%		


Table 3 Recovery parameters and perioperative outcomes

	Group 1	Group 2	<i>P</i> value
Multimodal analgesia, <i>n</i> (%)	59 (39.9%)	432 (70.1%)	< 0.001
Early mobilization, <i>n</i> (%)	71 (75.5%)	520 (93.4%)	< 0.001
Median POD of oral feeding tolerance (IQR)	2 (2–2)	2 (1–2)	< 0.001
Median volume of oral fluids on POD0, ml (IQR)	0 (0–300)	450 (200–700)	< 0.001
Median diuresis on POD0, ml (IQR)	2400 (1700–3300)	1800 (1400–2300)	< 0.001
iv fluids on POD0, number of patients (%)	125 (84.5%)	377 (61.2%)	< 0.001
Postoperative morbidity, <i>n</i> (%)	20 (13.6%)	17 (2.8%)	< 0.001
LSG	10 (11.6%)	13 (2.6%)	< 0.001
LRYGB	10 (16.1%)	4 (3.4%)	0.002
CD I	12	10	
Rhabdomyolysis	7	4	
Delayed gastric emptying	2	5	
Fever of unknown origin	1	-	
Pulmonary infection	2	1	
CD II	1	-	
Pulmonary infection requiring antibiotics	1	-	
CD III	3	5	
Hemorrhage	2	3	
Anastomotic leakage	1	2	
CD IV	2	2	
Pneumonia with acute respiratory distress syndrome	1	-	
Cardiorespiratory failure requiring ICU	1	2	
Anastomotic leakage with peritonitis, cardiorespiratory failure after reoperation requiring ICU		1	
CD V	2	-	
Pulmonary embolism	1	-	
Hernia strangulation with intestine necrosis, anastomosis dehiscence and peritonitis	1	-	
Median length of hospital stay, days (IQR)	4 (3–5)	3 (2–4)	< 0.001
Prolonged LOS (> 4 days), <i>n</i> (%)	79 (53.4%)	225 (36.5%)	< 0.001
LSG	45 (52.3%)	182 (36.6%)	0.006
LRYGB	34 (54.8%)	43 (36.1%)	0.016
Readmissions, <i>n</i> (%)	16 (10.8%)	35 (5.7%)	0.04





Impact of Adherence to the ERAS[®] Protocol on Short-term Outcomes after Bariatric Surgery

Piotr Małczak^{1,2}  · Michał Wysocki^{1,2} · Hanna Twardowska¹ · Alicja Dudek¹ · Justyna Tabiś¹ · Piotr Major^{1,2} · Magdalena Pisarska^{1,2} · Michał Pędziwiatr^{1,2}

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The compliance of the study group was high (> 80), they observed lower morbidity in patients with higher adherence. Patients with greater compliance had a shorter LOS.

Early mobilization and food tolerance as factors affecting the risk of developing complications.

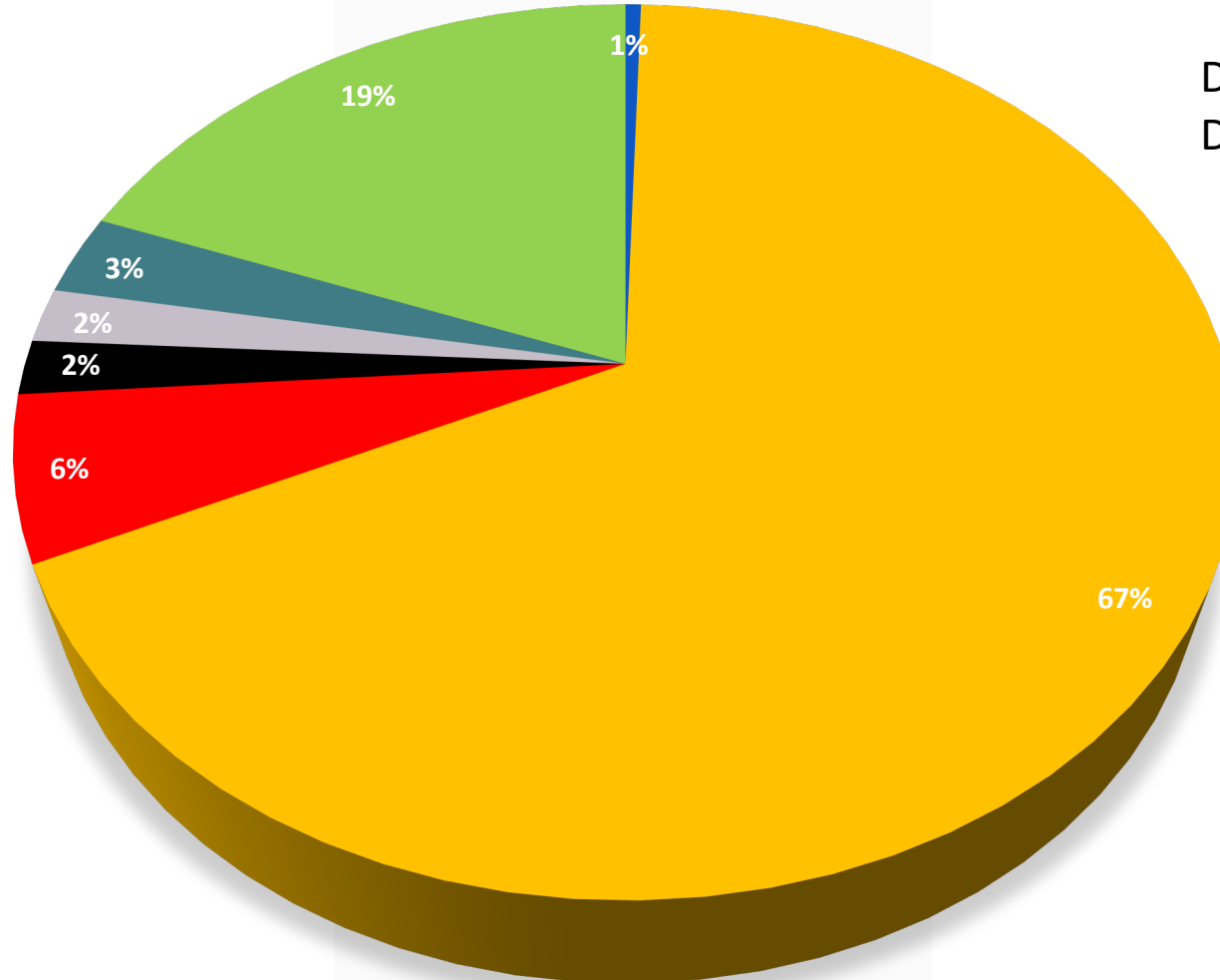
Additionally, compliance was found to lower the risk of complications by 50%.

Multimodal anesthesia, food tolerance, the volume of oral fluids and the need for iv fluids significantly affected the risk of prolonged LOS.

Ospedale Ceccarini - Riccione

Case Mix

Dal 2021: 204 interventi
Degenza media 2.9 gg



- Banding
- Bypass Lesti-Zappa
- RYGB
- OAGB
- Saji
- Transit Bipartition
- Sleeve

- Counseling
- **Stop fumo 6 settimane prima**, controllo glicemico, CPAP negli OSAS gravi
- Prehabilitation: **esercizio fisico consigliato ma compliance molto bassa**
- Calo ponderale preoperatorio auspicabile
- Digiuno preoperatorio: liquidi chiari fino a 2 ore prima dell'intervento
- **No carbo loading**
- Approccio polifarmacologico al PONV
- **Analgesia multimodale** (oppioid free o sparing, FANS, ketamina, blocchi di parete)
- Anestesia multimodale: anestesia generale basata su farmaci a breve durata d'azione e a basso grado di accumulo per favorire un rapido recupero
- Blocco neuromuscolare (NMB) Reversal con Sugammadex del NMB indotto da Rocuronio (è associato a minor dolore postoperatorio e PONV e ad una più rapida dimissione in reparto)
- Prevenzione dell'ipotermia

- No SNG
- No CV
- **No drenaggio di routine tranne Sleeve**
- 2 ore di osservazione in recovery room
- Mobilizzazione entro 4 ore dal termine della procedure in reparto
- Dieta liquida + mousse alla sera dell'intervento
- RX TD in 1 POD (scopo documentale), dieta semiliquida, stop liquidi ev, ginnastica respiratoria, deambulazione
- Dimissione in 2 POD, discharge criteria:
 - adeguato controllo del dolore con analgesici orali non oppiacei
 - parametri vitali nella norma (FC < 100 bpm, T° < 37,6, FR < 20/min.)
 - adeguato introito idrico, dieta liquida tollerata, deambulazione soddisfacente
 - non evidenza di sepsi o segni di complicanza postoperatoria

Chiamata a casa tutti i giorni fino al 1 controllo ambulatoriale dopo 7 giorni





...and so which ERAS item?

- We can't say that there is a most important item!
- Importance of adherence to ERAS protocols
- ERAS pathway core: Anaesthetic protocols+ minimally invasive surgery + PONV (early re-feeding, early mobilization)

Need of more evidence

- Prehabilitation
- Carbohydrate loading
- Goal directed fluid therapy

Comment

> [Ann Surg.](#) 2018 Jun;267(6):998-999. doi: 10.1097/SLA.0000000000002720.

T **ERAS Implementation—Time To Move Forward**

[Henrik Kehlet](#) ¹

Affiliations + expand

PMID: 29462010 DOI: [10.1097/SLA.0000000000002720](#)

The ERAS implementation process has been well-described^{9,10} by starting to read the ERAS literature on the procedure in question, to know your own data, to compare with other data from fully implemented ERAS programs and to monitor the results. Hopefully, we will see an enhanced implementation process, but remembering that the concept of “enhanced recovery” is a dynamic process and with several additional challenges to achieve “the pain and risk free operation”^{22,23} and based upon the simple question “Why is the patient in hospital today?”²⁴



S.I.C.O.B.

XXXII CONGRESSO
NAZIONALE SICOB

23 - 25 MAGGIO 2024
GIARDINI
NAXOS



Grazie