

Enhanced Recovery after Colorectal Surgery

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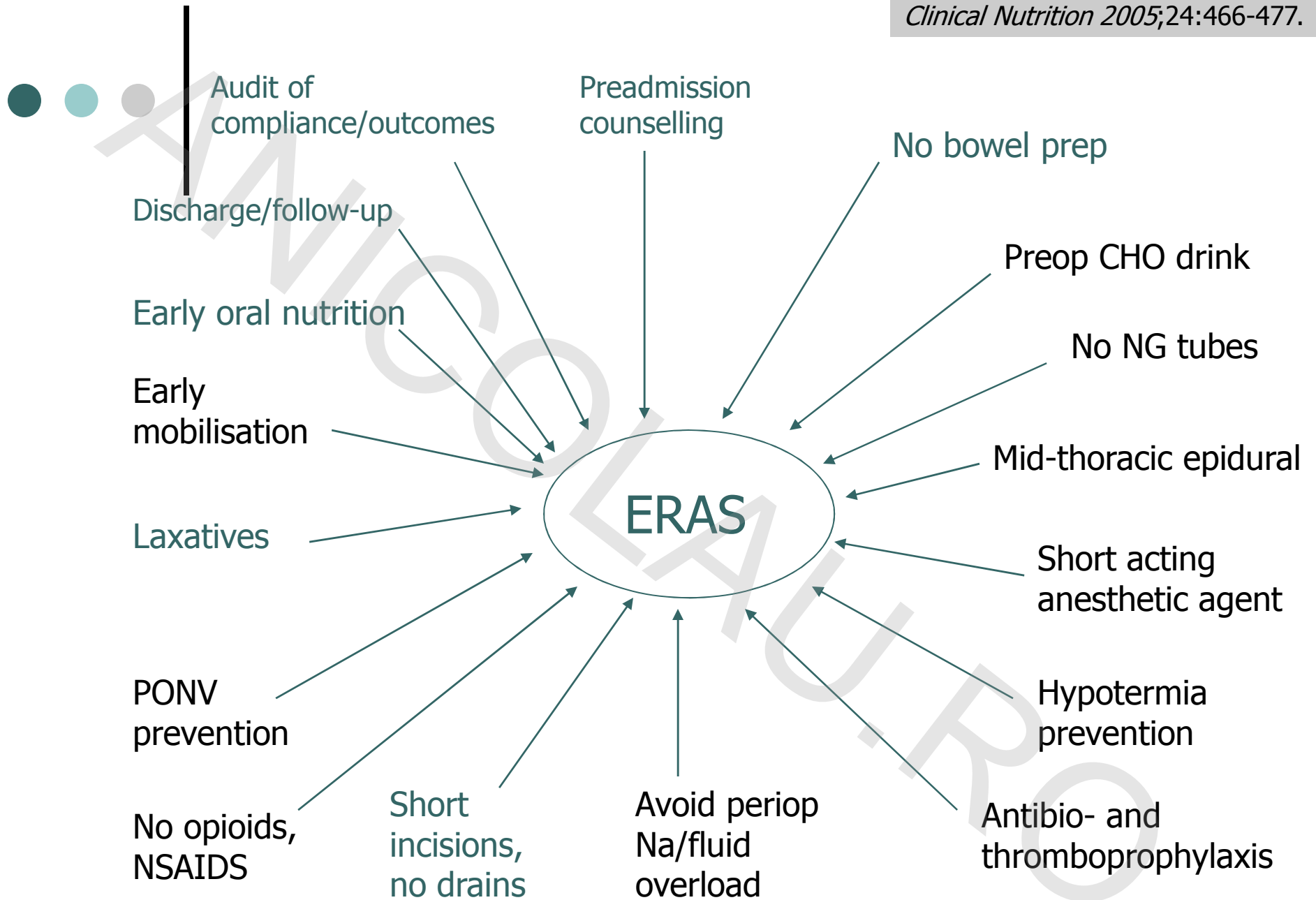
*Karolinska Institute, Stockholm, Sweden

ERAS - Enhanced Recovery After Surgery

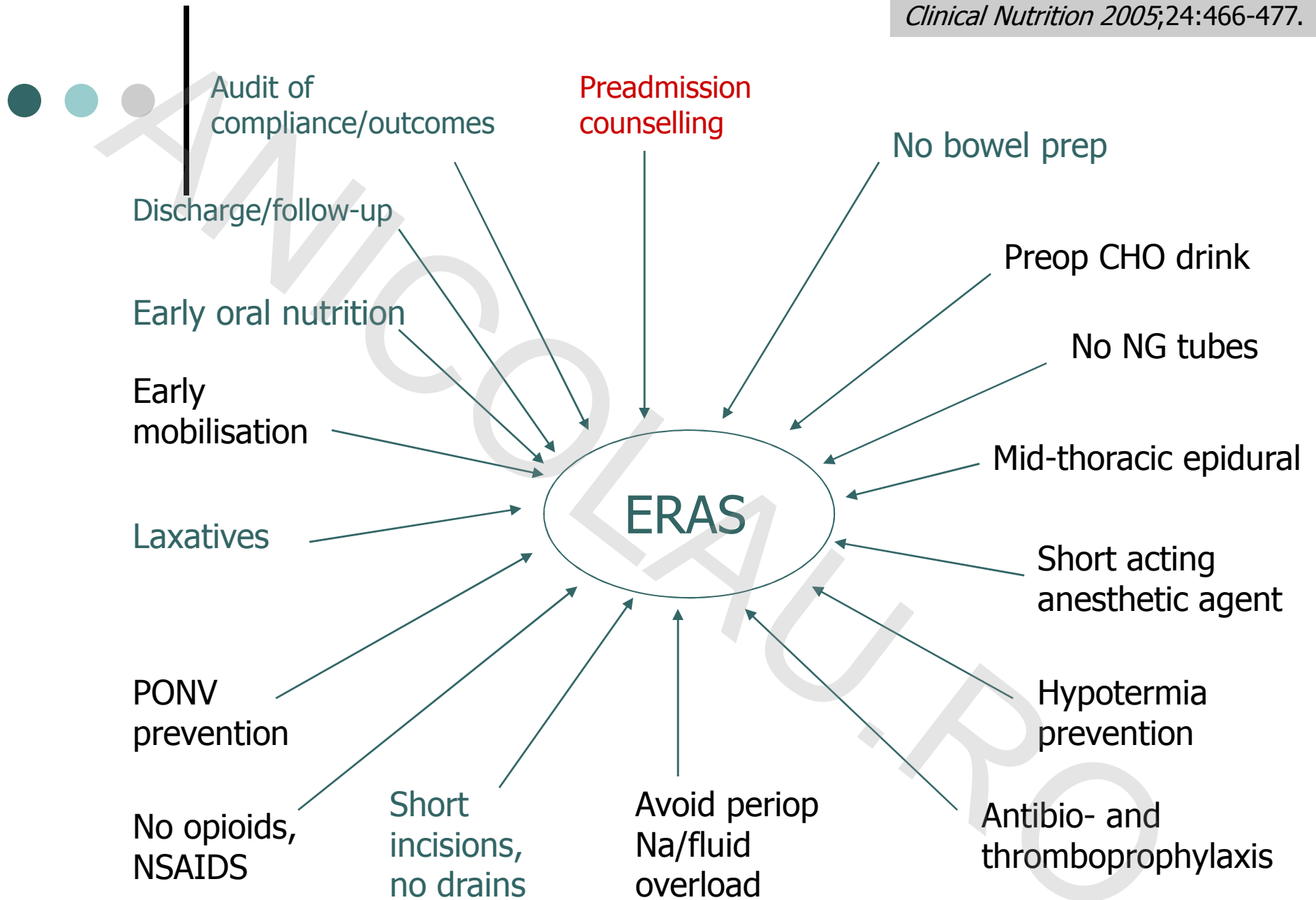
- Rationale: supporting wound healing and recovery by:
 - reducing the stress of surgery,
 - minimizing catabolism and
 - promoting anabolism.
- Denmark (Hvidovre University Hospital, Copenhagen)
 - Kehlet H. Multimodal approach to control postoperative pathophysiology and rehabilitation. *Br J Anaesth* 1997;78(5):606-617.
 - median LOS **2** and **4** days after colonic and rectal surgery (Basse et al. *Ann Surg* 2000;23(1):51-57.

ERAS multicentre trial: Copenhagen, Edinburgh, Stockholm, Tromsø, Maastricht - Nygren J et al. - *Clinical Nutrition* 2005; 24: 455-461.

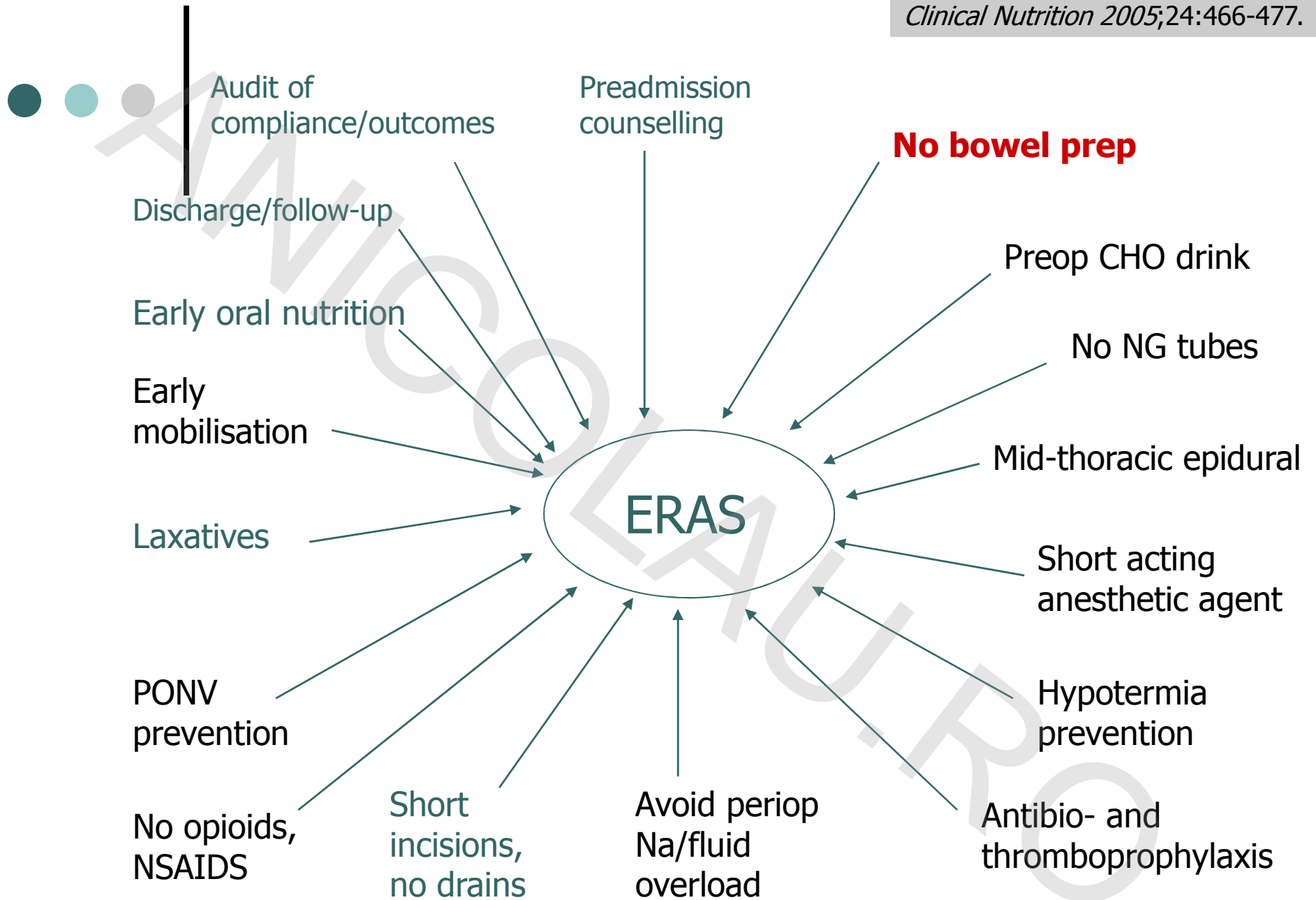
Modified from: Fearon K et al.
Clinical Nutrition 2005;24:466-477.



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Mechanical Bowel Preparation (MBP)

- Dehydration before surgery
- Overnight fasting - further dehydration
- Increased risk for hypotension during anaesthesia
- Increased risk for excess fluid treatment
- Gut oedema - paralysis



MBP

- Not necessary – has no benefit in colorectal surgery

Slim K et al. J. Br J Surg 2004

Wille-Jorgensen P et al. Dis Colon Rectum 2003

Platell C, Hall J. Dis Colon Rectum 1998

Pineda CE et al. J Gastrointest Surg 2008

Gravante G et al. Int J Colorectal Surg 2008

- Harmful!

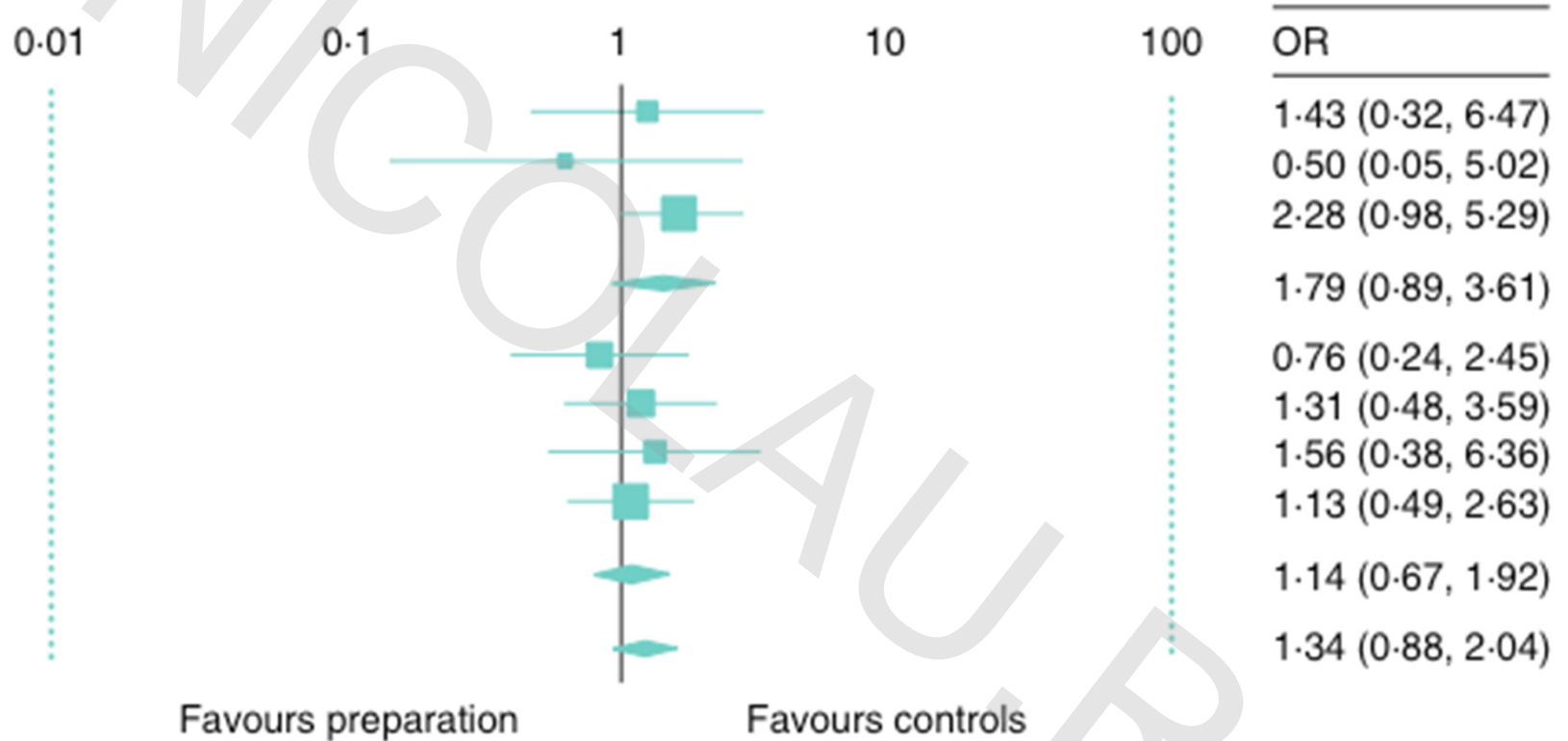
- Dehydration/electrolyte abnormalities (elderly!)

- Patient discomfort

- May increase risk for anastomotic leak!

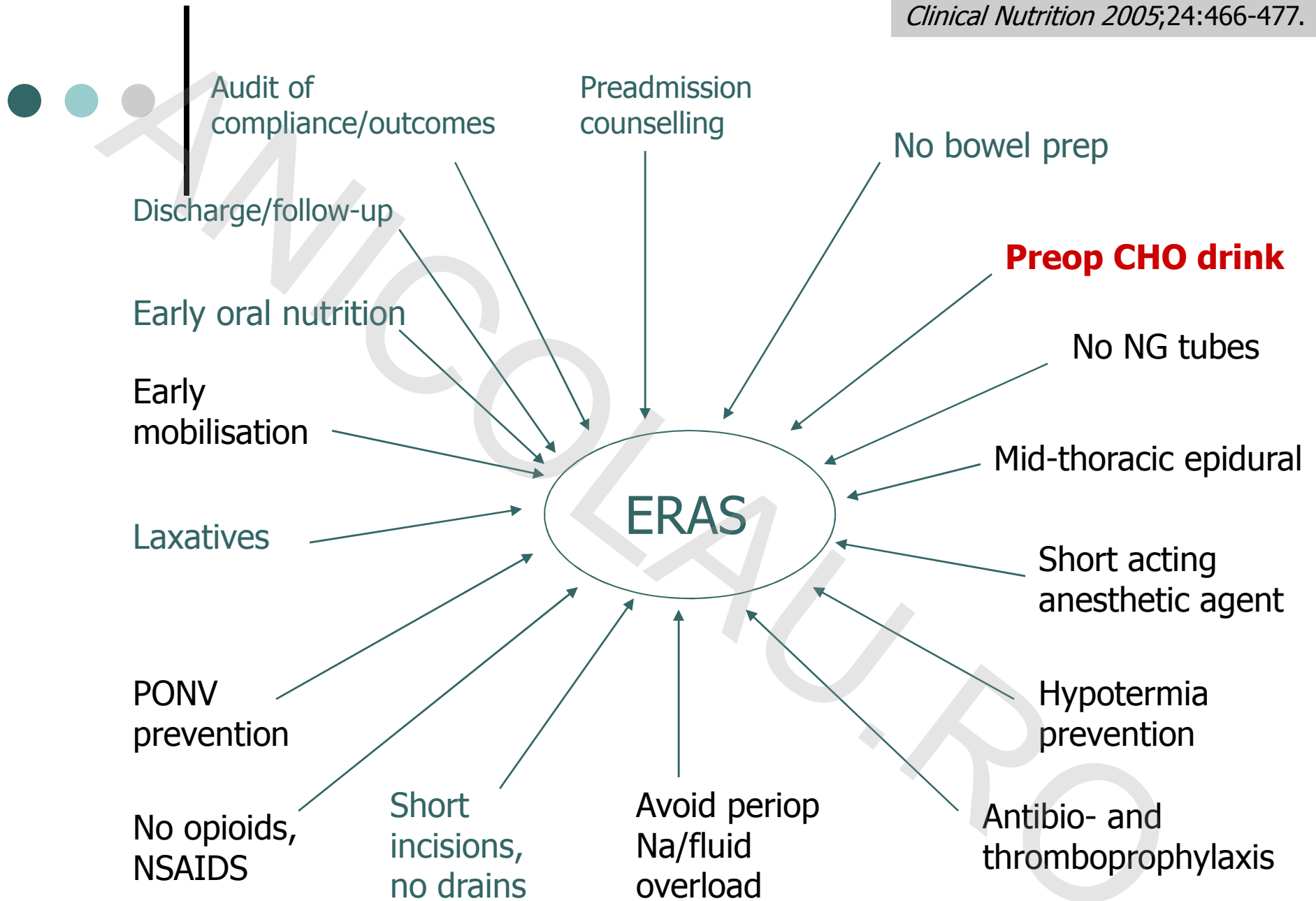
Slim K, Vicaut E, Panis Y, Chipponi J. Br J Surg 2004;91(9):1125-30.

MBP ↑ risk for anastomotic leak



N = 1454, OR 1.75 (1.05 – 2.70), p = 0.032

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Preoperative CHO drink

or How to Make Everybody Happy

Oral CHO drink (12.5%), 800 ml the night before and 200 ml 2 hs preop



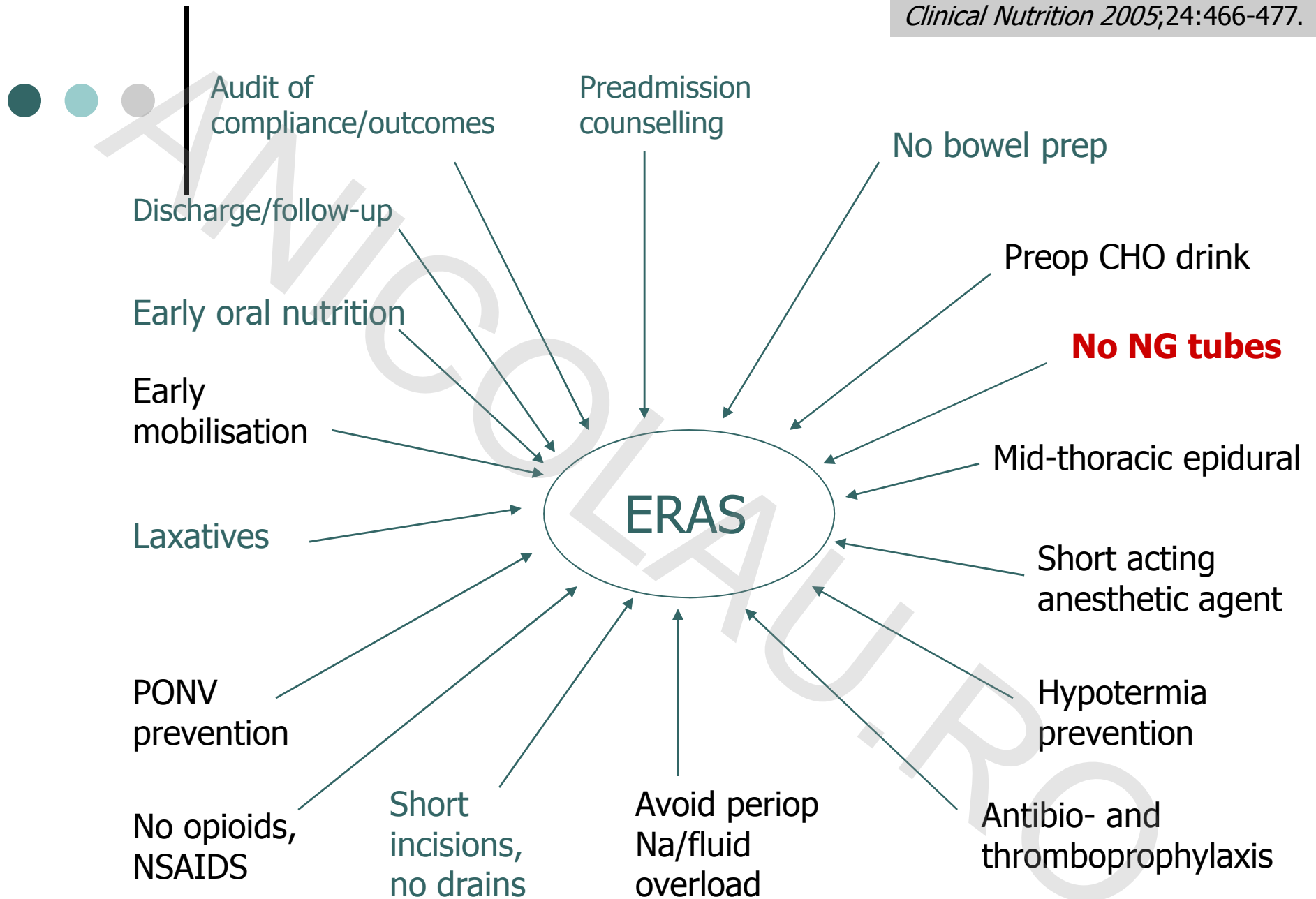
preop anxiolysis

↓ postop insulin resistance

fastens recovery

↓ PONV after laparoscopic
cholecystectomy

Modified from: Fearon K et al.
Clinical Nutrition 2005;24:466-477.

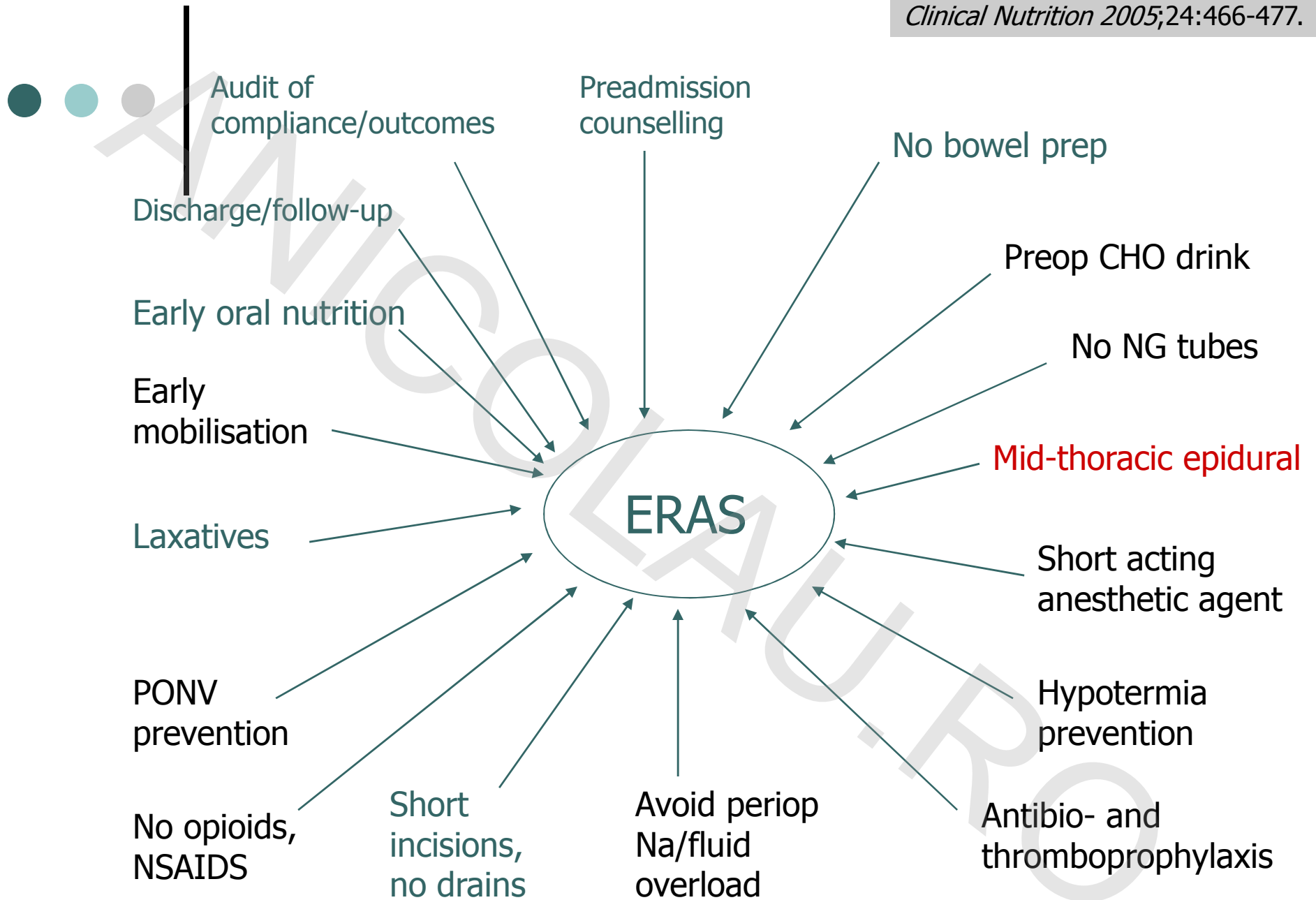


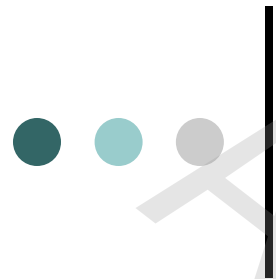
Prophylactic Nasogastric Decompression Following Abdominal Surgery

- Meta-analysis
 - **33** Studies, N = 5,240 patients
 - Patients without routine NG tube use had:
 - Earlier return of bowel function ($P < 0.00001$)
 - ↓ pulmonary complications ($P = 0.01$)
 - ↓ LOS
 - **No difference in anastomotic leak** between patients with vs without NG tubes ($P = 0.70$)
 - “Routine nasogastric decompression does not accomplish any of its intended goals and should be abandoned in favor of *selective* use of the nasogastric tube”

[Nelson R, et al. *Cochrane Database Syst Rev.* 2007;Jul 18;(3):CD004929]

Modified from: Fearon K et al.
Clinical Nutrition 2005;24:466-477.



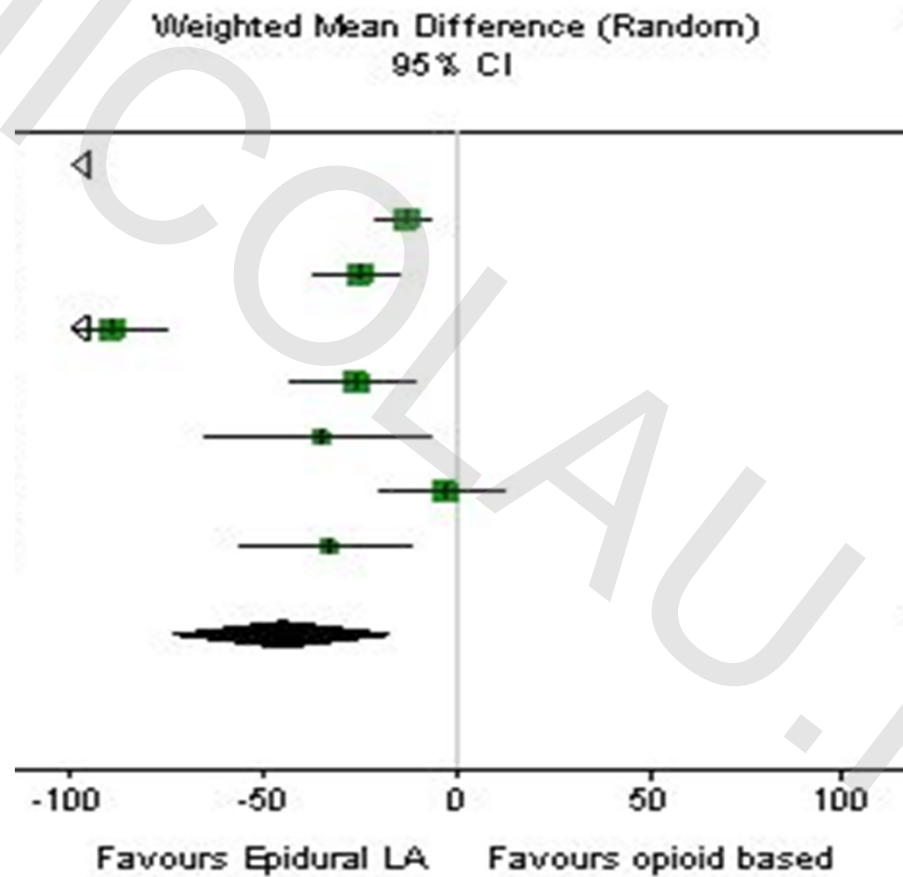


Epidural Analgesia

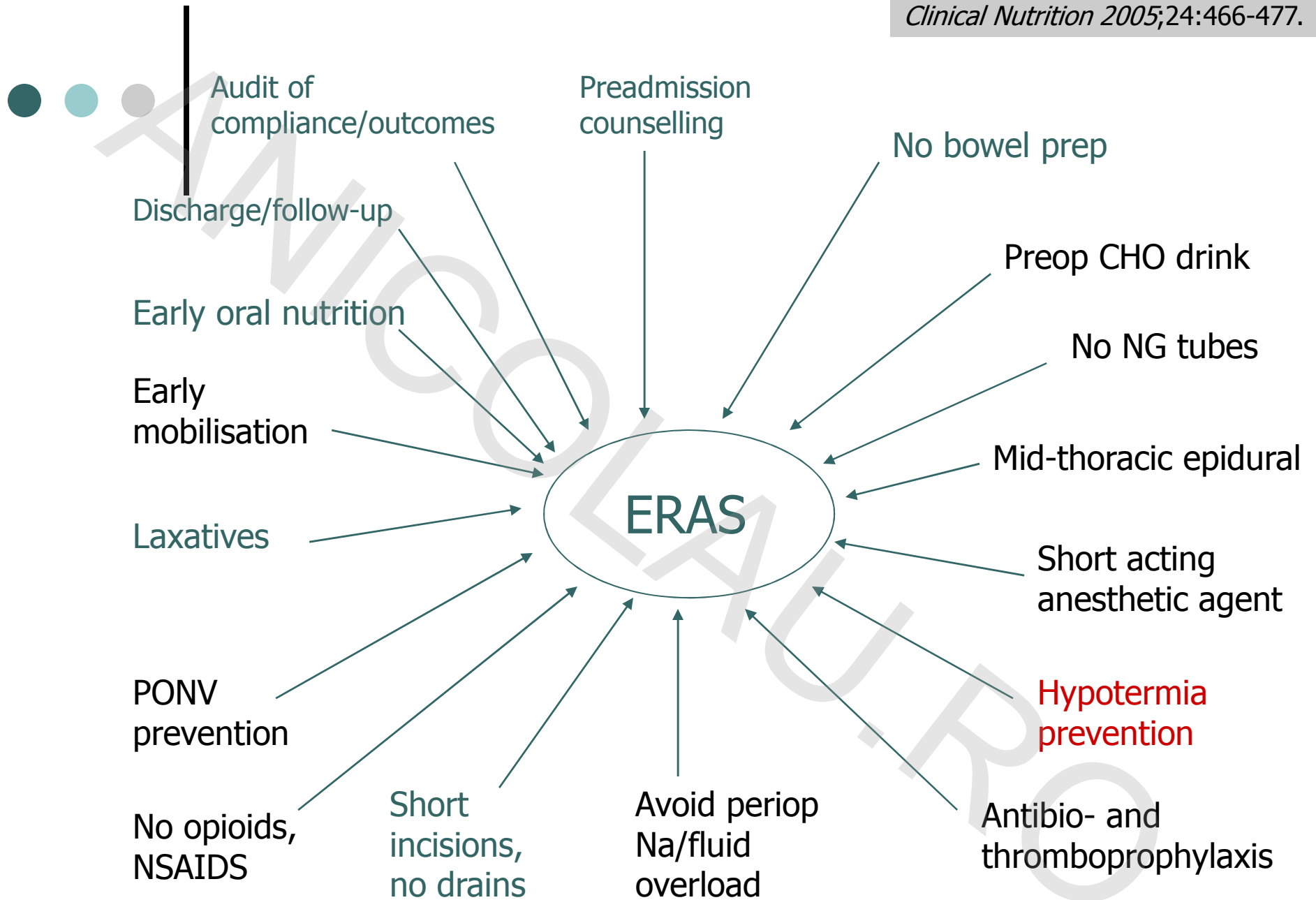
- Mid-thoracic (T7-T8)
 - analgesia + sympathetic block
 - early mobilisation
 - ↓ postop. ileus duration
- Preemptive analgesia/combined GE+TE
 - ↓ stress hormones and insulin resistance
 - ↓ postop. morbidity and mortality

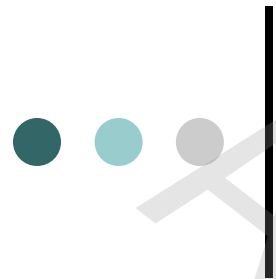
Rodgers A, Kehlet H et al. *Br Med J* 2000; 321:1493.
- Local anesthetics ± low dose fentanyl
- Avoids intra-and postop. opioids

TEA & Postoperative ileus



Modified from: Fearon K et al.
Clinical Nutrition 2005;24:466-477.





Hypothermia

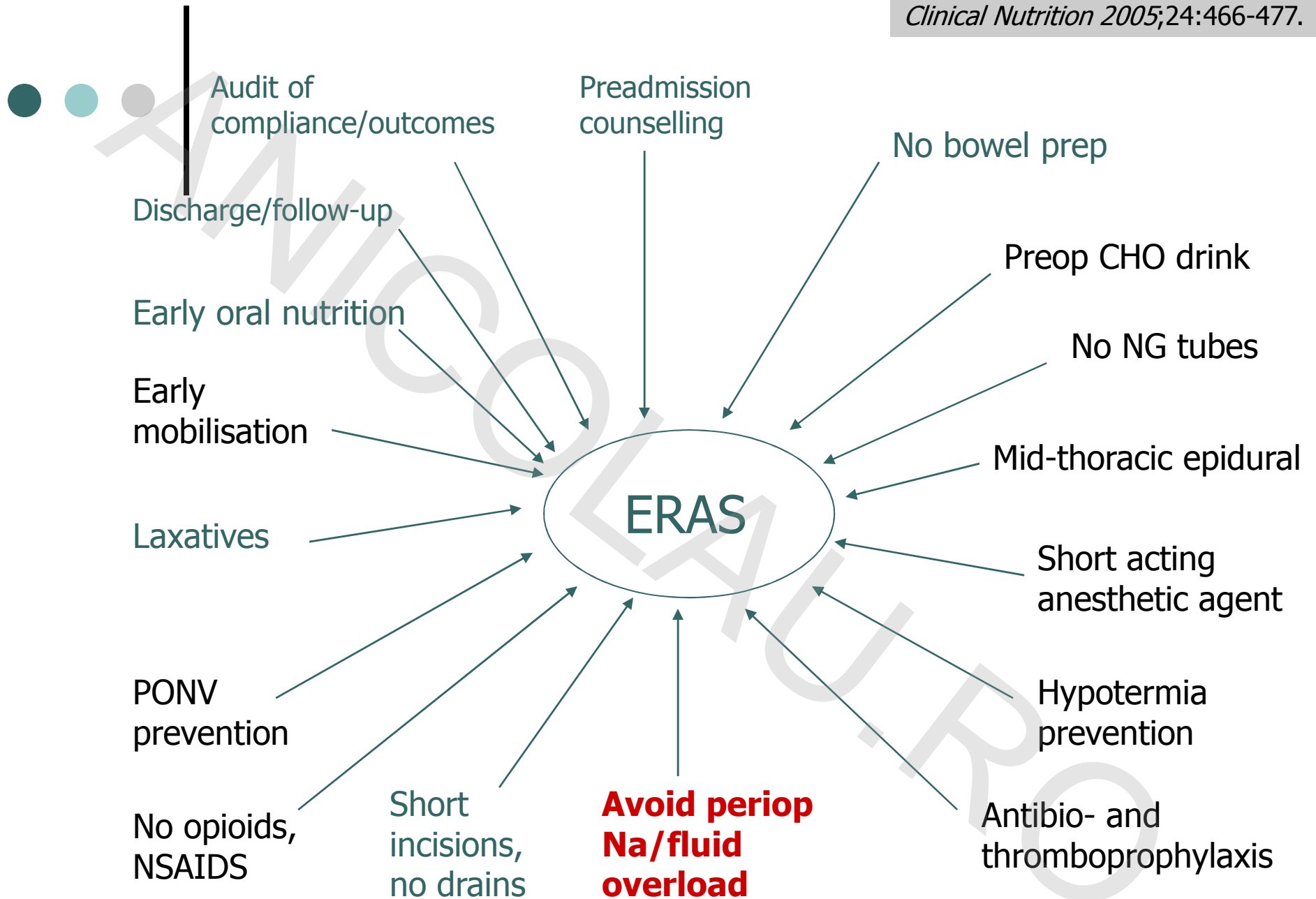
- Sympathetic stimulation, acidosis, coagulation abnormalities
- Heating cover + warming iv fluids
 - ↓ transfusion requirements
 - ↓ wound infections
 - ↓ cardiac complications

Kurz A, Sessler DI, Lenhardt R. N Engl J Med 1996; 334: 1209-15.

Frank SM et al. J Am Med Assoc 1997; 277: 1127-34.

Schmied H et al. Lancet 1996; 347: 289-92.

Modified from: Fearon K et al.
Clinical Nutrition 2005;24:466-477.



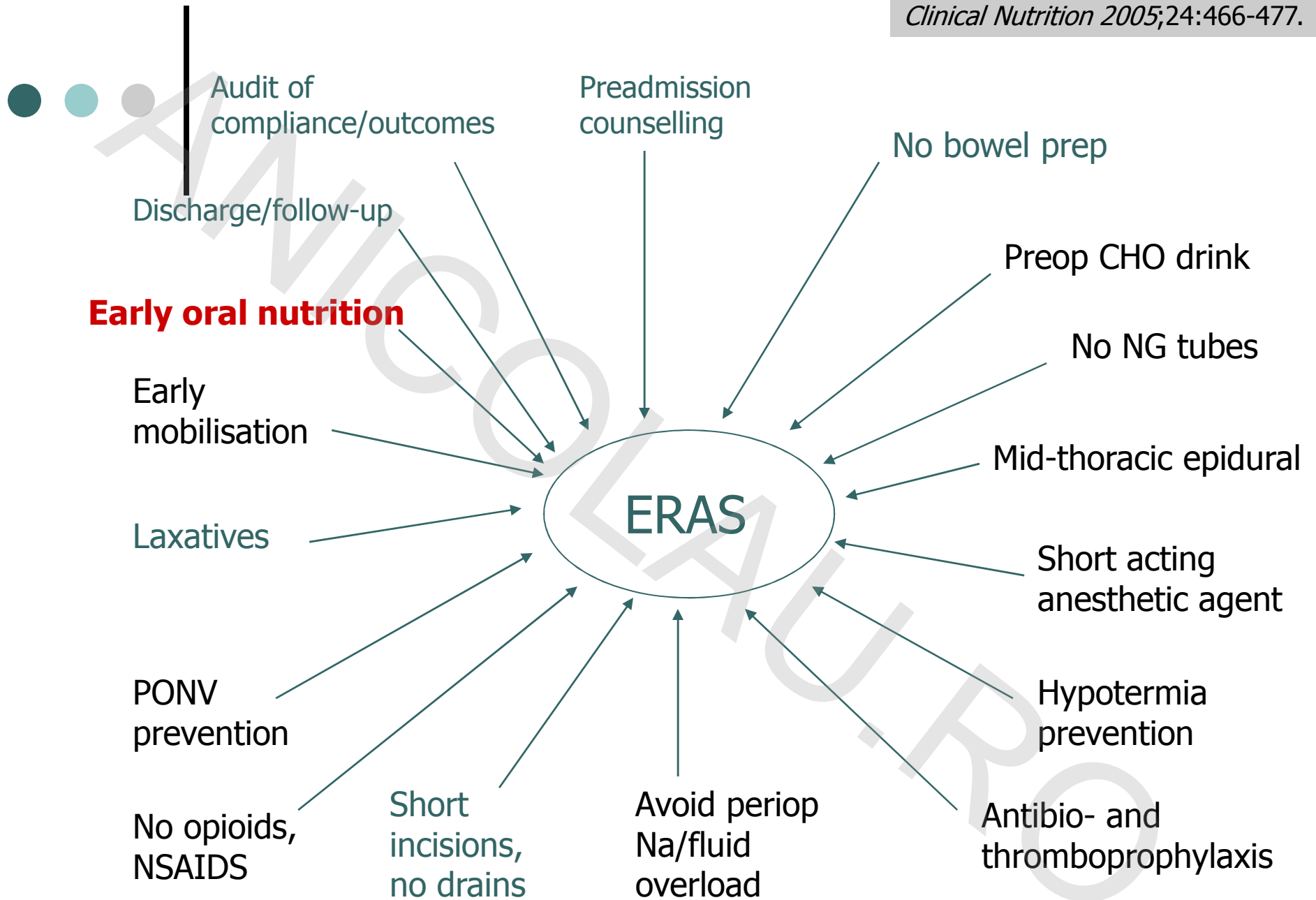
Perioperative Fluid Management

Tambraya AL et al. World J Surg 2004; 28:1046-51.
Lobo DN et al. Lancet 2002; 359:1812-8.
Brandstrup B et al. Ann Surg 2003; 238:641-8.

- ✓ Na/fluid overload ↑ postoperative ileus, complications and LOS
- ✓ “wet is best”
- ✓ Avoid bowel preparation
- ✓ Allow CHO drink Intra-and postoperative restriction (Na <145 mEq/day)
- ✓ Maintain 0 fluid balance
- ✓ low dose vasopressors if needed



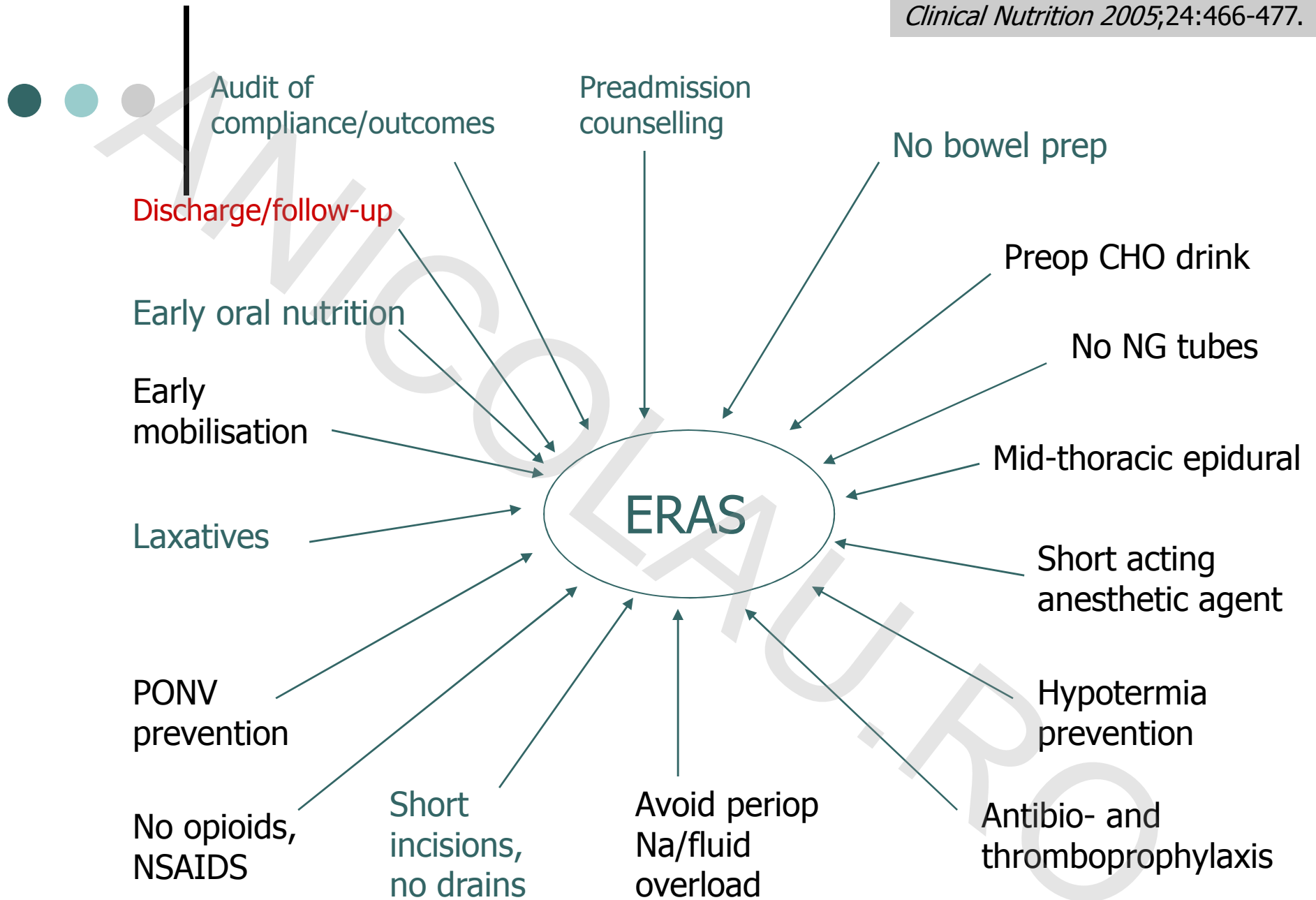
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● ● ● | Postoperative Oral Intake

- ↓ insulin resistance:
 - preop CHO drink + TE + early oral intake
- starting 4 hours after surgery
- 400 ml energy dense oral supplements starting day 0

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Discharge / Follow-up

- Discharge criteria
 - Good pain control on oral NSAIDS
 - Oral solid food, no iv fluids required
 - Independently mobile or same level as preop.
 - Willing to go home
- Follow-up
 - Hotline (telephone) with hospital 24-48 hs
 - Hospital visit at 7-10 days
 - Late visit at 30 days
 - Good cooperation with general practitioner



Clinical Evidence

- Nygren et al. Clin Nutr 2005 – observational, ERAS (DK) vs traditional care (NE, UK, NO, SE)
- Maessen et al. Br J Surg 2007 – 5 European centers, 425 patients: first stool after 3 days, discharge after 5 days
- The Northern Europe study: Lassen et al. Ann Surg 2008 – no guidelines for postoperative practice in many centres
- The Swiss study: Müller et al. Gastroenterology 2009 (156 pts, 4 university hospitals, open colonic surgery) - ↓ LOS, ↓ **complications**
- Dutch Breakthrough Project Perioperative Care
 - Maessen et al. Clin Nutr 2009 – 65% pts eat normal food next day after surgery
 - Jottard et al. Clin Nutr 2009 – postop nasogastric tube use ↓ from 88% to <10% pts
- Inclusion criteria extended
 - malnourished patients, advanced age are no exclusion criteria for ERAS
 - Independent predictors for complications: comorbidities (ASA 3-4), male sex and rectal surgery (Hendry et al. Br J Surg 2009)
 - Upper GI tract surgery (Lassen et al. Ann Surg 2008)
 - Liver resections (van Dam Br J Surg 2008)

ERAS included in the ESPEN guidelines for perioperative nutrition
(Braga et al. Clin Nutr 2006)


A comparison in five European Centers of case mix, clinical management and outcomes following either conventional or fast-track perioperative care in colorectal surgery

Nygren J et al. *Clinical Nutrition* 2005; 24: 455-461

	Total	DK	NL	NO	UK	SE
n	451	118	76	61	87	109
Cardiorespiratory (%)	10	7	5	10	11	15
Surgical total (%)	17	20	18	13	11	18
Anastomotic leak	3	4	4	3	1	1
Infective total (%)	19	14	28*	13	28*	16
Pneumonia	4	0	4	8*	10*	2
Wound infections	8	8	20"	3	3	6
Total patients with complications (%)	35	33	38	30	39	34

* p<0.05 vs. DK; " p<0.05 vs. DK, SE, NO, UK

Nygren J et al. *Clinical Nutrition* 2005; 24: 455-461



N	Total	DK	NL	NO	UK	SE
	451	118	76	61	87	109
Mortality n(%)	10(2)	6(5)	2(3)	1(2)	1(1)	0(0)
Readmissions n(%)	49(11)	26(22)	6(8)*	10(16)	2(2)*	5(5)*
Reoperations n(%)	33(7)	8(7)	7(9)	8(13)	3(3)	7(6)
LOS: median (IQR)	—	2 (1)	8(6)*	7(3)*	9(6)*	7(5)*
LOS: mean (SD)	—	3 (6)	12(9)*	9(9)*	12(8)*	9(5)*
Total LOS: median	—	2 (3)	8(6)*	8(4)*	9(6)*	8(6)*
Total LOS: mean	—	6 (11)	12(9)*	10(9)*	12(8)*	9(6)*



Clinical Emergency Hospital ongoing trial

2009 - 13 patients ; median age: 60 yo

- ❖ Type of operations - laparoscopic resections (7p)
 - 2p right hemicolectomies for cancer (lap surgery)
 - 5p left hemicolectomies (3 lap surgery)
 - 6p rectosigmoidian resections (2 lap surgery)
- ❖ 13 predefined FT modalities
- ❖ Median time until the first bowel movement: 2nd day
- ❖ Solid food intake – 90% starting in the first operative day
- ❖ Complications: -anastomotic leakage (1p)
-wound infection (2p)
- ❖ Rate of readmission: 0%
- ❖ Mortality: 0%



Conclusions

- ERAS is a multimodal perioperative approach aiming at promoting recovery after major colorectal surgery
- ERAS is both advantageous for the patient and for the hospital
- ERAS ↓ LOS and possibly postoperative complications
- ERAS is spreading as standard of practice throughout Europe