

ERAS in der kolorektalen Chirurgie – eine Standortbestimmung 2018

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Städtisches Klinikum Solingen gGmbH

Fast-track vs. ERAS?

Fast-track

=

ERAS



H. Kehlet
Kopenhagen



O. Lundqvist
Stockholm



K. Fearon
Edinburgh

Fast track – die Anfänge



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L. Barda
H. Rohrer

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8 Patienten

>70 Jahre (71 – 88 Jahre)

Kolonkarzinom

1. Schmerztherapie: Bupivacain-PDA Th7-Th9
2. restriktive Infusionstherapie: 1275ml
3. keine Drainage, keine Magensonde
4. sofortige orale Kost
5. sofortige Mobilisation

Entlassung am 2. postoperativen Tag

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Was ist ERAS?

Ein perioperativer klinischer Behandlungsplan:

- interprofessionell
- prozedurenspezifisch
- evidenzbasiert

Das Ziel:

- postoperative Organfunktionen vermeiden
- Heilung beschleunigen
- postoperative Komplikationen vermeiden

Die Nebenwirkung:

- kürzere Krankenhausverweildauer

Erst besser, dann schneller!

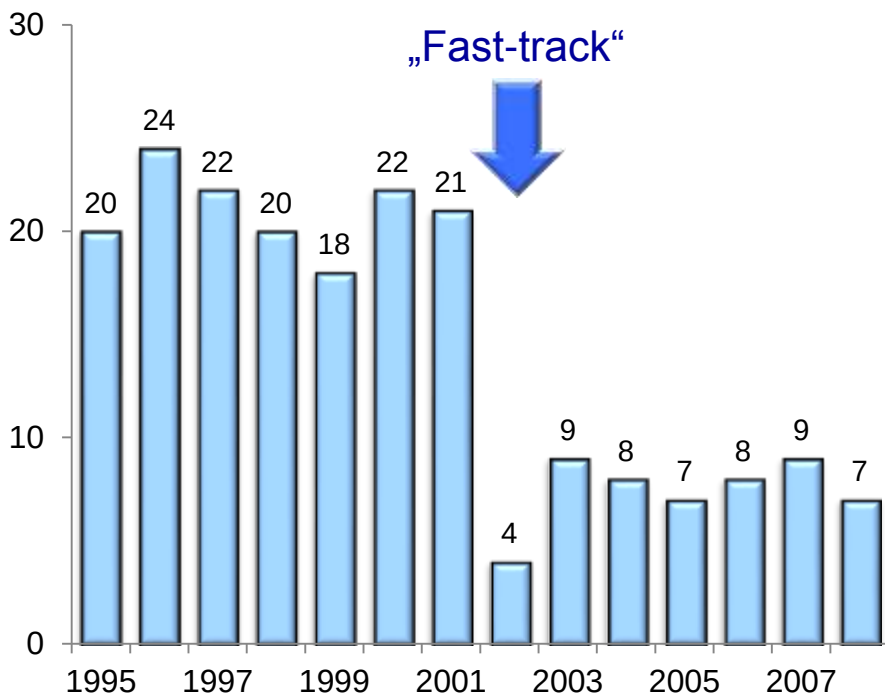
Vergleich traditionell - ERAS

Operation

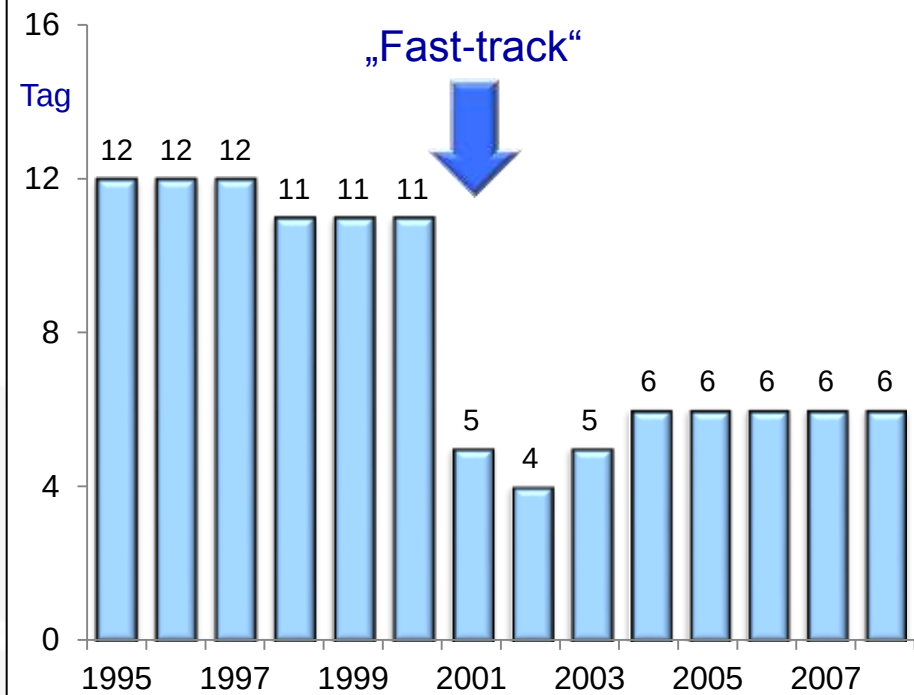


ERAS bei Kolonresektionen Charité Campus Mitte 2001-2008

Allgemeine Komplikationen



Entlassungstag



ERAS bei Kolonresektionen Altona 2010-2011, n = 332

Komplikationen	allgemein		
	nein	ja	
lokal			
nein	-	4	4
ja	44	11	55
	44	15	59

1 Pneumonie, 1 Harnwegsinfekt,
1 Nierenversagen, 1 Lungenembolie bei APC-Resistenz



ERAS beim Rektumkarzinom?

Recovery after laparoscopic colonic surgery with epidural analgesia, and early oral nutrition and mobilisation

L Bardram, P Funch-Jensen, P Jensen, M E Crawford, H Kehlet

The rate of postoperative recovery is determined by pain, stress-induced organ dysfunction, and limitations in conventional postoperative care. We attempted to provide "stress-free" colonic resection for neoplastic disease in eight elderly high-risk patients by a combination of laparoscopically assisted surgery, epidural analgesia, and early oral nutrition and mobilisation. Effective pain relief allowed early mobilisation, and hospital stay was reduced to 2 days without nausea, vomiting, or ileus. Postoperative fatigue and impairment in functional activity were avoided. Major advances in postoperative recovery can be achieved by early aggressive perioperative care in elderly high-risk patients undergoing colonic surgery.

Lancet 1995; **345**: 763–64

Original article

doi:10.1111/j.1463-1318.2011.02767.x

Postoperative morbidity after fast-track laparoscopic resection of rectal cancer

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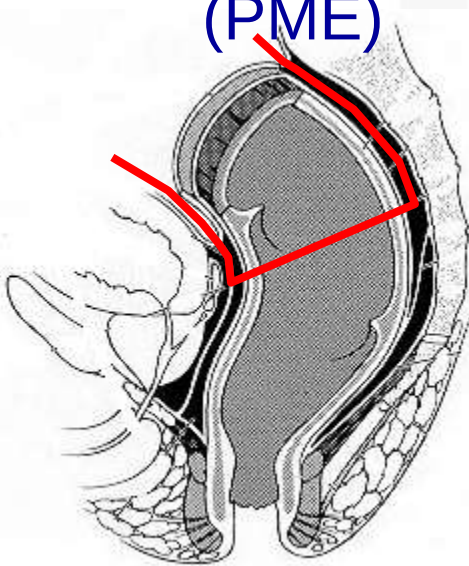
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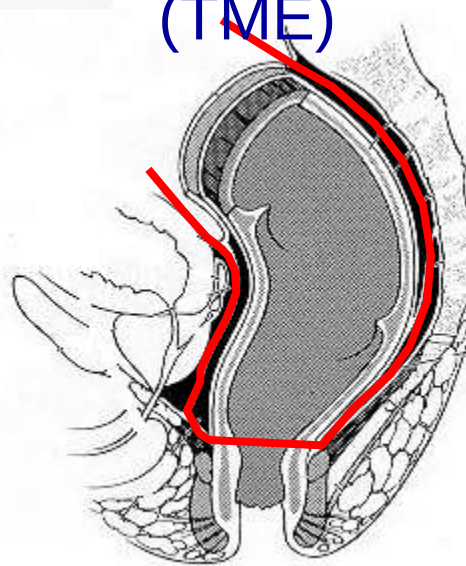
ERAS beim Rektumkarzinom?

Rektumresektion

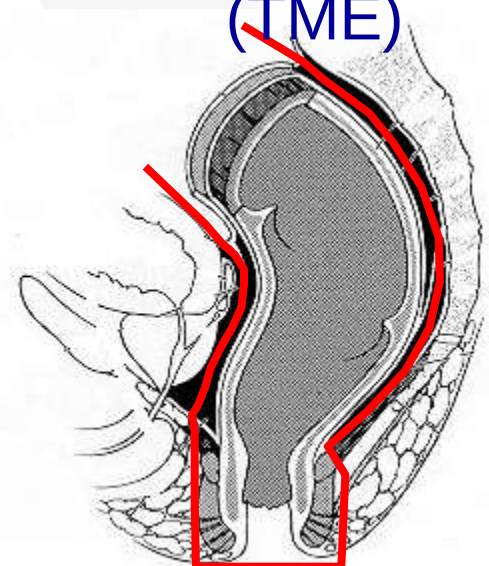
anteriore
Rektumresektion
(PME)



tiefe anteriore
Rektumresektion
(TME)



abdominoperineale
Rektumexstirpation
(TME)





Arbeitsgruppe Fast-track-Kolon II



n = 327

Klinikum Löbau/Zittau,
Ammerland Klinik
Klinikum Minden
Städtisches Klinikum Gütersloh
Klinikum Niederberg
Klinikum Essen Mitte
Marienhospital Aachen
Universitätsklinikum Bonn
Hunsrück Klinik, Kreuznacher Diakonie
Klinikum Aschaffenburg
Klinikum der Ludwigshafen
Westpfalz Klinikum Standort III
Diakoniekrankenhaus
Klinikum Starnberg
Klinikum Nürnberg
St. Marien Hospital
Kliniken des Main-Taunus Kreises
St. Elisabeth Krankenhaus
Charité Campus Mitte

ERAS beim Rektumkarzinom

n = 327

	AR + PME	TAR + TME	APR + TME
Patienten	122	142	63
Alter (Jahre)	68 (28 - 88)	68 (37 - 88)	71 (40 - 92)
ASA III / IV	38%	44%	53%
Risikofaktoren	63%	66%	75%
Laparoskopie	36%	48%	30%

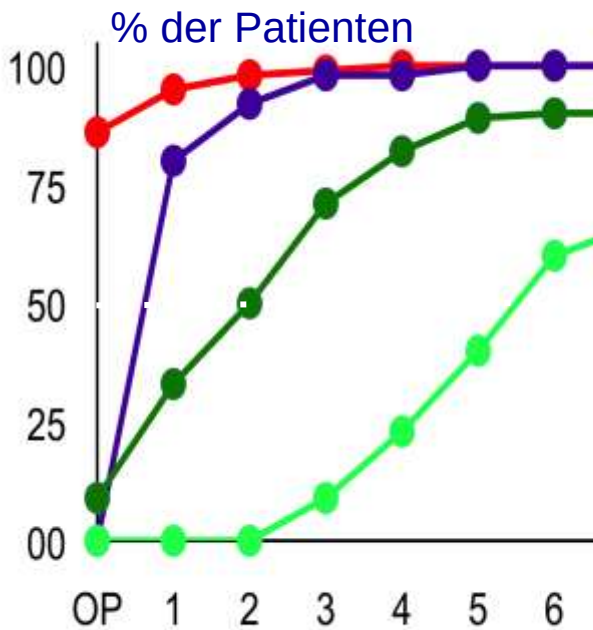
Fast-track beim Rektumkarzinom

Essen, trinken, Stuhlgang, entlassungsfähig

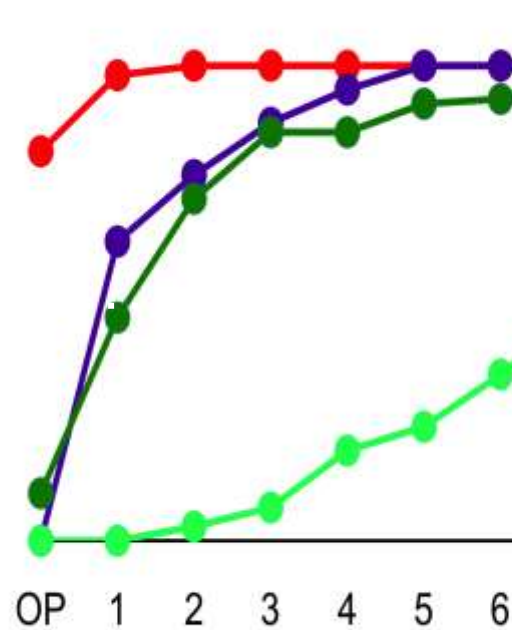


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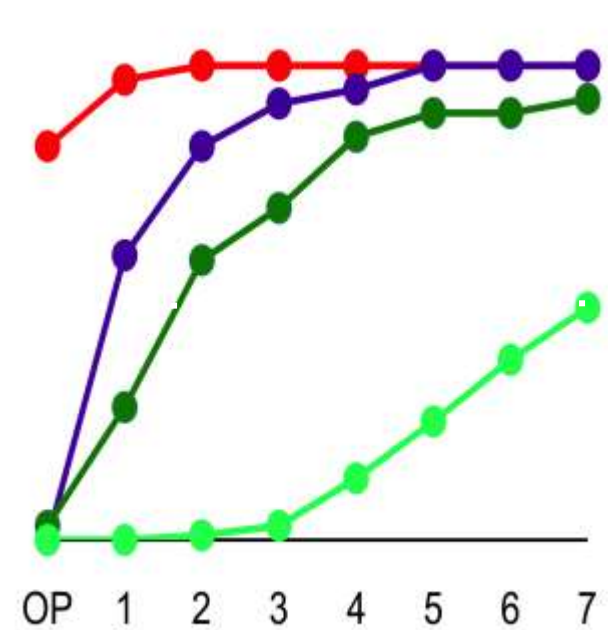
AR-PME



TAR-TME



APR-TME



● essen ● trinken ● Stuhlgang ● entlassungsfähig

Evidenzlage kolorektale Resektionen

Meta-Analyse von RCT



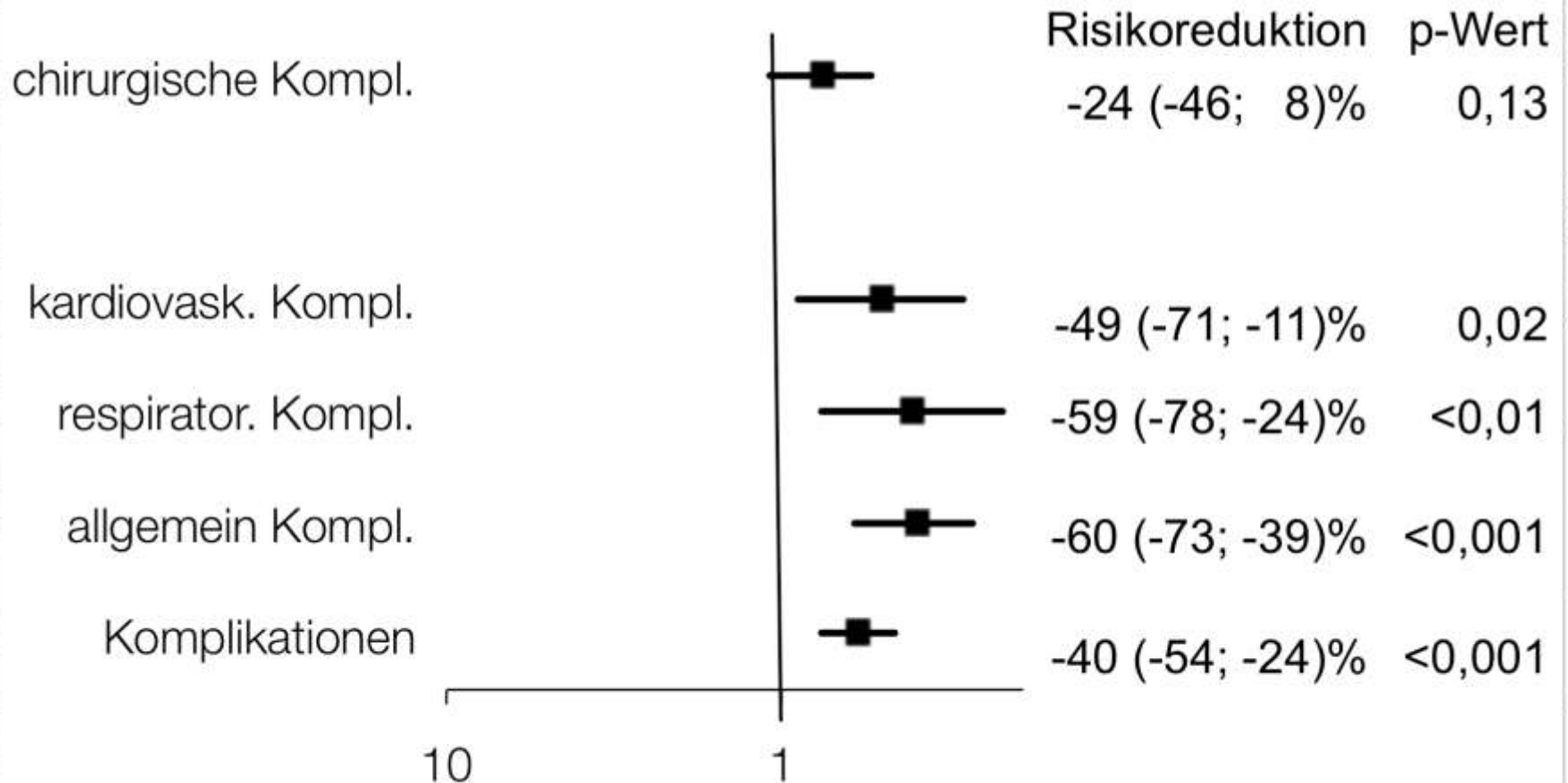
Trial	Multicentric	Follow-up (days)	Original procedure	Total patients	ERAS	Control	LPS/open	ERAS items
Anderson et al. [30]	No	30	Colon	28	14	11	Open	12
Delaney et al. [31]	No	30	Colorectal	62	31	33	Open	4
García-Botello et al. [32]	No	–	Colorectal	122	61	58	LPS/open	9
Gatt et al. [33]	No	30	Colorectal	38	19	20	Open	12
Ionescu et al. [34]	No	–	Colorectal	96	48	48	Open	10
Khoo et al. [35]	No	14	Colorectal	70	35	35	Open	8
Lee et al. [36]	No	30	Colorectal	92	46	54	LPS	5
Muller et al. [37]	Yes	30	Colon	152	76	75	Open	9
Ren et al. [13]	No	30	Colorectal	598	299	298	Open	11
Serclova et al. [38]	No	30	Colorectal	102	51	52	Open	10
Vlug et al. [12]	Yes	30	Colon	386	193	207	LPS/open	11
Wang et al. [41]	No	30	Colon	162	81	82	LPS/open	8
Wang et al. [14]	No	30	Colorectal	212	106	104	Open	8
Wang et al. [39]	No	30	Colon	98	49	50	LPS	8
Wang et al. [29]	No	90	Colorectal	80	40	38	LPS	9
Yang et al. [40]	No	–	Colorectal	64	32	30	Open	10

ERAS bei kolorektalen Resektion

Evidenz aus RCT



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Systematischer Review

Abdominalchirurgie, nosokomiale Infektionen

36 RCT n = 4.142



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Operationen	RCT
kolorektale Chirurgie	26
Gastrektomie / Magenresektion	7
konventionelle BAA-Operationen	2
Leberresektion	2
Darmresektion aller Art	2
Ösophagusresektion	1
Prostatektomie	1

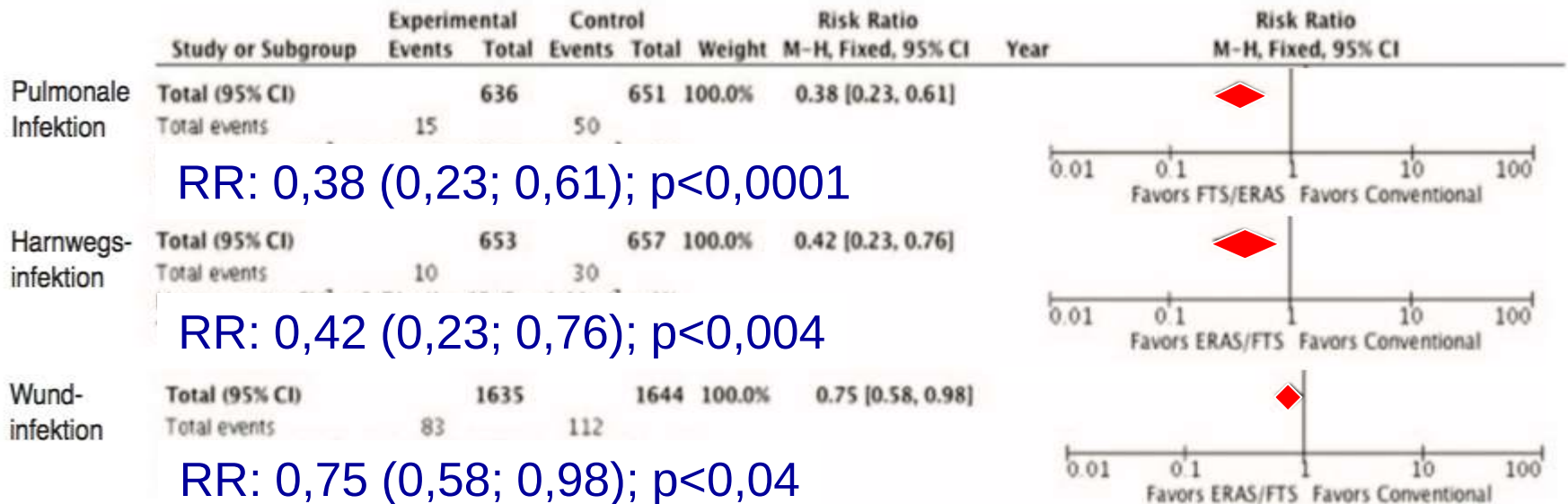
Systematischer Review

Abdominalchirurgie, nosokomiale Infektionen

36 RCT n = 4.142



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RR: 0,38 (0,23; 0,61); p<0,0001

RR: 0,42 (0,23; 0,76); p<0,004

RR: 0,75 (0,58; 0,98); p<0,04

ERAS
besser

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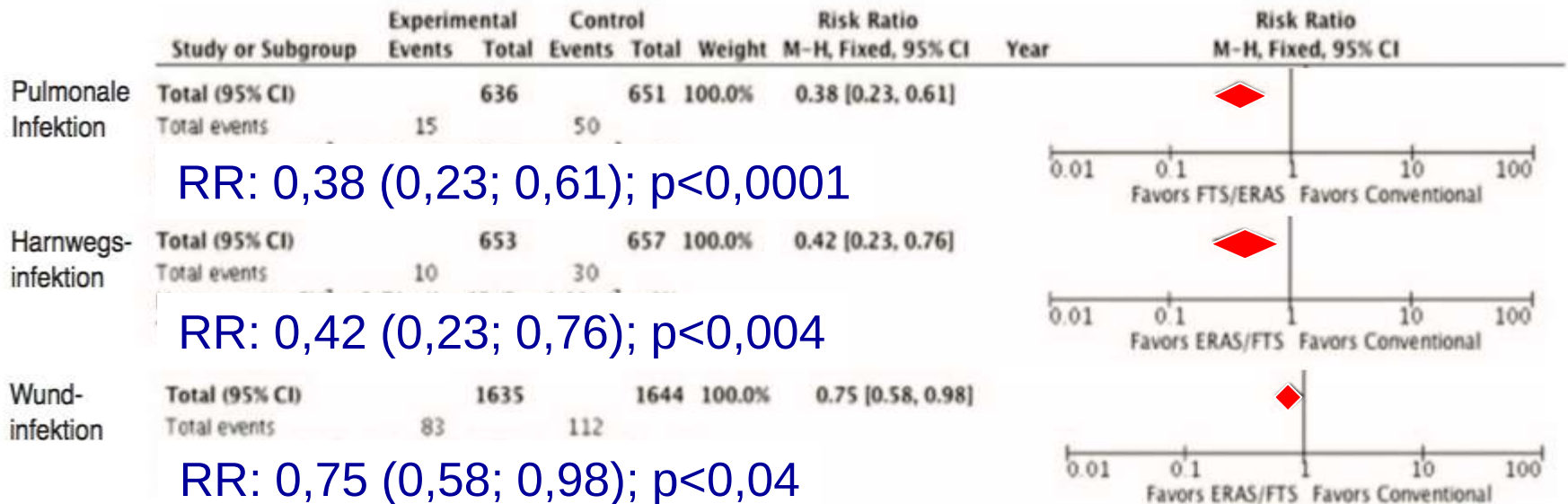
Systematischer Review

Abdominalchirurgie, nosokomiale Infektionen

36 RCT n = 4.142



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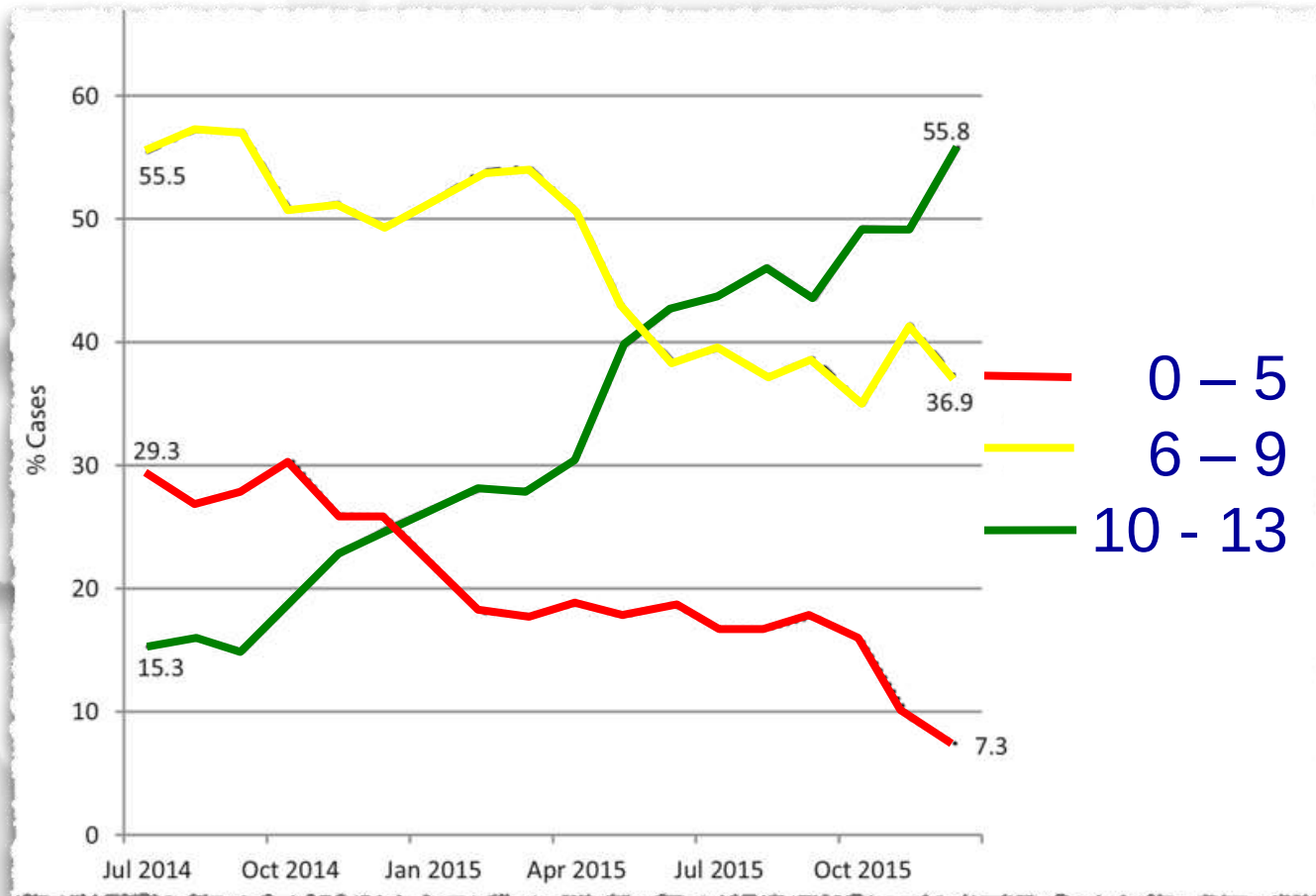
ERAS
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präoperativ	intraoperativ	postoperativ (OP-Tag)
Beratung / Schulung	Antibiotikaprophylaxe	Blasenkatheter entfernen
keine Darmspülung	Standard. Anästhesie	orale Ernährung
keine Prämedikation	MIC	Mobilisation aus dem Bett
PONV-Prophylaxe	keine Magensonde	
KH-Getränk	Normothermie	
	„goal-directed volume therapy“	
	keine Drainage	
	Peridural- oder Regionalanästhesie	

ERAS und Compliance

n=8.139, 113 Kliniken, USA

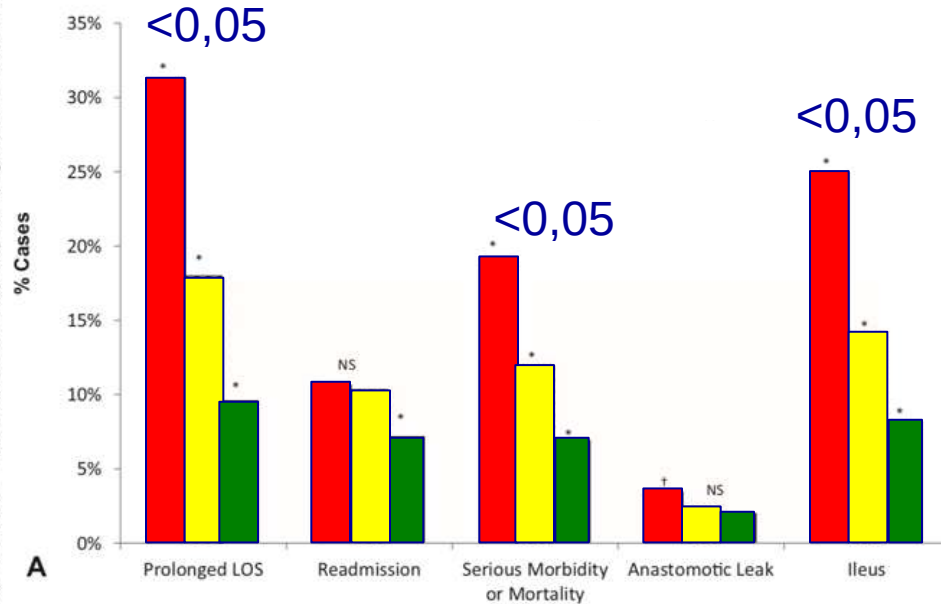


ERAS und Compliance

n=8.139, 113 Kliniken, USA

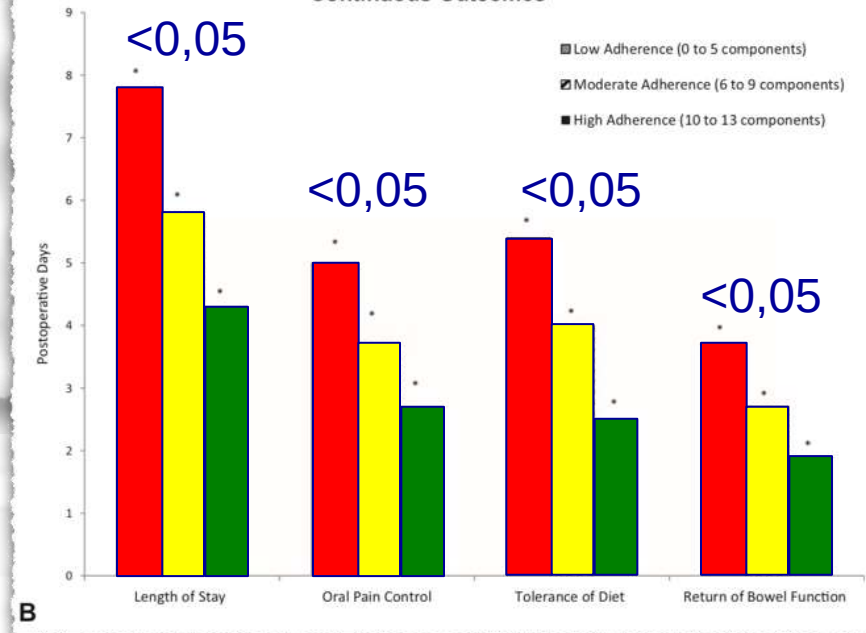
0 – 5
6 – 9
10 – 13

Binary Outcomes



>LOS WiedAuf M&M AnaIns Ileus

Continuous Outcomes



LOS Schmerz Kost Stuhl

ERAS und Compliance

n=2.876, 15 Kliniken, Ontario



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Care Pathway	ERAS Recommendations	Compliance in Total Cohort n (%)
Compliance with each preoperative intervention	Received patient education booklet and counseling	2366 (82.3)
	Instructed on length of stay	2415 (84.0)
	Consumed fluid carbohydrate rich drink morning of surgery	1783 (62.0)
	Appropriate bowel prep Fleet enema for left-sided resections, oral mechanical bowel prep for low anterior resections	2166 (75.3)
Compliance with each intraoperative intervention	Administration of acetaminophen and/or gabapentin prior to surgery	2007 (69.8)
	Use of fluid monitor intraoperatively	769 (26.7)
	Avoidance of abdominal drains and nasogastric tubes	2442 (84.9)
	Use of Lidocaine infusion and/or Epidural	2182 (75.9)
Compliance with each postoperative intervention	Early enteral feeding clear fluids day of surgery, offered solids POD1	1636 (56.9)
	Early ambulation dangling day of surgery, walking POD1	1367 (47.5)
	Chewing gum 3x/d	1511 (52.5)
	Avoidance and early removal of Foley catheters (POD1 for colon, POD3 for rectal surgery)	1543 (53.7)
Compliance with each phase of care*	Preoperative care pathway	2147 (74.7)
	Intraoperative care pathway	1627 (56.6)
	Postoperative care pathway	1160 (40.3)
	Compliance with all 3 care pathways	578 (20.1)
Overall compliance [†]		

ERAS und Complicance

n=2.876, 15 Kliniken, Ontario



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Multivariable (Adjusted) for

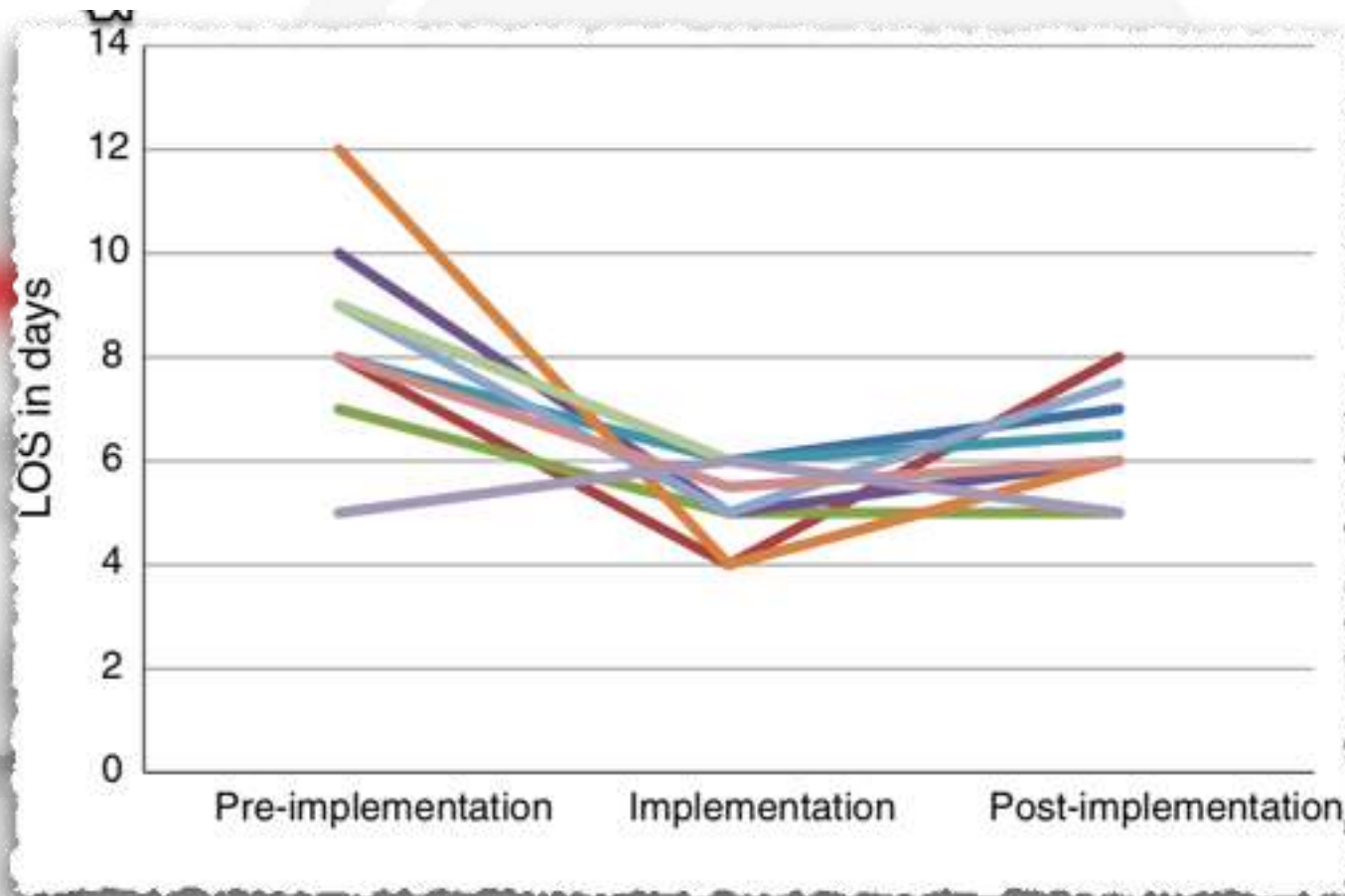
Höheres Risiko:	Alter	0,99
	männlich	0,80
	Anämie	0,71
	Divertikulitis	0,75
	IBD	0,70
	Rektum	0,61
Niedrigeres Risiko:	Laparoskopie	3,14
	ERAS-Compliance	1,85

ERAS Persistenz

n = 1.270, 10 Kliniken, Niederlande



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ERAS Implementierung



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Recovery after laparoscopic colonic surgery with epidural analgesia, and early oral nutrition and mobilisation

L. Bardram, P. Funch-Jensen, P. Jensen, M. E. Crawford, H. Kehlet

The rate of postoperative recovery is determined by pain, stress-induced organ dysfunction, and limitations in conventional postoperative care. We attempted to provide "stress-free" colonic resection for neoplastic disease in eight elderly high-risk patients by a combination of laparoscopically assisted surgery, epidural analgesia, and early oral nutrition and mobilisation. Effective pain relief allowed early mobilisation, and hospital stay was reduced to 2 days without nausea, vomiting, or ileus. Postoperative fatigue and impairment in functional activity were avoided. Major advances in postoperative recovery can be achieved by early aggressive postoperative care in elderly high-risk patients undergoing colonic surgery.

Lancet 1995; 345: 763-64

The rate of postoperative recovery is determined by stress-induced organ dysfunction, such as gastrointestinal paralysis, cardiopulmonary, and thromboembolic complications, and fatigue.^{1,2} The surgical stress response can be reduced by minimally invasive techniques, such as laparoscopic surgery,³ or by different neural blockade.^{4,5} Subsequently, postoperative morbidity may be reduced and recovery hastened.⁶ In addition to its pain-relieving effect, epidural blockade has a positive effect on postoperative ileus.⁷

After conventional open colonic surgery, hospital stay is about 8-10 days, and postoperative fatigue leads to several weeks of convalescence and impaired functional activity.⁸ If open colonic surgery is combined with epidural analgesia and early oral nutrition and mobilisation, postoperative hospital stay is reduced to about 5 days.⁹ Laparoscopic colonic surgery also results in less postoperative pain and a hospital stay of about 5 days.¹⁰

We investigated the combined effect of laparoscopic surgery, epidural analgesia, and early oral nutrition and mobilisation in elderly high-risk patients undergoing colonic resection for neoplastic disease.

We studied nine consecutive patients about to undergo elective colonic resection for neoplastic disease. Informed consent was obtained. Patients were included if they were aged over 70 years and were able to take care of themselves at home without extensive help. Patients with tumours in the transverse colon or rectum were excluded.

Preoperatively, a thoracic epidural catheter was inserted between T7 and T9. After epidural blockade with 6-8 mL bupivacaine 0.5%, general anaesthesia was induced with fentanyl 0.1-0.25 mg, enflurane, and nitrous oxide and oxygen. Additional epidural bupivacaine 0.5%, 4 mL per h, was given during surgery. After surgery, 20 mL bupivacaine 0.25% was injected to the largest incision. Postoperative pain treatment consisted of continuous epidural bupivacaine 0.25%, 4 mL per h, for 48 h and oral tramadol 30 mg daily for 8 days. Opioids were avoided because of their effects on gastrointestinal function. Intraoperative and early postoperative intravenous fluids amounted to a median of 1275 mL (range 650-2300), without blood transfusion. At surgery the bowel was fully mobilised, the

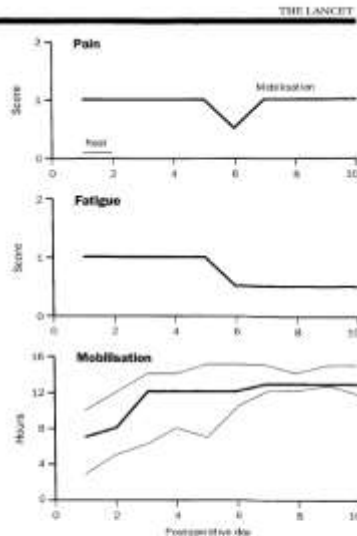


Figure 1. Postoperative pain, fatigue, and mobilisation after colonic resection. Scores for postoperative pain and fatigue on 0-2 scale. Length, 2 cm. Median (range) values shown; large (small) as line bars for mobilisation.

results were divided centrally, and the ileum or distal sigmoid was transected intra-abdominally by laparoscopy. After delivery of the bowel through a small incision, the second bowel transection and the anastomosis were performed outside the body. In right-sided hemicolectomy, a one-layer hand-sewn anastomosis was used and after sigmoid resection the anastomosis was done with a circular stapler inserted through the anus. No drains were used. A single dose of antibiotics (ceftriaxone 1.5 g and cefuroxime 1.0 g) was given.

Normal oral food intake enticed by cereal protein solution (about 1000 kcal [4200 kJ] and 80 g protein per day) was allowed immediately after surgery. Cisapride 20 mg was given twice daily. The bladder catheter was removed after 24 h. Early mobilisation was enforced according to a fixed schedule. The epidural catheter was removed after 48 h and discharge was planned for 2-3 h subsequently.

Pain, nausea, and intake, defecation, hours of mobilisation, and fatigue were recorded for the first 10 postoperative days. Additional analgesia was registered. Patients were asked for a final assessment 1 month postoperatively.

In one patient, a rectosigmoid resection was converted to an open procedure because of neoplastic growth into the left ureter, so data were excluded. Eight patients (median 78 years, range 71-88) completed the trial, seven were on diuretics for heart disease, and two had severe cardiopulmonary disease with preceding myocardial infarction and pulmonary embolism. One patient did not have cardiopulmonary disease.

THE LANCET

Seven patients had Dukes' type B (four) and C (three) adenocarcinoma; the other patient had a large sessile adenoma. The surgical procedures were seven right-sided hemicolectomies and one sigmoid resection. Median duration of surgery was 220 min (range 135-260). Median blood loss was 50 mL (0-200). There were no intraoperative or postoperative complications.

Pain during mobilisation was slight during the entire postoperative period (figure). In addition to the scheduled administration of 20 mg tramadol daily for 6 days, three patients took 1-5 tablets of 10 mg morphine and three took occasional paracetamol. The effective pain relief allowed early mobilisation. The patients were out of bed for a median of 6 h on the first day and 8 h on day 2 (figure). After discharge, patients regained normal "at home activities" very quickly, and were mobilised for about 12 h from day 3. None of the patients needed extra social home care.

Median oral fluid intake from day 1 was 2500 mL (1900-3200), together with 2-3 meals. No patient vomited, and slight nausea was experienced by only two patients, each only once. Six patients passed faeces first on day 1 and two on day 2. Bowel function was thereafter normal except in one patient, who had no bowel function on days 3-6.

The first two patients in the programme were not discharged until day 3, despite having normal bowel function on day 2, because of logistic or personal problems. The next six patients followed the scheduled plan and went home on the 2nd postoperative day. 1 month postoperatively all patients were back to normal function. They were very satisfied with the entire postoperative course and all would recommend the procedure to others; no one felt they had been discharged too early.

We have shown that further postoperative recovery can be achieved in elderly high-risk patients undergoing elective colon resection, with a combined strategy of laparoscopic surgery, continuous epidural blockade, and early oral nutrition and mobilisation. The most pronounced features were the lack of nausea, vomiting, and postoperative ileus. Furthermore, the high level of activity at home after the early discharge is remarkable in this elderly group of patients.

Because of the multimodal approach, it is impossible to identify precisely the factors responsible for these positive results. An important limiting factor to early recovery after colonic resection is gastrointestinal ileus, which was avoided by use of epidural local anaesthetic and early oral nutrition. In addition, we used a prokinetic drug (cisapride) and avoided opioids and gastric tubes.

Although the number of patients is small, there is a surprising lack of cardiopulmonary morbidity, especially since all but one patient had cardiopulmonary disease. Reduced bleeding, restricted intravenous perioperative fluids, and epidural analgesia may all have reduced cardiopulmonary stress.

The accelerated recovery, effective into the late postoperative period, suggests that an early aggressive postoperative stress-reducing effort is worth while. Our patients did not have postoperative deterioration in organ function leading to extended stay in hospital and fatigue. This may be an important advantage, since elderly surgical patients usually have impaired recovery of strength after abdominal surgery.¹ Our regimen needs confirmation in larger series since benefits from laparoscopic colonic surgery per se are controversial.¹¹ Finally, the advantages have to be balanced against the small risk of abdominal wall metastases after laparoscopic cancer surgery.¹²

This study was supported by a grant from Pharmacia Läkemedel AB, Solna, Sweden, and the Alfred Benzon Fund, Copenhagen.

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ERAS-Society Centers of Excellence

ERAS[®] Society



6. ERAS-World Congress



>400 Teilnehmer
65 Nationen

Aktuelle Diskussion:

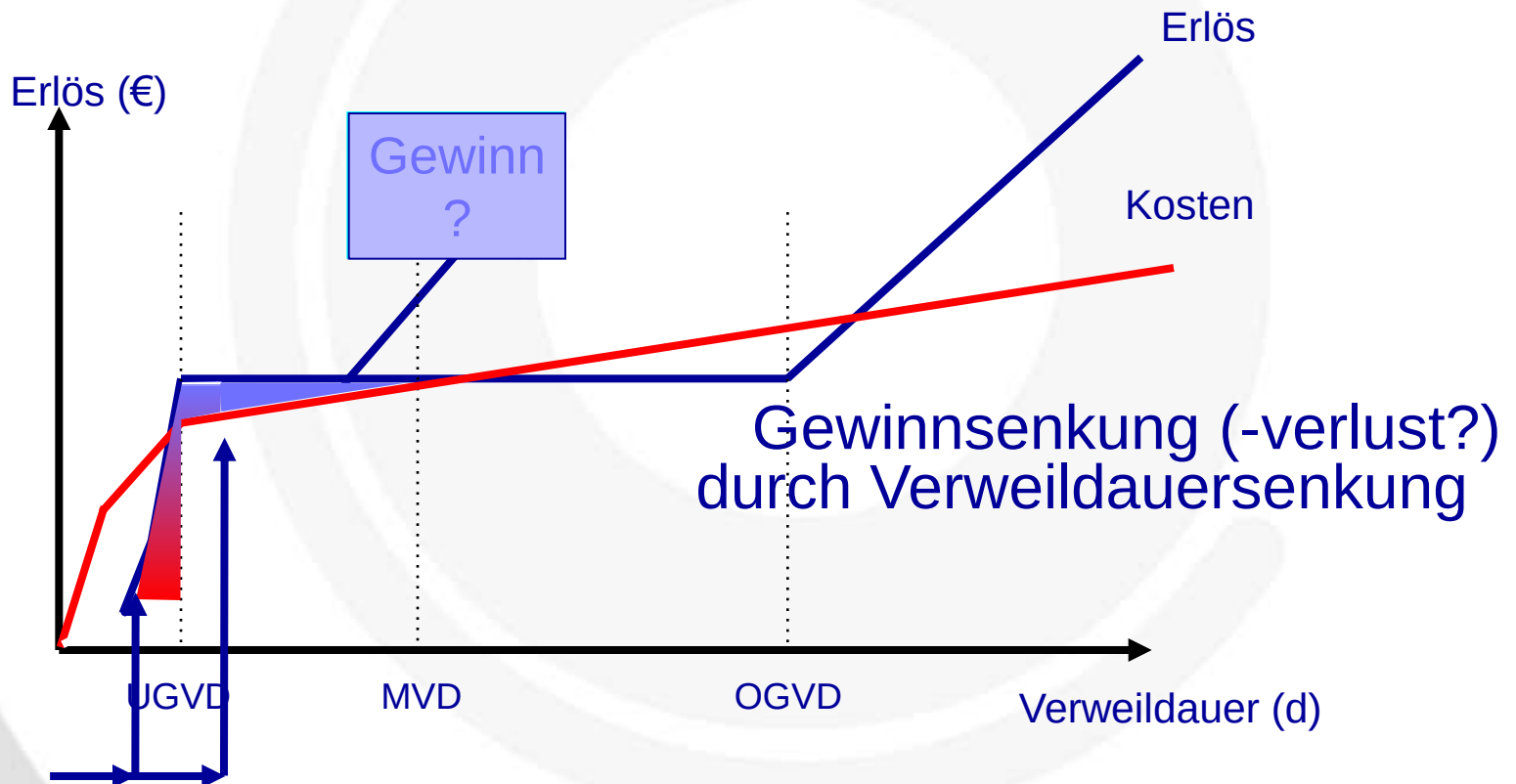
Implementierung
Compliance
Notfälle

ERAS und Ökonomie 2018

Gewinnminderung durch optimale Therapie!



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Erlösabschlag bei
Unterschreiten der UGVD

ERAS und Verweildauer

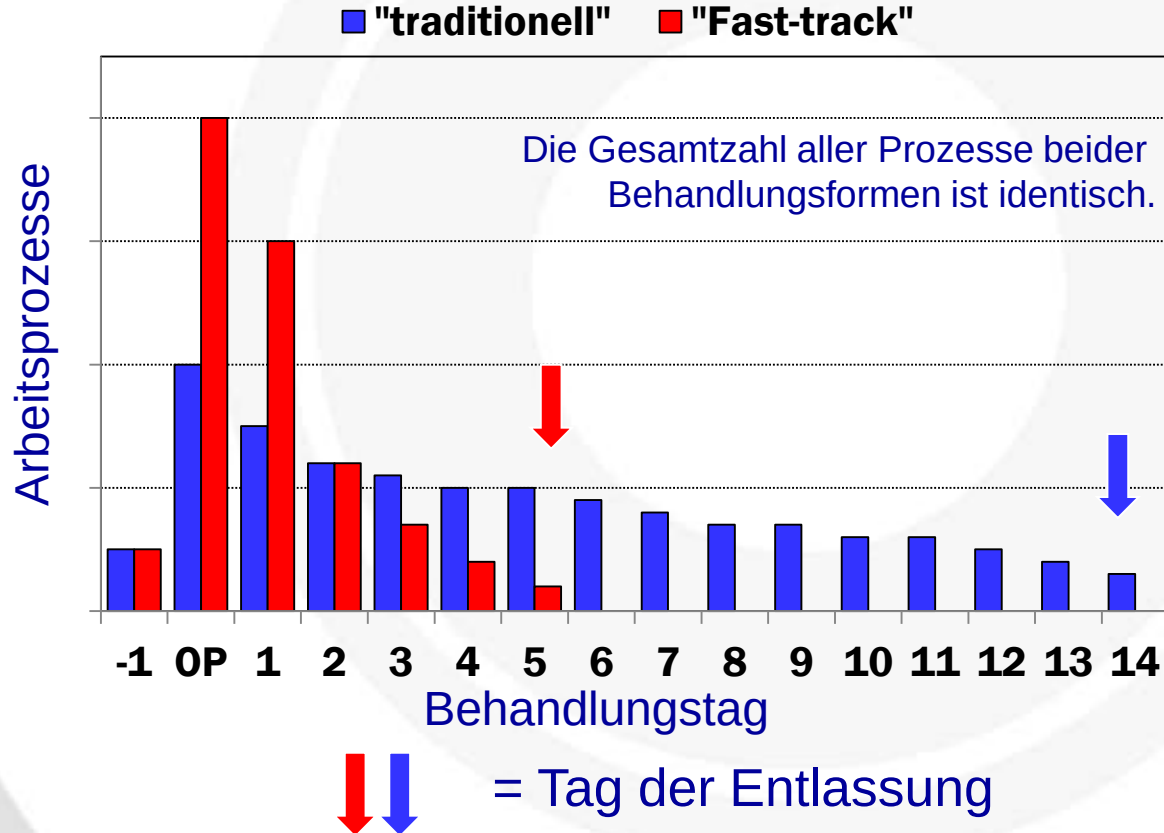
TABLE 3. Characteristics of 157 Consecutive Patients Who Underwent Day-case Colectomy.

Age, yrs	52)*
Sex, male/female	78/79
Body mass index, kg/m ²	26.1 (26.0, 16–45)*
Operative time, min	108 ± 31.1 (95.0, 45–232)*
Length of stay, h	10.4 ± 3.4 (10.0, 7–14.7)*
Time for passage of flatus, h	1.1 ± 0.3 (1.0, 0–4)*
Time for first bowel movement, h	1.9 ± 0.4 (2.0, 0–6)*
Weight gain on postoperative day 1	2.9 ± 0.5 (3.0, 0–8)*
Weight gain recorded on postoperative day 2	2.7 ± 0.5 (2.9, 0–5)*
Weight gain recorded on postoperative day 3	2.2 ± 0.4 (2.0, 0–5)*

*Mean ± standard deviation (median, range).

Erst besser, dann schneller!

ERAS und Arbeitsverdichtung 1995 - 2018



Strukturelle Veränderungen erforderlich
ERAS = „nursing care pathway“

Teuer aber sexy?

Fast track vs. Robotics

	Fast track	Robotics
Chirurgische Komplikationen	+ (?)	-
Medizinische Komplikationen	+++	?
Postoperative Erholung	+++	?
Verweildauer	+++	?
Kosten	+	---
Werbeeffekt	?	+++
Logistischer Aufwand	---	-
„Sexy?“	+	+++++



ERAS bei kolorektaler Resektion

Hocheffektiv!

- rasche Rekonvaleszenz,
- weniger Komplikationen

„Pflicht“ bei kolorektalen Operationen!

Nicht sexy, daher in Deutschland vernachlässigt!

- in Alltag und Forschung

Deutschland = „slow track“-Country!