



Verbesserung des onkologischen Outcome unter ERAS

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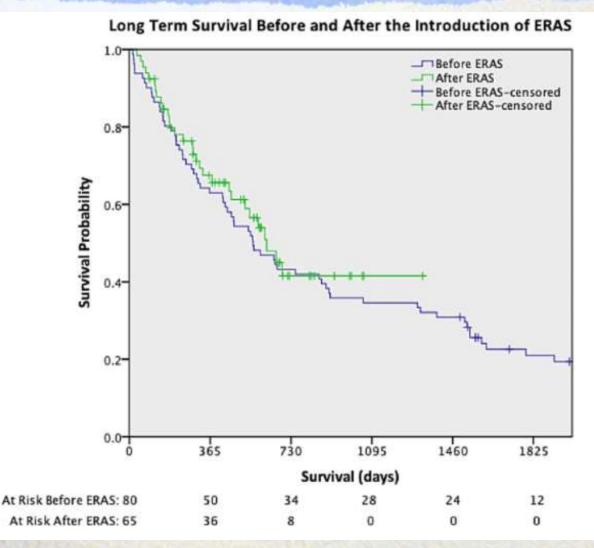
I.S.D.S International Society for Digestive Surgery TAGUNGSPROGRAMM 19. Frühjahrstagung vom 26.05 - 02.06.2018 Adherence to the ERAS protocol is Associated with 5-Year Survival After Colorectal Cancer Surgery: A Retrospective Cohort Study

Results

In patients with \geq 70 % adherence to ERAS interventions (N = 273,), the risk of 5-year cancer-specific death was lowered by 42 %, HR 0.58 (0.39–0.88, cox regression) compared to all other patients (<70 % adherence).

Significant independent perioperative predictors of increased 5-year survival were avoiding overload of intravenous fluids, HR 0.53 (0.32–0.86); oral intake on the day of operation, HR 0.55 (0.34–0.78); and low CRP levels on postoperative day 1.

Gustafsson, U.O., Oppelstrup, H., Thorell, A. et al. World J Surg (2016) 40: 1741. https://doi.org/10.1007/s00268-016 3460-y



Achieving long term survival in oesophagectomy patients aged over 75. August 2016Annals of Medicine and Surgery 9(C):15-21Ben Oakley, Christopher M Lamb et al. Enhanced recovery after surgery pathway for oesophagectomy patients [10].

Post-operative day

Day 0	Extubate as soon as possible if on ventilator
	Analgesia: epidural or paravertebral \pm patient controlled analgesia
Day 1	Leave critical care
	Physiotherapy goal: chest physio and sit out of bed
Day 2	Physiotherapy goal: chest physio, sit out of bed, walk 10 m
Day 3	Chest drain changed to valved bag
	Physiotherapy: chest physio, sit out of bed, walk the length of the ward ×2
Day 4	Physiotherapy: sit out of bed, walk the length of the ward ×3
Day 5	Commence oral intake if no clinical evidence of leak.
	Remove nasogastric tube, chest drain, epidural/paravertebral and central line. Start oral analgesia.
	Physiotherapy: walk freely on ward, shower

- Day 6 Physiotherapy: shower, walk independently, climb stairs
- Day 7 Full mobilization and activities of daily living. Discharge.

Results

45% of patients were enrolled into an Enhanced Recovery After Surgery program and they demonstrated a significantly reduced length of stay from 18 to 14 days (p = 0.005) and 30-day mortality from 6.2% to 0% (p = 0.04) compared to the time period before the program. Long-term survival is achievable in patients aged over 75 years.

> Achieving long term survival in oesophagectomy patients aged over 75. August 2016Annals of Medicine and Surgery 9(C):15-21Ben Oakley, Christopher M Lamb et al.

Cochrane Database of Systematic Reviews

Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery (Review)

Bond-Smith G, Belgaumkar AP, Davidson BR, Gurusamy KS

Bond-Smith G, Belgaumkar AP, Davidson BR, Gurusamy KS. Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery. Cochrane Database of Systematic Reviews 2016, Issue 2. Art. No.: CD011382. DOI: 10.1002/14651858.CD011382.pub2.

Primary outcomes

- 1. Mortality.
 - i) Short-term mortality (in-hospital mortality or mortality within three months).
 - ii) Long-term mortality (for patients undergoing surgery for cancer).
- 2. Serious adverse events (within three months).
 - i) Clavien-Dindo classification (Clavien 2009; Dindo 2004): grade III or higher.
 - ii) International Conference on Harmonisation-Good Clinical Practice (ICH-GCP) guideline (ICH-GCP 1996): serious adverse events defined as any untoward medical occurrences that result in death, are life threatening, require inpatient hospitalisation or prolongation of existing hospitalisation and result in persistent or significant disability/ incapacity.
 - iii) Individual complications that could clearly be classified as grade III or higher by the Clavien-Dindo classification Clavien 2009; Dindo 2004), or as a serious adverse event by the ICH-GCP cl assification.
- 3. Health-related quality of life (using any validated scale).

Secondary outcomes

- 1. Adverse events (within three months). We included all adverse events reported by the study authors, irrespective of theirseverity.
- 2. Length of hospital stay (including the index admission for major upper gastrointestinal, liver or pancreatic surgery and any surgical complicationrelated readmissions).
- 3. Number of hospital readmissions.
- 4. Time to return to normal activity (return to preoperative mobility without additional carer support).
- 5. Time to return to work (for those who were employed previously).
- 6. Costs (however reported by study authors; we converted costs to the single currency of USD based on the existing conversion rate on the day of the analysis).



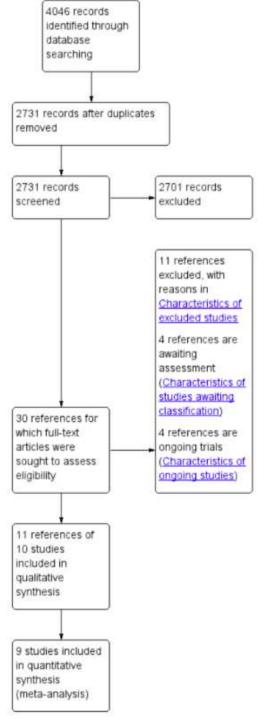
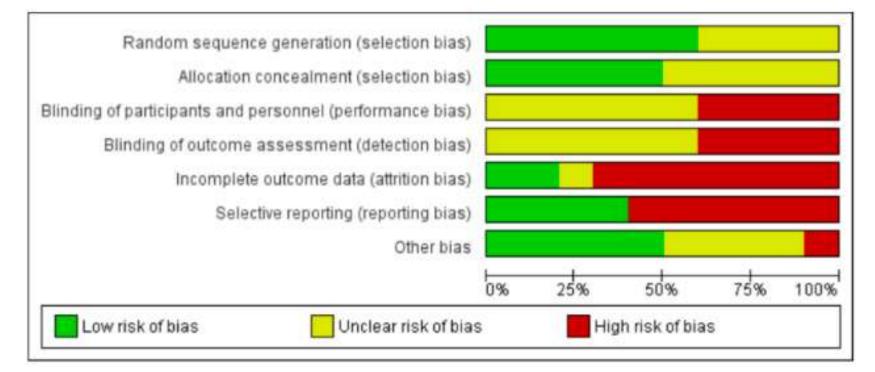




Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

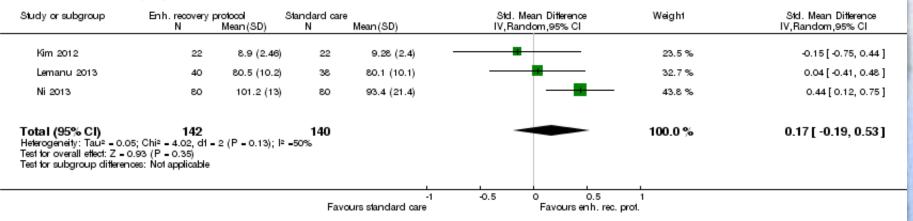




Criteria for judging risk of bias

- 1. Random sequence generation (biased allocation to interventions) due to inadequate generation of a randomised sequence. There is a low risk of selection bias if the investigators describe a random component in the sequence generation process such as:
- 2. Allocation concealment (selection bias) Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignmentThere is a low risk of selection bias : central allocation (including telephone, web-based and pharmacy-controlled randomization)
- 3. Blinding of participants
 Performance bias due to knowledge of the allocated interventions by
 participants during the study
- 4. Blinding of personnel/ care providers (performance bias).
- 5. Blinding of outcome assessor (detection bias)
 Detection bias due to knowledge of the allocated interventions by outcome assessors
- 6. Incomplete outcome data (attrition bias) effect size, or missing data were imputed using appropriate methods. #
- 7. Selective Reporting (reporting bias)
 Reporting bias due to selective outcome reporting

Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Comparison: 3 Enhanced recovery protocol versus standard care (sensitivity analysis) Outcome: 1 Health-related quality of life



Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Comparison: 2 Enhanced recovery protocol versus standard care (subgroup analysis) Outcome: 4 Health-related quality of life

Study or subgroup	En h. recovery prok N Ma	ocol Sta ean (SD)	andard care N	Mean (SD)		an Ditterence om,95% Cl	Weight	Std. Mean Ditterence IV,Random,95% Cl
1 Oecophagectomy Subtotal (95% CI) Heterogeneity: not applicat Test for overall effect: not ap			0					Not estimable
2 Gastrectomy Kim 2012	22	8.9 (2.46)	22	9.28 (2.4)			18.2 %	-0.15 [-0.75, 0.44]
Lemanu 2013	40	80.5 (10.2)	38	80.1 (10.1)			24.5 %	0.04 [-0.41, 0.48]
Subtotal (95% CI) Heterogeneity: Tau ² - 0.0; Test for overall effect: Z - 0		° = 0.61); l≥ =0.0	60 0%				42.7 %	-0.03 [-0.39, 0.32]
3 Liver surgery Jones 2013	46	37.2 (2.4)	45	35.6 (2.4)			→ 25.6%	0.66 [0.24, 1.08]
Ni 2013	03	101.2 (13)	80	93.4 (21.4)			31.6 %	0.44 [0.12, 0.75]
Subtotal (95% Cl) Heterogeneity: Tau ² = 0.0; Test for overall effect: Z = 4		° = 0.41); l² =0.4	125 %			•	57.3%	0.52 [0.27, 0.77]
Total (95% CI) Heterogeneity: Tau ² = 0.06 Test for overall effect: Z = 1 Test for subgroup difference	.73 (P = 0.084)						100.0 %	0.29 [-0.04, 0.62]
			Favo	-1 ours standard care	-0.5	0 0.5 Favours en h. rec. pr	1 of.	

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1 FEB 2016 DOI: 10.1002/14651858.CD011382.pub2

Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Length of hospital stay

Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Comparison: 1 Enhanced recovery protocol versus standard care Outcome: 7 Length of hospital stay

Study or subgroup	En h. recovery p N Me	rotocol Si ean (SD)[days]	andard care N M	ean (SD)[days]	Mean Difference IV,Fixed,95% CI		Mean Difference IV,Fixed,95% CI
Barlow 2011	64	16 (12.2)	57	19 (14.9)		0.5 %	-3.00 [-7.89, 1.89]
Jones 2013	46	4 (2.7)	45	7 (2.7)		9.5 %	-3.00 [-4.11, -1.89]
Kim 2012	22	5.36 (1.46)	22	7.95 (1.98)		11.1 %	-2.59 [-3.62, -1.56]
Lemanu 2013	40	1 (2.7)	38	2 (1.4)	-8	13.0 %	-1.00 [-1.95, -0.05]
Liu 2010	33	6.2 (1.9)	30	9.8 (2.8)		8.2 %	-3.60 [-4.79, -2.41]
Lu 2014	135	10 (4.1)	162	13 (5.4)		10.0 %	-3.00 [-4.08, -1.92]
Ni 2013	80	6.9 (2.8)	80	8 (3.7)	-8-	11.3 %	-1.10 [-2.12, -0.08]
Wang 2010	45	6 (1.4)	47	8 (1.4)	-	35.7 %	-2.00 [-2.57, -1.43]
Zhao 2014	34	7.15 (8.4)	34	12.52 (8.4) —		0.7 %	-5.37 [-9.36, -1.38]
Total (95% CI) Heterogeneity: Chi ² = 23. Test for overall effect: Z = 1 Test for subgroup differen	12.55 (P < 0.00001)	3); l° - 86%	515		•	100.0 %	-2.19 [-2.53, -1.85]
				-10		5 10	
			Favo	urs en h. rec. prot.	Favours	s standard care	

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1 FEB 2016 DOI: 10.1002/14651858.CD011382.pub2

Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Comparison: 1 Enhanced recovery protocol versus standard care Outcome: 8 Readmissions

Study or subgroup	En h. recovery protocol n/N	Standard care n/N	Risk Ratio M-H,Fixed,95% Cl	Weight	Risk Rato M-H, Fixed, 95% Cl	
Jones 2013	2/48	0/45		4.5 %	4.89 [0.24, 99.18]	
Kim 2012	1/22	0/22		4.5 %	3.00 [0.13, 69.87]	
Lemanu 2013	8/40	8/38		73.2 %	0.95 [0.40, 2.28]	
Liu 2010	1/33	0/30		4.7 %	2.74 [0.12, 64.69]	
Lu 2014	0/135	0/162			Not estimable	
Wang 2010	1/45	1/47		8.7 %	1.04 [0.07, 16.20]	
Zhao 2014	1/34	0/34		4.5 %	3.00 [0.13, 71.15]	
			•	100.0 %	1.40 [0.69, 2.87]	
	Fa	0.0 vours en h. rec. prot.	01 0.1 1 10 Favours stand	100 ard care		

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1 FEB 2016 DOI: 10.1002/14651858.CD011382.pub2

Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Comparison: 1 Enhanced recovery protocol versus standard care Outcome: 9 Costs

Study or subgroup	En h. recovery protocol Sta N Mean (SD)[,000 USD	ndard care]N Mean (SD)[,000 USD]	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% Cl
Kim 2012	22 7.4543 (0.7058)	22 7.77 (0.9342)		18.2 %	-0.32[-0.81, 0.17]
Lemanu 2013	40 11.127 (9.819)	38 11.67 (10.7175) 🕈	I	→ 0.2 %	-0.55 [-5.12, 4.02]
Wang 2010	4.9554292 (0.585437)	47 5.02 (0.582165)	—	76.5 %	-0.67 [-0.91, -0.43]
Zhao 2014	54 41196 (1.956553)	34 6.4 (1.956553)		5.0 %	-1.26 [-2.19, -0.33]
Total (95% CI) Heterogeneity: Chi ^e = 3.41 Test for overall effect: Z = 5 Test for subgroup differen		141	•	100.0 %	-0.63 [-0.84, -0.42]
		-4 Favours en h. rec. prot.	-2 0 2 Favours stand	4 lard care	

1 FEB 2016 DOI: 10.1002/14651858.CD011382.pub2

Mild adverse events

Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Comparison: 1 Enhanced recovery protocol versus standard care Outcome: 6 Mild adverse events (number)

Study or subgroup	En.h. recovery protocol N	Standard care N	log [Rate Ratio] (SE)	Rate Ratio IV,Fixed,95% CI	Weight	Rate Ratio IV,Fixed,95% Cl
Barlow 2011	64	57	-0.9 (0.24)	-	39.9 %	0.41 [0.25, 0.65]
Jones 2013	46	45	-1.05 (0.52)		8.5 %	0.35 [0.13, 0.97]
Kim 2012	22	22	-0.69 (0.87)		3.0 %	0.50 [0.09, 2.76]
Lemanu 2013	40	38	0.46 (0.73)		4.3 %	1.58 [0.38, 6.62]
Liu 2010	33	30	-0.5 (0.65)		5.4 %	0.61 [0.17, 2.17]
Lu 2014	135	162	-0.69 (0.53)		8.2 %	0.50 [0.18, 1.42]
Ni 2013	08	03	-0.69 (0.35)		18.7 %	0.50 [0.25, 1.00]
Wang 2010	45	47	0.29 (0.5)		9.2 %	1.34 [0.50, 3.56]
Zhao 2014	34	34	-0.41 (0.91)		2.8 %	0.66 [0.11, 3.95]
Total (95% CI) Heterogeneity: Chi ² = 7.67 Test for overall effect: Z = 4 Test for subgroup differen		515		•	100.0 %	0.52 [0.39, 0.70]
			Favours en h. rec. prot.	0.01 0.1 1 1 Favours sta		

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1 FEB 2016 DOI: 10.1002/14651858.CD011382.pub2

Serious adverse events

Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Comparison: 2 Enhanced recovery protocol versus standard care (subgroup analysis) Outcome: 3 Serious adverse events (number)

Study or subgroup	log [Rate Ratio] (SE)	Rate Ratio IV,Fixed,95% CI	Weight	Rate Ratio IV, Fixed, 95% CI	
1 Oesophagectomy Zhao 2014	-1.1 (1.63)		2.4 %	0.33 [0.01, 8.12]	
Subtota I (95% CI) Heterogeneity: not applicabl Test for overall effect: Z = 0.6			2.4 %	0.33[0.01,8.12]	
2 Gastrectomy Kim 2012	1.1 (1.63)		- 2.4 %	3.00 [0.12, 73.31]	
Lemanu 2013	-0.05 (0.63)		16.4 %	0.95 [0.28, 3.27]	
Subtotal (95% CI) Heterogeneity: Chi² = 0.43, Test for overall effect: Z = 0.1	d1 = 1 (P = 0.51); l≈ =0.0% 17 (P = 0.87)	•	18.8 %	1.10[0.35, 3.49]	
3 Liver surgery Jones 2013	-0.46 (0.43)		35.2 %	0.63 [0.27, 1.47]	
Lu 2014	2.13 (1.51)		2.9 %	8.41 [0.44, 162.32]	
Ni 2013	-0.08 (0.4)		40.7 %	0.92 [0.42, 2.02]	
Subtotal (95% CI) Heterogeneity: Chi² - 2.83, Test for overall effect: Z - 0.8	d1 = 2 (P = 0.24); l≥ =29% 59 (P = 0.55)	•	78.7 %	0.84 [0.48, 1.48]	
Test for overall effect: Z = 0.6	d1 – 5 (P – 0.58); l≈ –0.0% 56 (P – 0.58) s:Chi≈ – 0.52, d1 – 2 (P – 0.77),	◆ -0.0%	100.0 %	0.87 [0.53, 1.43]	
	0.005 Favours enh. rec. prot.	0.1 1 10 Favours standar	200 rd care		

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Serious adverse events

Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Comparison: 1 Enhanced recovery protocol versus standard care Outcome: 3 Serious adverse events (number)

Study or subgroup	En.h. recovery protocol N	Standard care N	log [Rate Ratio] (SE)		te Ratio d,95% Cl	Weight	Rate Ratio IV,Fixed,95% CI
Barlow 2011	64	57	-1.29 (0.57)			16.7 %	0.28 [0.09, 0.84]
Jones 2013	46	45	-0.46 (0.43)			29.3 %	0.63 [0.27, 1.47]
Kim 2012	22	22	1.1 (1.63)			2.0 %	3.00 [0.12, 73.31]
Lemanu 2013	40	38	-0.05 (0.63)		—	13.7 %	0.95 [0.28, 3.27]
Lu 2014	135	162	2.13 (1.51)			2.4 %	8.41 [0.44, 162.32]
Ni 2013	08	80	-0.08 (0.4)		-	33.9 %	0.92 [0.42, 2.02]
Zhao 2014	34	34	-1.1 (1.63)	i		2.0 %	0.33 [0.01, 8.12]
Total (95% CI) Heterogeneity: Chi ² = 7.16 Test for overall effect: Z = 1 Test for subgroup difference		438		•		100.0 %	0.72[0.45,1.13]
			Favours enh. rec. prot	0.005 0.1	1 10 Favours stane	200 dard care	

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Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Short term mortality

Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreatic surgery Comparison: 1 Enhanced recovery protocol versus standard care Outcome: 1 ShortHerm mortality

Study or subgroup	En.h. recovery protocol n/N	Standard care n/N	Risk Ratio M-H,Fixed,95% Cl	Weight	Risk Ratio M-H,Fixed,95% Cl		
Barlow 2011	3/64	Q/57		→ 34.3 %	6.25 [0.33, 118.38]		
Jones 2013	1/46	1/45	<mark></mark>	65.7 %	0.98 [0.06, 15.17]		
Kim 2012	0/22	0/22			Not estimable		
Liu 2010	0/33	0/30			Not estimable	1	
Lu 2014	0/135	0/162			Not estimable	1	
Ni 2013	0/80	0/80			Not estimable		
Wang 2010	0/45	Q/47			Not estimable		
Total (95% CI) 425 443 100.0 % 2.79 [0.44, 17.73] Total events: 4 (Enh. recovery protocol), 1 (Standard care) Heterogeneity: Chi≥ = 0.85, d1 = 1 (P = 0.36); i≥ =0.0% 100.0 % 2.79 [0.44, 17.73] Test for overall effect: Z = 1.09 (P = 0.28) Test for subgroup differences: Not applicable 100.0 % 2.79 [0.44, 17.73]							
	Fa	uvours en h. rec. prot.	.01 0.1 1 10 Favours standar	100 rd care			

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1 FEB 2016 DOI: 10.1002/14651858.CD011382.pub2

Short term mortality

Review: Enhanced recovery protocols for major upper gastrointestinal, liver and pancreafic surgery Comparison: 2 Enhanced recovery protocol versus standard care (subgroup analysis) Outcome: 1 Short-term mortality

Study or subgroup	Enh. recovery protocol n/N	Standard care n/N	Risk M-H, Fixed	Rato Weight I,95% Cl	Risk Rato M-H,Fixed,95% Cl	
1 Oesophagectomy Subtota (195% CI) Total events: 0 (Enh. recov Heterogeneity: not applical: Test tor overall effect: not ap	le l	O care)			Not estimable	
2 Gastrectomy Jones 2013	1/46	1/45		100.0 %	0.98 [0.06, 15.17]	
Lu 2014	0/135	0/162			Not estimable	
Ni 2013	08/0	0/80			Not estimable	
Subtotal (95% CI) Total events: 1 (Enh. recov Heterogeneity: not applical: Test for overall effect: Z = 0.	le l	287 care)		100.0 %	0.98 [0.06, 15.17]	
3 Liver surgery Kim 2012	0/22	0/22			Notestimable	
Liu 2010	0/33	0/30			Not estimable	
Wang 2010	0/45	0/47			Not estimable	
Subtotal (95% CI) Total events: 0 (Enh. recov Heterogeneity: not applical: Test for overall effect: not ap	le l	99 care)			Not estimable	
Total (95% CI) Total events: 1 (Enh. recov Heterogeneity: not applicab Test for overall effect: Z = 0. Test for subgroup difference	vle 02 (P = 0.99)	386 care)		100.0 %	0.98 [0.06, 15.17]	
	Fa	vours en h. rec. pro	0.01 0.1 1 1.	10 100 Favours standard care		

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1 FEB 2016 DOI: 10.1002/14651858.CD011382.pub2

Key results

- None of the trials reported long-term deaths, medium-term healthrelated quality of life (three months to one year), time to return to normal activity, or time to return to work.
- The difference between enhanced recovery protocols and standard care was imprecise for short-term deaths, percentage of people with major complications, total number of major complications, healthrelated quality of life and hospital readmissions. Enhanced recovery protocols had a lower percentage of people with minor complications, fewer minor complications, shorter length of hospital stay (approximately two days shorter hospital stay per person) and lower costs (cost savings of approximately USD 6300 per person) compared to standard care. Because the trials were of poor quality and did not include clinically important end points, future high quality studies are needed in this field.