



“Update on ERAS for HPB Surgery”

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Initial experience with a multimodal enhanced recovery programme in patients undergoing liver resection

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Recovery After Surgery (ERAS) Group

British Journal of Surgery 2008; 95: 969–975

Initial experience with a multimodal enhanced recovery programme in patients undergoing liver resection

Methods: The ERAS protocol of epidural analgesia, early oral intake and early mobilization was studied prospectively in a consecutive series of 61 patients. Outcomes were compared with those in a consecutive series of 100 patients who underwent liver resection before the start of the study. Endpoints were postoperative length of hospital stay, postoperative resumption of oral intake, readmissions, morbidity and mortality.

Results: Fifty-six patients (92 per cent) in the ERAS group tolerated fluids within 4 h and a normal diet on day 1 after surgery. Median hospital stay, including readmissions, was 6.0 days compared with 8.0 days in the control group (P < 0.001). There were no differences in rates of readmission (13 and 10.0 per cent respectively) or mortality (0 and 2.0 per cent) between ERAS and control groups.

Conclusion: The ERAS fast-track protocol is safe and effective for patients undergoing liver resection. It allows early oral intake, promotes faster postoperative recovery and reduces hospital stay.

multimodal fast-track programme on outcomes in r surgery: a multicentre pilot study

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Results: Thirteen patients were treated by laparoscopic liver resections in the ERAS programme in one centre (group 1). Their outcomes were compared with outcomes of laparoscopic procedures performed either before the introduction of the ERAS programme during 2003–2005 in the same centre or during the same period in other additional care (group 2). Median total LOS (range 3–10 days) in group 1 was 4.2 days (range 3–10 days) in group 2. This difference was not statistically significant. Functional recovery occurred 2 days earlier in group 1 (median 3.0 days [range 1–7 days] vs. median 5.0 days [range 2–8 days]; $P < 0.044$). There were no significant differences in complications, conversions or duration of operation. Blood loss was significantly less in the ERAS group (median 50 ml [range 50–200 ml] vs. median 250 ml [range 50–800 ml]; $P < 0.002$).

HPB 2009, 11, 140–144

Implementation of a Fast-Track Clinical Pathway Decreases Postoperative Length of Stay and Hospital Charges for Liver Resection

De-Xin Lin · Xuan Li · Qi-Wen Ye ·
Fen Lin · Lin-Li Li · Qi-Yu Zhang

Cell Biochem Biophys. 2011 Nov;61(2):413-9

Implementation of a Fast-Track Clinical Pathway Decreases Postoperative Length of Stay and Hospital Charges for Liver Resection

- Cohort study
- 117 patients
- LoS 7 vs 11 days ($p < 0.01$)
- Hospital charges - saving RMB 5,622 (£570)
- No difference in morbidity, mortality or readmissions

Evaluation of a fast-track programme for patients undergoing liver resection

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Evaluation of a fast-track programme for patients undergoing liver resection

Background: Recent developments in perioperative pathophysiology and care have documented evidence-based, multimodal rehabilitation (fast-track) to hasten recovery and to decrease morbidity and hospital stay for several major surgical procedures. The aim of this study was to investigate the effect of introducing fast-track principles for perioperative care in unselected patients undergoing open or laparoscopic liver resection.

Methods: This was a prospective study involving the first 100 consecutive patients who followed fast-track principles for liver resection. Catheters and drains were systematically removed early, and patients were mobilized and started eating and drinking from the day of surgery. An opioid-sparing multimodal pain treatment was given for the first week. Discharge criteria were: pain sufficiently controlled by oral analgesics alone, patient comfortable with discharge and

Results: Median length of stay (LOS) for all patients was 4 days following laparoscopic *versus* 5 days following open resection ($P < 0.001$). Median LOS after minor open resections (fewer than 3 segments) was 5 days *versus* 6 days for major resections (3 or more segments) ($P < 0.001$). Simple right or left hemihepatectomies had a median LOS of 5 days. The readmission rate was 6.0 per cent and 30-day mortality was zero.

Conclusion: Fast-track principles for perioperative care were introduced successfully and are safe after liver resection. Routine discharge 2 days after laparoscopic resection and 4–5 days after open liver resection may be feasible.

Randomized clinical trial

Randomized clinical trial on enhanced recovery versus standard care following open liver resection

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Enhanced Recovery in Liver Resection

ERP Group

- Education
- CHO preOp + ONS
- Thoracic epidural
- Early mobilisation
- Goal Directed Fluid Therapy for 6 hours post operatively with LiDCOrapid™

Standard Group

- Standard Surgical Technique
- Standard Anaesthetic
- Thoracic epidural

Preop info, education and counselling
Preop optimisation
Preop bowel prep (avoid)
Preop fasting + CHO
Avoid Pre-med
Prophylaxis against thromboembolism
Antimicrobial prophylaxis
Standard anaesthetic protocol
PONV
Laparoscopy
Avoid NG Tube
Prevent intraoperative hypothermia
Perioperative fluid management
Routine surgical drainage
Urinary drainage
Prevention of ileus
Postop analgesia - epidural (avoid opiates)
Perioperative nutritional care
Postop glucose control
Early mobilisation

ER Elements
19/20

**But Standard group
used
13/20**

Gustafsson World J Surg epub Oct 2012

Results

- Both groups similar in age, sex, BMI, ASA
- Significantly more malignancies in ERP group [p=0.021]
- Significantly more neoadjuvant chemo in ERP group [p=0.021]
- Significantly higher P-POSSUM operative severity [p=0.012]
- Major resections 21 vs 12 [p=0.06]

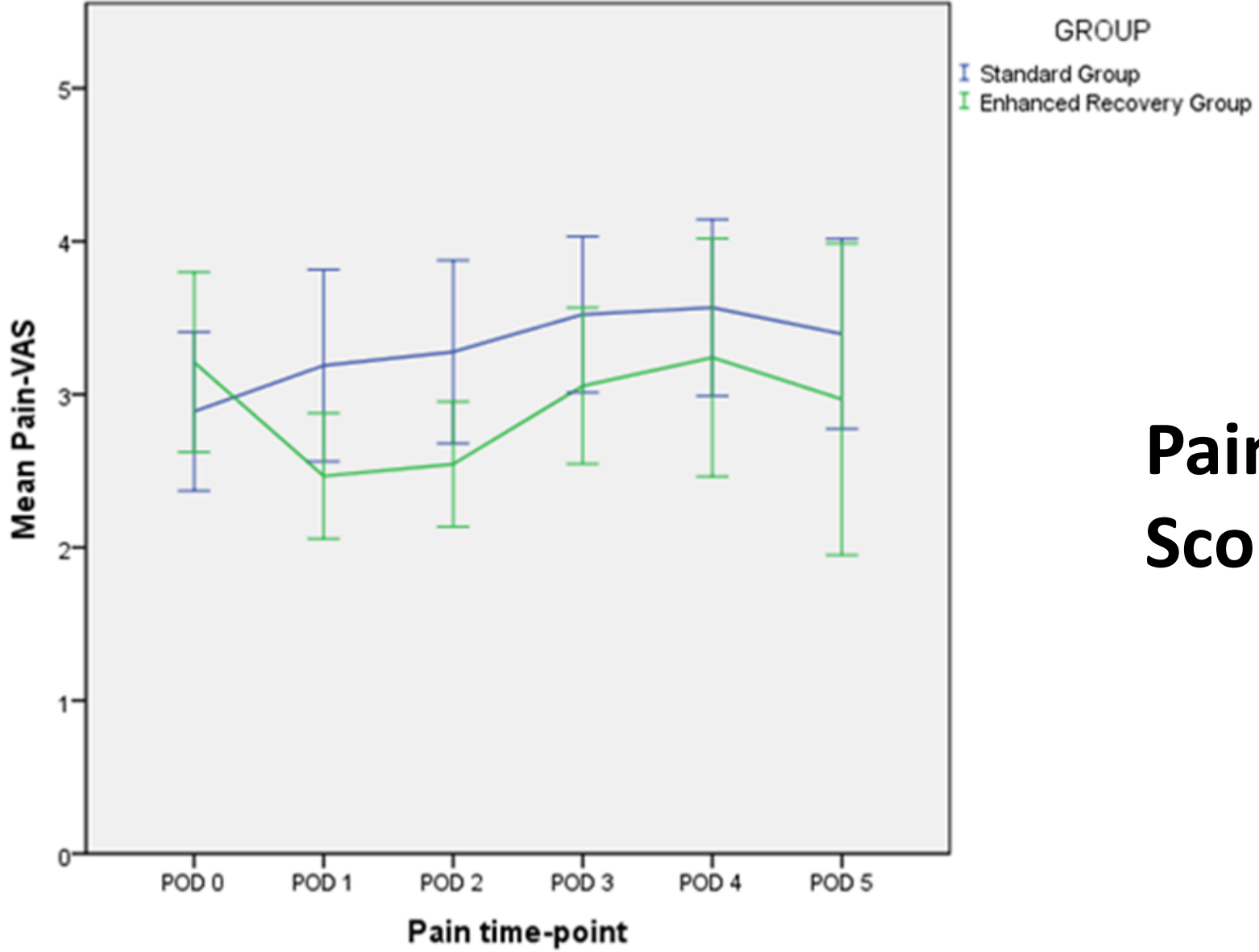
Results

	ERP Group	Standard Group	p-value
Time until medically fit for discharge - days [IQR]	3.00 [3-4]	6.00 [6-7]	<0.001
Hospital Length of Stay - days [IQR]	4.00 [3-5]	7.00 [6-8]	<0.001

Results – Liver complications

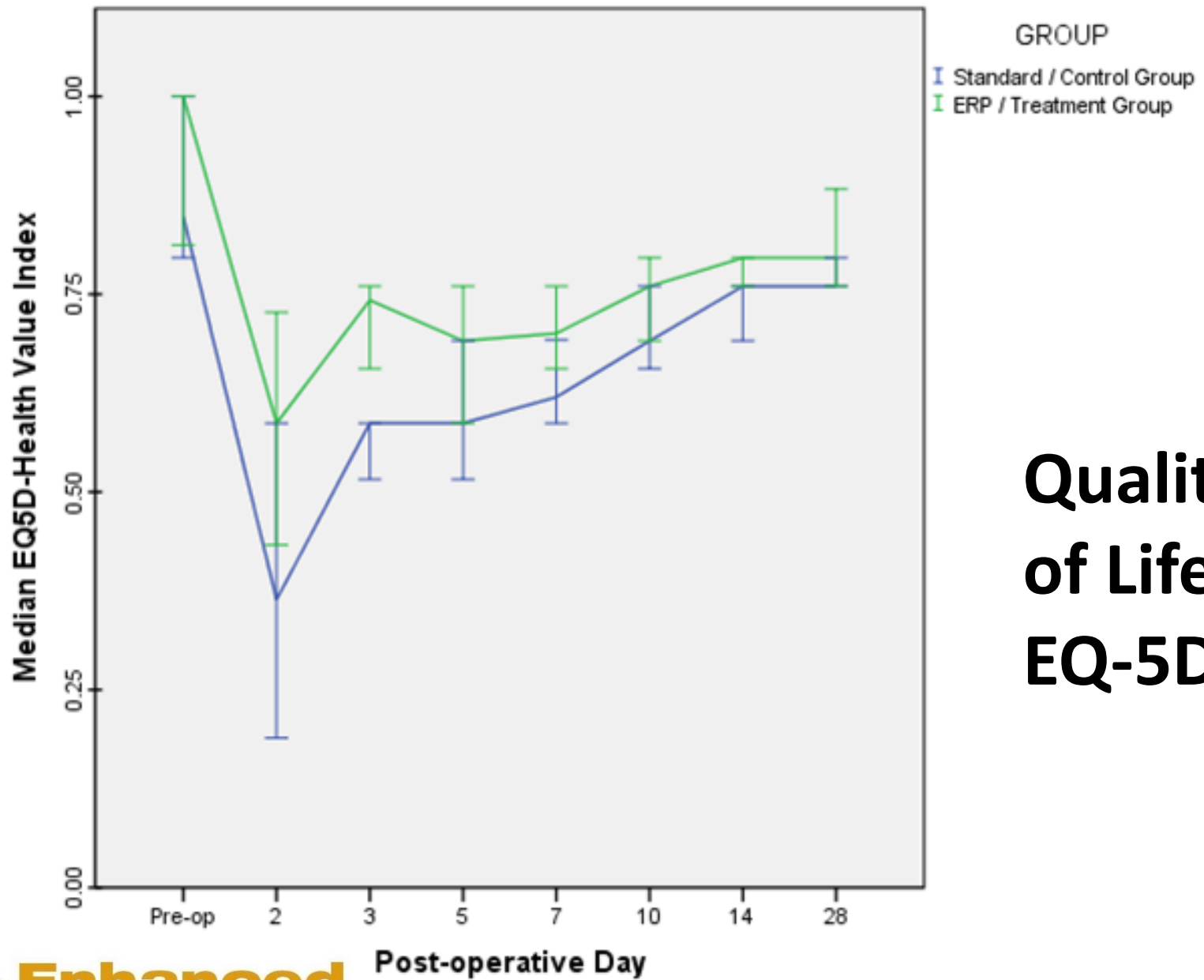
Morbidity	ERP Group	Standard Group	p-value
Abdominal Collection/Infection	2	3	0.319
Bile Leak	3	3	0.322
Biliary Stricture	1	0	0.511
Transient hepatic insufficiency	3	1	0.266
Liver failure	1	1	0.505
Total complications	10	8	0.829
Total no of patients	7 (15.2%)	5 (11.1%)	0.612

Morbidity	ERP Group	Standard Group	p-value
Arrhythmia	1	3	0.255
Chest Infection / Pneumonia	1	5	0.101
Delirium	1	0	0.511
GI Bleed	0	1	0.5
Hypotension	0	2	0.253
Incarcerated port-site hernia	1	0	0.511
Perforated diverticulum	0	1	0.5
Pleural Effusion	0	1	0.5
Postoperative Ileus	0	3	0.129
Thromboembolic disease	0	1	0.5
Urinary tract infection	0	1	0.5
Wound Dehiscence/infection	0	2	0.253
Total Complications	4	20	0.009
No. of patients with complications	3 (6.5%)	12 (26.7%)	0.020

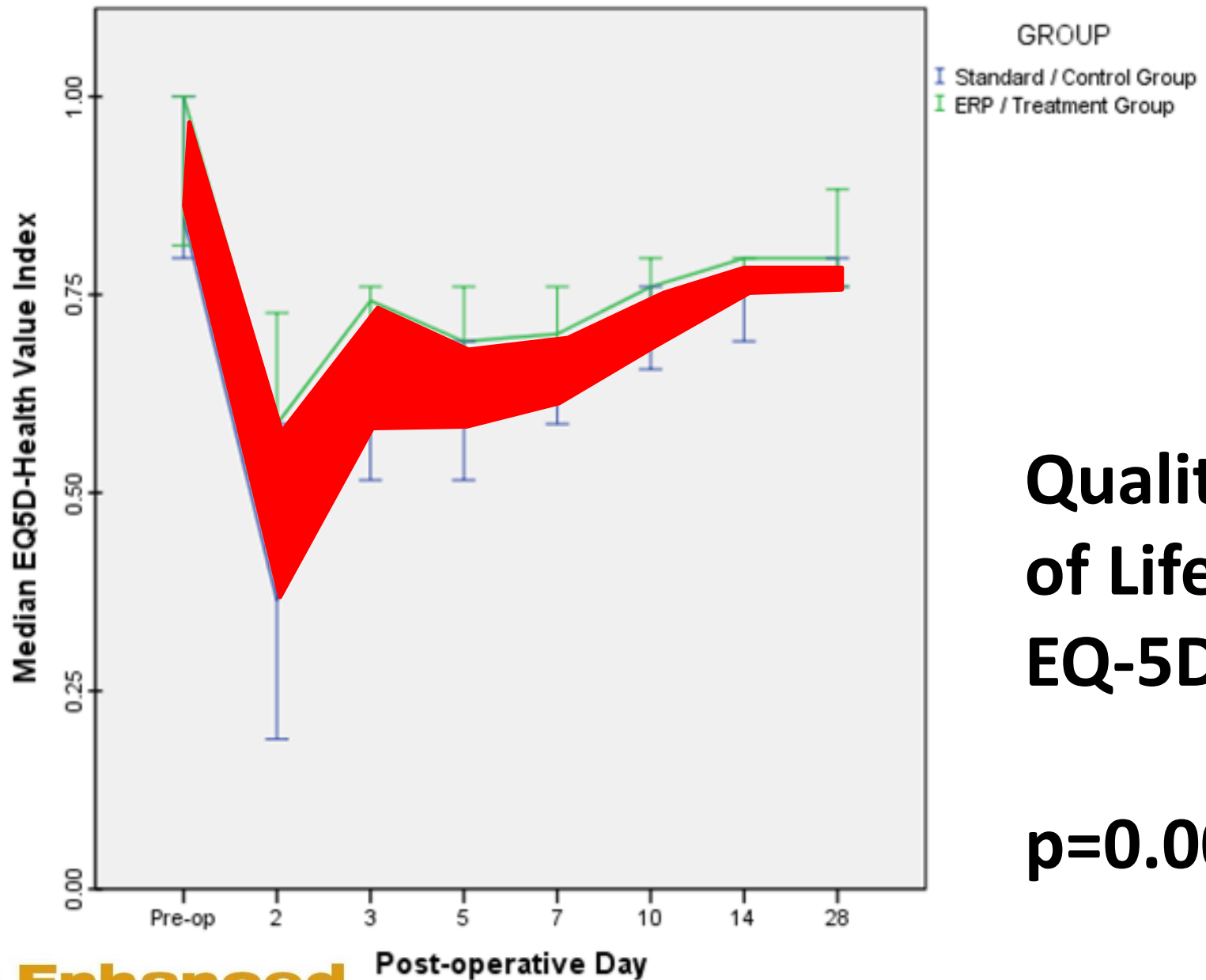


Pain Scores

Error Bars: 95% CI



Quality of Life EQ-5D



**Quality
of Life
EQ-5D**

p=0.002



**Enhanced
RECOVERY**

ERAS Society (UK)

Royal Surrey County Hospital

NHS Foundation Trust



ERAS Society



Cost Analysis

- Based on anaesthetic, surgical, length of stay (per level of care), and community costs (POD-28)
- Δ Costs = £995.17 in favour of ERP
- LiDCO*rapid*TM, ONS, preOp
- Physio
- Acute Pain Team

New Approaches

- Laparoscopic resections
- Other analgesic modalities
 - IT morphine -Koea *HPB Surg 2009:271986*
 - 4.7 days, 100% fully mobile POD1
 - Wound Catheter: Basingstoke *HPB 2004;6(3):186-9*
 - Edinburgh -Epidural vs. Wound Catheter within an ERAS programme
- IT Opiate + wound catheter?

New Approaches

- 2013 - Retrospective review of a gradual introduction of an ERAS programme
- Epidural changed to IT morphine because inability to provide appropriate care package
- Wound catheter added later
- Reduced LoS from 6 to 3 days ($p=0.021$)
- But readmissions increased ($p=0.044$)

Connor et al HPB 2013;15:294-301

Pancreatic ERAS

	Type of Surgery	Study Design	No. of pts ERP / C	LoS ERP / C
Kennedy 2007	PD	Cohort Study	91/44	7/13
Berberat 2007	Maj PD	Case Series	255	10
Balzano 2008	PD	Cohort Study	252/252	13/15
Kennedy 2009	Dist P	Cohort Study	71/40	6.7/10.2
Montiel Casado 2010	PD	Case Series	82	9
di Sebastiano 2011	PPPD	Case Series	145	10



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Guidelines for perioperative care for pancreaticoduodenectomy: Enhanced Recovery After Surgery (ERAS[®]) Society recommendations[☆]

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New Approaches

- Nutrition
- Laparoscopic Whipples
 - USC offers for benign conditions
 - Mayo clinic (4-5 hr op) LoS 4-6 days

Questions?

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