Enhanced RECOVERY
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Plymouth Hospitals NHS
NHS Trust
Peninsula Hepato-biliary & Pancreatic Cancer Centre

Initial Experience With an Enhanced Recovery After Surgery (ERAS) Programme in Patients Undergoing Liver Resection

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Aims

- A formalised ERAS protocol was introduced in our unit in January 2013.

- This study aims to compare outcomes “before” and “after” ERAS.

Background

- Enhanced recovery after surgery (ERAS) is well established in Colorectal surgery
- ERAS aims to:
  - decrease the impact of surgical stress
  - maintain homeostasis
- Resulting in:
  - earlier functional recovery
  - decreased length of hospital stay (LOS)
- Traditional outcomes in hepatic surgery [1]
  - Median LOS 8-14days
  - Morbidity 38-45%
  - Mortality 2.7-3.1%

The Literature

- Data for ERAS in hepatic surgery scarce but a few studies have shown [1-4]:
  - decrease in LOS of 2-4 days
  - no increase in adverse events
  - some evidence of decrease in complications [5]

Our ERAS Pathway

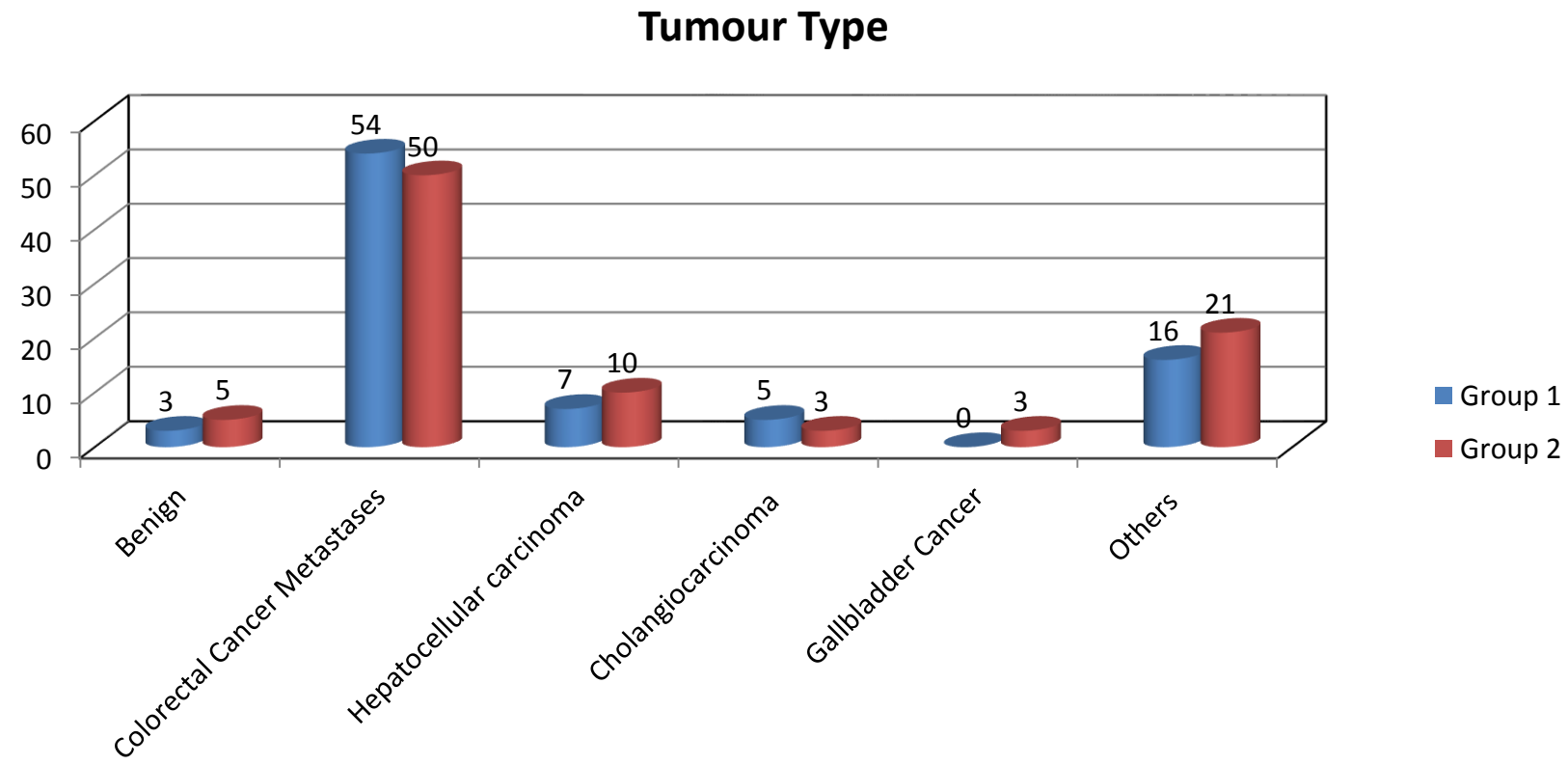
- Formally introduced in our unit for hepatic & pancreatic surgery in January 2013
- Post-op pathway designed to fit on 1 x A4 sheet (landscape). Goals set for each day post-op + discharge criteria
- Slight variations in pathway according to procedure
- Initially copy placed in notes
- As familiarity increased replaced by ward copies (A3 size)

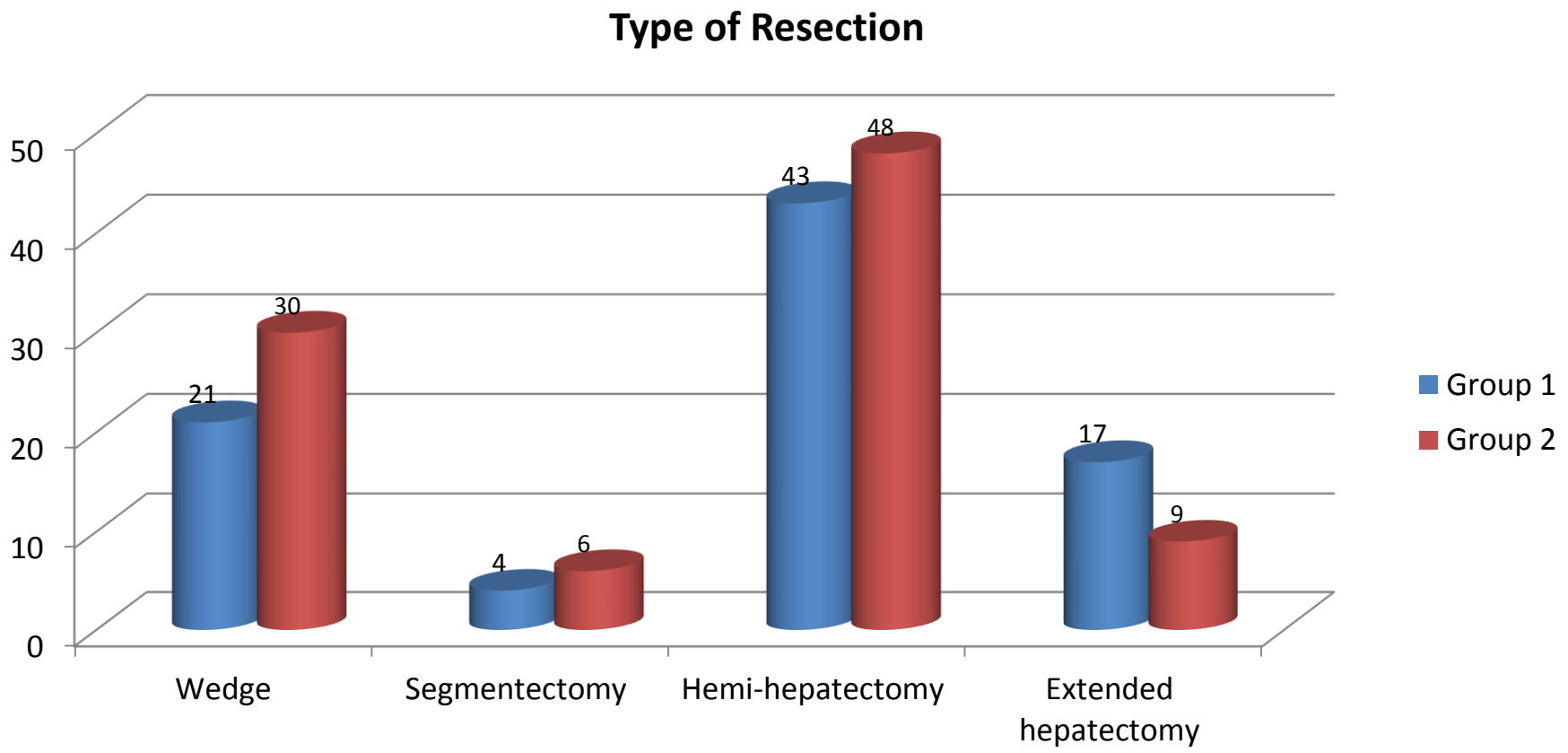
Post Op ERAS pathway: Open Extended & Hemi-Hepatectomy +/- Roux-en-Y Hepatico-Jejunostomy							
	Day of Operation (Day 0) HDU	**1st Day after Op (Day 1)**	**2nd Day after Op (Day 2)**	**3rd Day after OP (Day 3)**	**4th Day after Op (Day 4)**	**5th - 7th Day after OP (Days 5-7)**	**Discharge Criteria**
Monitoring	Hourly obs Oxygen via mask	2-4 hourly obs (min)/Stop oxygen	4 hourly obs (min)	4 hourly obs (min)	6 hourly obs (min)	6 hourly obs (min)	Observations normal
DVT prophylaxis	TEDS/Clexane **6** hrs post-op	TED Stockings Clexane	TED Stockings Clexane	TED Stockings Clexane	TED Stockings Clexane	TED Stockings Clexane	**Home** with clexane 40 mg sub cut for **28 days. Pt able to self inject.**
Pain Control	Epidural or PCA IV paracetamol (***Half dose for extended resection***	As per Day 0 plus Oral analgesia	As per Day 0 plus Oral analgesia	**REMOVE** epidural / PCA Oral analgesia	Oral analgesia	Oral analgesia	Pain controlled
NG Tube ***Roux-en-Y only***	In place	Spigot it if <500ml in 24 hrs	REMOVE if <500 ml in 24 hrs				
Abdominal Drain	In place	In place	**REMOVE** if **no** bile/enteric contents in drain				
Urinary Catheter	In place	In place	**REMOVE** unless contra indicated				
Central Line	In place	**REMOVE**, unless contra-indicated					
IV Fluids	In place	In place	**STOP**				
Investigations	Chest X-Ray in recovery/HDU FBC, LFTs, INR U&Es Monitor lactate & clotting	FBC, LFTs, U&E, INR		FBC, LFTs, U&E, INR		FBC, LFTs, U&E, INR	All results acceptable Bilirubin is <3 x normal and/or LFTs are improving
Drinking & Eating **If Roux-en-Y follow plan in pink**	Sips of water, NO food Free fluids & normal diet when patient can tolerate	Sips of water, NO food Normal diet and free fluids	Sips of water, NO food Normal diet and free fluids	Free fluids Normal diet and free fluids	Normal diet and free fluids	Normal diet and free fluids	Normal diet and free fluids
Wound Care	None	Check wounds, **only** change dressings ***if*** leaking	If wound is dry, **REMOVE** dressing				Wound satisfactory Wound care advice given
Personal Care	Assist patient with personal care	Assist patient with personal care	Encourage pt to self care and dress in day clothes	Encourage pt to self care and dress in day clothes	Pt dressed in day clothes	Pt self caring to patient's norm	Independent - to patient's norm

Methods

- Two cohorts of patients:
  - Group 1: January to December 2010 (pre-ERAS)
  - Group 2: January to October 2013 (post-ERAS)
- Inclusion criteria:
  - Any liver resection during above time periods
- Outcome measures:
  - Post-operative length of stay (LOS)
  - Morbidity
  - 30-day mortality
  - 30-day re-admission
- Statistical analysis
  - SPSS version 22.0
  - Chi-squared for categorical data
  - Mann-Whitney-U for continuous data

Demographics	**Group 1 (n=85)**	**Group 2 (n=93)**	
Age in years [median (range)]	64 (33-84)	66 (17-84)	P=0.276
Gender - male	47	41	P=0.135
ASA Grade	I: 8 II: 60 III: 17	I: 5 II: 50 III: 22	P=0.396
Co-morbidities	45 (53%)	46 (49.4%)	P=0.643





	Group 1 (n=85)	**Group 2 (n=93)**	
Bile duct reconstruction	7 (8.2%)	3 (3.2%)	P=0.147
Number of segments resected [median (range)]	4.0 (0.5-6.0)	4.0 (0.5-6.0)	P=0.520

Outcomes

Outcomes	**Group 1 (n=85)**	**Group 2 (n=93)**	
Post-operative Length of Stay in days [median (range)]	8 (4-34)	6 (2-48)	P<0.001
Overall morbidity	27 (31.8%)	26 (28.0%)	P=0.579
30-day re-admission	5 (5.9%)	11 (11.8%)	P=0.166
30-day mortality	0%	0%	

Outcomes excluding bile duct reconstruction

Outcomes	**Group 1 (n=78)**	**Group 2 (n=90)**	
Post-operative Length of Stay in days [median (range)]	8 (4-29)	6 (2-48)	P<0.001
Overall morbidity	25 (32.0%)	24 (26.7%)	P=0.579
30-day re-admission	4 (5.1%)	8 (8.9%)	P=0.166
30-day mortality	0%	0%	

Discussion

- LOS
  - Reduced by 2 days
- Morbidity
  - Similar between groups
- 30-day re-admission rates
  - Slight increase post-ERAS (not significant)
  - Potential bias
- No difference in outcomes after exclusion of patients needing bile duct reconstruction
- Easy to follow ERAS pathway - on a single A4 sheet paper

Conclusions

- ERAS is safe in liver resection
- Reduction in length of stay by 2 days
- There was no significant increase in 30-day re-admission or post-operative complication rates

References

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3. Spelt L, Ansari D, Sturesson C, Tingstedt B & Andersson R. Fast-track programmes for hepatopancreatic resections: where do we stand? 2011; 13: 833-838
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ASA Grade	I: 8 II: 60 III: 17	I: 5 II: 50 III: 22	P=0.396
Co-morbidity	45	46	P=0.643
Tumour type Benign Colorectal Cancer Metastases Hepatocellular carcinoma Cholangiocarcinoma Gallbladder Cancer Others	 3 (3.5%) 54 (63.5%) 7 (8.2%) 5 (5.9%) 0 (0.0%) 16 (18.8%)	 5 (5.4%) 50 (53.8%) 10 (10.8%) 3 (3.2%) 3 (3.2%) 21 (22.6%)	P=0.422
Type of resection Wedge Segmentectomy Hemi-hepatectomy Extended hepatectomy	 21 (24.7%) 4 (4.7%) 43 (50.6%) 17 (20.0%)	 30 (32.3%) 6 (6.5%) 48 (51.6%) 9 (9.7%)	P=0.224
Bile duct reconstruction	7 (8.2%)	3 (3.2%)	P=0.147
Number of segments resected [median (range)]	4.0 (0.5-6.0)	4.0 (0.5-6.0)	P=0.520