

ORIGINAL ARTICLES

Early Discharge Following Liver Resection for Colorectal Metastases

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Abstract

Objective

Liver resection is currently the recognised treatment for localised colorectal liver metastases. Hospital stay in recently published series is between seven and 12 days for open surgery and five and eight days for laparoscopic resection. Recently there has been interest in the use of 'fast-track' recovery protocols following major abdominal surgery. Our aim was to measure the effect of such a protocol on hospital stay following liver resection.

Methods

Data was collected prospectively from 12 consecutive patients undergoing open liver resection between August 2003 and September 2004. All patients had a large sub-costal incision with full mobilisation of the liver. A 'fast-track' protocol was employed consisting of intra venous fluid restriction, patient controlled analgesia and early diet and mobilisation. Data on postoperative complications and hospital stay was recorded.

Results

Twelve patients with a median age of 60 (range 43-74) years underwent liver resection. Resection consisted of one hepatic lobectomy, two trisegmentectomies, three bisegmentectomies and six segmentectomies. Median hospital stay was four (range two to seven) days. One epileptic patient developed carbamazepine toxicity delaying their discharge. A further patient developed a collection requiring no intervention.

Conclusion

Early discharge following major liver resection using a 'fast-track' recovery protocol is both safe and achievable.

Recently there has been sustained interest in the use of 'fast-track' recovery protocols in major abdominal surgery. Efforts have focused on attenuation of the surgical stress response and improving physiological function to reduce postoperative complications and hospital stay. Such protocols commonly include early mobilisation and diet, optimised fluid and analgesic regimens, as well as avoidance of abdominal drains and nasogastric tubes. With recent advances and growing experience in liver surgery it is well suited to the introduction of such protocols to further enhance postoperative recovery.

Our aim was to measure the effect of a 'fast-track' recovery protocol on hospital stay following liver resection for colorectal metastases.

Patients and Methods

We collected data prospectively from 12 consecutive patients undergoing open liver resection for colorectal metastases between August 2003 and September 2004 in one surgical centre.

All procedures were carried out by a single surgeon with a specialty interest in liver surgery. Patient consent for surgery was obtained and the rehabilitation programme was discussed in full with both the patient and their family. All patients had open segment-orientated liver resection carried out through a large sub-costal incision with full mobilisation of the liver. Liver dissection was carried out with an ultrasonic dissector and Floseal® tissue glue was applied to the resection margins at the end of the procedure to aid haemostasis. Abdominal drains were not used in any patients following resection. Antibiotic prophylaxis consisted of a single dose of Cefuroxime (1.5g) administered intravenously at the beginning of the procedure.

A multi-modal optimisation package was employed in all patients. Patients were allowed to drink clear fluids until two hours before surgery to avoid preoperative dehydration. Oral fluids were encouraged on the night of surgery with diet introduced on the first postoperative day if tolerated. Patients received supplement drinks twice daily until discharge. An intravenous fluid regime using two litres of 4% dextrose/0.18% saline was administered over the first 24 hours unless sign of salt or water depletion became evident. A protocol using small boluses of Gelofusine was employed for patients with signs of hypovolaemia. Intravenous fluids were stopped after 24 hours.

The analgesic regimen consisted of patient controlled morphine for 24-48 hours with regular oral Paracetamol 1g four times daily. Following the cessation of patient controlled morphine, a non-steroidal analgesic was commenced in the form of oral Ibuprofen 600mg four times daily. Where non-steroidal analgesia was contraindicated patients were commenced on Tramadol 50-100mg four times daily.

Introduction

Liver resection is currently the recognised treatment for localised colorectal liver metastases. A large proportion of patients however will be unsuitable for resection either due to the extent of disease or their fitness for surgery. The prognosis without treatment is usually less than 12 months.^{1,2} Following liver resection the five-year survival ranges between 30-50% with operative mortality of around 3%.^{3,4,5,6,7,8} Recently published series of patients undergoing liver resection report hospital stay between seven to 12 days^{6,7,8,9} for open surgery and five to eight^{10,11,12,13} days for laparoscopic resection.

Urinary catheters were removed after 24-48 hours to aid mobilisation. Early mobilisation was encouraged and an intensive physiotherapy regime was employed. Blood samples were taken preoperatively, on the night of surgery and daily for the first four postoperative days. The decision regarding discharge from hospital was taken by the consultant in charge of the patient's care. Prior to discharge patients were required to be tolerating full diet, mobilising unaided and experiencing good analgesia with oral medication. Data on postoperative complications and hospital stay was recorded for each patient. Patients were seen in the outpatient clinic two weeks following their discharge.

Results

Twelve patients with a median age of 60 (range 43-74) years underwent open liver resection for colorectal metastases. Resection consisted of one hepatic lobectomy, two trisegmentectomy, three bisegmentectomies and six segmentectomies. Mean operating time was 140 minutes. Resection margins were clear in all patients.

Table I – Patient Characteristics

Liver resection patients (n=12)	
Characteristics	
Age (years)	60 (range 43-74)
Sex	
Male	8
Female	4
ASA	
I	4
II	7
III	1
Urea (mmol/L)	4.5 (4.0-5.0)
Creatinine (mmol/L)	87 (74-100)
Haemoglobin (g/L)	13.2 (12.3-13.9)
Operation time (minutes)	130 (110-160)
Operation	
Lobectomy	1
Trisegmentectomy	2
Bisegmentectomy	3
Segmentectomy	6

Values are medians and IQR unless stated

All patients tolerated the early introduction of oral fluids and diet. The median time to cessation of intravenous fluids was the first postoperative day (range one to four). Patients received an average volume of 3230ml of intravenous fluid on the day of theatre, with 2090ml and 680ml on days one and two respectively. The average intravenous sodium load was 432mmol, 110mmol and 48mmol on day zero, day one and day two respectively. Three patients received intravenous fluids after day one as it was felt to be clinically indicated. One patient required a postoperative blood transfusion on the day of theatre. The mean dose of morphine received was 17mg on day zero, 21mg on day one and 2mg on day two.

Data on time to first bowel motion was available for 10 patients with a median time of 4.5 days to first bowel motion. The median duration of hospital stay was four (range two to seven) days.

One epileptic patient developed carbamazepine toxicity delaying their discharge. A further two patients developed collections requiring no intervention. There were no postoperative mortalities during the study period. We did not notice any significant alteration in renal function or in the recovery of synthetic liver function during the series.

Table II – Blood Results

	Pre-op	Day 1	Day 2	Day 3
Hb	13.2 (12.3-13.9)	10.5 (10.1-12.4)	11.0 (9.1-11.7)	9.8 (8.8-10.9)
Urea	4.5 (4.0-5.0)	5.5 (3.8-6.3)	4.0 (2.8-5.3)	4.2 (3.3-5.1)
Cr	87 (74-100)	83 (68-93)	82 (63-101)	76 (59-100)
Alb	44 (41-46)	32 (26-34)	33 (32-35)	35 (30-35)
AST	23 (21-33)	354 (201-530)	233 (115-457)	122 (89-205)
ALT	21 (16-22)	351 (204-579)	351 (178-918)	260 (149-628)
Bil	11 (9-14)	17 (12-30)	22 (10-32)	23 (13-34)

Values are medians and IQR

Conclusions

Liver resection is currently the treatment of choice for colorectal liver metastases. With the increased experience in liver resection as well as the technical advances, surgery is becoming safer for a larger proportion of patients.³ Advances in postoperative care with the introduction of multi-modal rehabilitation programmes may offer a further benefit to those already being realised. The opportunity to get patients home more quickly after surgery has implications not only for provision of healthcare services but also for a patient group where quality of life, and especially time spent out of hospital, is particularly important.

Recovery protocols have already been used to good effect in other major abdominal procedures and liver surgery may also benefit from their introduction. Our short series of patients show that rapid discharge from hospital following liver resection is both safe and achievable. Our results also compare favourably to other series in the literature including laparoscopic series, in terms of hospital stay. It also compares favourably to historical controls with hospital stays of between seven and nine days prior to the introduction of fast-track recovery. It is however only a small number of patients and caution must be used in comparing it to much larger series.

There has been sustained interest in the literature recently regarding the role of fluid and sodium restriction and the effects on postoperative recovery. In our series it was evident that patients tolerated the early introduction of oral fluids and diet. Furthermore the administration of intravenous fluid was limited to the first postoperative day. While we attempted to restrict the amount of intravenous fluid that patients received as part of the protocol it is evident from the volumes infused that this was only partly successful. We did not encounter any renal complications of the fluid regime employed.

Further research is required to validate the individual elements of 'fast-track' protocols and particularly the role of fluid optimisation and the effect on recovery. There are also challenges brought about by the more rapid discharge of patients. Follow-up arrangements and access to surgical services have to be closely considered to ensure that patient care is not sacrificed in the drive for ever quicker turnover.

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