

Enhanced recovery programmes in colorectal surgery are less enhanced later in the week: An observational study

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Summary

Objectives: Since the introduction and favourable early results of the enhanced recovery programme more than a decade ago, it has become increasingly popular following major abdominal surgery. The programme has now been adopted in the UK. The aim of our study was to see if the day of surgery affected hospital stay and we compared patients who had colorectal surgery early in the week (Monday to Wednesday) with those who had it later in the week (Thursday to Friday).

Design: Patient outcomes were studied between May 2010 and April 2011 from a prospectively maintained database. All colorectal surgeons involved in the enhanced recovery programme in our unit have a flexible rota and so no surgeon was operating on a particular day to avoid bias. An enhanced recovery programme protocol was utilised for all the patients with no bowel preparation, early feeding and early mobilisation.

Setting: Study was carried out at the University Hospitals of Leicester.

Participants: Patients undergoing elective colorectal resection between Monday and Friday.

Main outcome measure: Hospital stay.

Results: Two hundred and twenty-seven patients underwent surgery and were on the enhanced recovery programme during this period. Two (0.9%) patients who had surgery on a Sunday were excluded. Two hundred and twenty-five patients were analysed of which 155 (69%) were in the group (Monday to Wednesday) and 70 (31%) in the group (Thursday to Friday). No significant differences were observed amongst the groups for age ($p=0.129$), sex ($p=0.555$), tumour location ($p=0.140$), operation performed ($p=0.127$), type of surgery (laparoscopy or open, $p=0.892$), complications ($p=0.428$). However, a significant shorter length of stay was present in the first group six days (interquartile range: 4–10) versus eight days (interquartile range: 5–11) ($p=0.045$).

Conclusion: Operating on colorectal patients early in the week is associated with a significant decreased hospital stay. This should be put into consideration by units practising enhanced recovery programme if the maximal benefit of this is to be attained.

Keywords

enhanced recovery, day of surgery, colorectal surgery

Introduction

Since the introduction of enhanced recovery programmes over 10 years ago, the approach has become increasingly popular following major abdominal surgery.

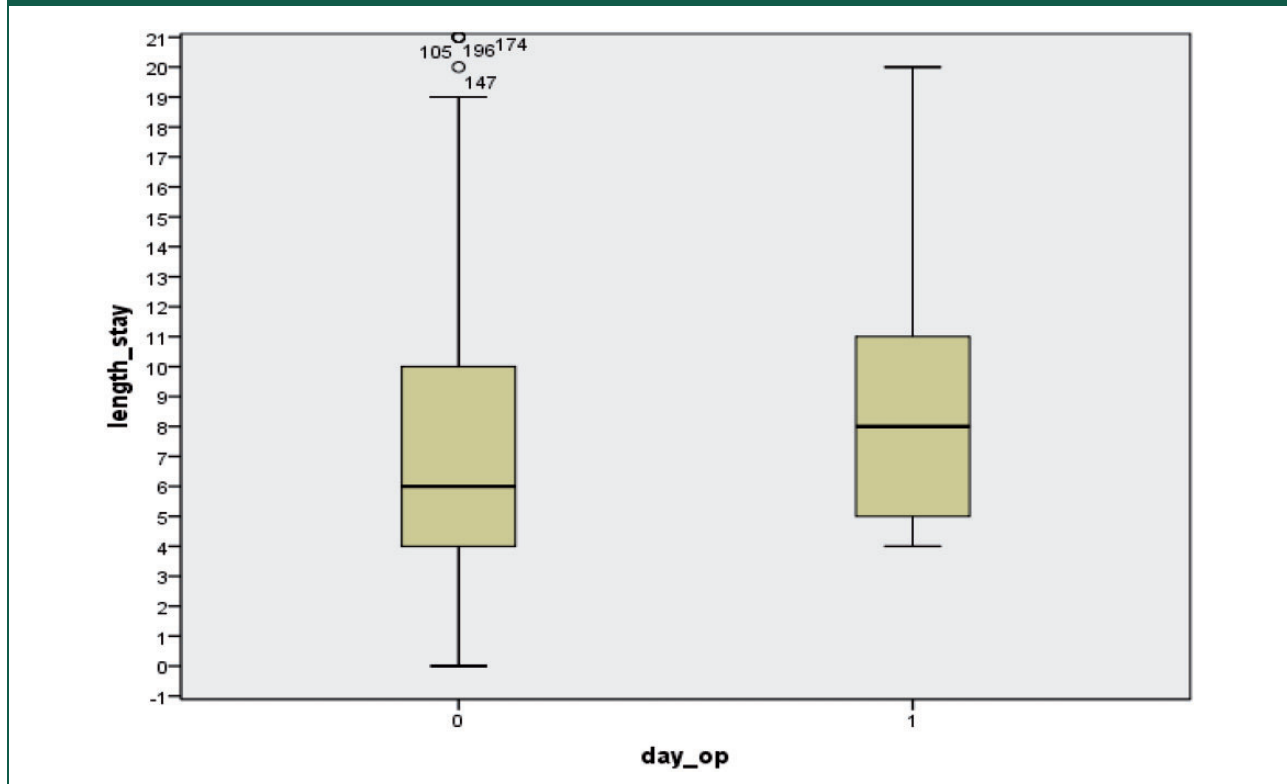
The multimodal fast track recovery programme was first introduced by Kehlet to enhance postoperative recovery and avoid common hindrances to early hospital discharge. These programmes optimise perioperative factors to reduce the physiological and psychological stress of surgery with the aim of improving patient outcome. Using this type of multimodal approach has been shown to reduce hospital stay to 2–4 days.¹ Improvements in less subjective endpoints using fast track regimes include reduced ileus, and preservation of lean body mass and postoperative exercise performance.² There is also evidence that the clinical improvements resulting from the implementation of an enhanced recovery programme do not increase readmission rates or the burden on primary care.^{3,4}

Uncertainties still exist on the relative contribution of each of the elements in the enhanced recovery programme. Several studies have looked at the role of individual elements and have not shown any significant effect of a single factor on short-term recovery.^{5–8}

Successful Enhanced Recovery After Surgery programmes need active collaboration between multidisciplinary team members on the ward supporting patient recovery after surgery. The five-day working week impacts on staff availability in wards.

No studies have examined the impact of day of surgery on short-term recovery following colorectal resection. The aim of our study was to investigate the effect of day of surgery (Monday to Wednesday versus

Figure 1. Length of stay for both groups. 0 (Mon to Wed group) had median stay of six days (interquartile range: 4–10 days) and one (Thur to Fri group) had median stay of eight days (interquartile range: 5–11 days).



Thursday to Friday) on hospital stay with the use of a multimodal rehabilitation programme.

Patients and methods

We studied patient outcomes from a prospectively maintained database between May 2010 and April 2011. Recruitment was from two university teaching hospital sites for consecutive patients undergoing elective colorectal resection. Excluded were those medically unfit for surgery, severe physical disability and in long-term care. Two groups were studied based on day of surgery (Monday to Wednesday versus Thursday to Friday).

All colorectal surgeons involved in the enhanced recovery programme in our unit have a flexible rota and so no surgeon was operating on a particular day to avoid bias.

Consecutive patients were recruited to have surgery on the earliest date convenient for both patient and surgeon. Patients were given preoperative information and preconditioned regarding expectations. They were allowed free fluids and high calorie containing drinks for up to 4 h before operation. Bowel preparation was with phosphate enema on

the morning of surgery. All patients received antibiotic and deep vein thrombosis prophylaxis.

Postoperatively, patients were given either patient controlled analgesia morphine, epidural or transabdominal preperitoneal blocks for 48 h. Paracetamol and non-steroidal anti-inflammatory drugs were administered concurrently and tramadol given for breakthrough pain once morphine was discontinued. Oral fluids were pushed immediately postoperatively and normal diet encouraged from day 1. Chest physiotherapy and mobilisation were commenced on day 1.

To be considered fit for discharge, patients had to be afebrile, fully mobile, passing flatus or faeces, using oral analgesics only for pain and have a healing wound. The decision for discharge was made by the most senior member of the team.

Statistical analysis was carried out using the Mann–Whitney U test or Fischer's exact test where appropriate with measurements of continuous outcomes analysed by repeated measures linear regression analysis.

Results

A total of 227 patients (94 women and 133 men) underwent surgery on the enhanced recovery

programme over the one-year period. Median age was 72 years (interquartile range 63–79). One hundred and thirty-seven underwent open surgery and 90 laparoscopic surgery. Analysis of 225 patients included 155 (69%) patients operated Monday to Wednesday and 70 (31%) patients were operated Thursday to Friday. Two (0.9%) patients who had surgery on a Sunday were excluded.

Patients in both groups were well matched for demographic data including age, sex, tumour location, operation performed and type of surgery

Table 1. Baseline characteristics. No statistically significant difference for patients in both groups (Monday to Wednesday versus Thursday to Friday).

Criteria	P-Value
Age	0.129
Sex	0.555
Tumour location	0.140
Operation performed	0.127
Type of surgery: laparoscopic vs open	0.892

(Table 1). Table 2 shows the different complications for both groups of patients studied with no significant difference noted (0.428).

The overall median hospital stay was seven days (interquartile range 6.0–9.75). There was however a significant difference in length of stay for both groups with a median length of stay for the Monday to Wednesday group at six days (interquartile range: 4–10) and eight days (interquartile range: 5–11) in the Thursday to Friday group (Mann–Whitney U test $p=0.045$) (Figure 1).

Whether the resection was right sided or left/rectal resection had no significant association with hospital stay (Table 3) ($p=0.127$).

Discussion

Perioperative care and recovery have been the major concerns in the development of modern surgery. Interest in recovery has focussed on processes and pathways to improve outcome. Multimodal rehabilitation regimes in association with both laparoscopic and open surgery suggest that the postoperative care package has the more major influence on recovery.^{2,3,6}

Table 2. Complications. No statistically significant difference for both groups of patients (Monday to Wednesday versus Thursday to Friday: $p=0.428$).

Complications	Total number of Patients 87	Mon to Wed 54	Thur to Fri 33
Prolonged ileus	20	12	8
Intra-abdominal collection	15	11	4
Acute renal failure	8	5	3
Anastomotic leak	5	3	2
Wound infection/dehiscence	10	7	3
Myocardial infarction	2	2	0
Chest infection	12	5	7
Bowel obstruction	2	1	1
Urinary tract infection	7	4	3
Stomal necrosis	1	1	0
Atrial fibrillation	2	2	0
Ureteric injury	1	0	1
High stoma output	1	0	1
Transient ischaemic attack	1	1	0

Table 3. Operations by day of surgery ($p=0.127$).

Mon to Wed		Thur to Fri	
Anterior resection	59	Anterior resection	28
Right hemicolectomy	54	Right hemicolectomy	22
Hartmann's procedure	13	Hartmann's procedure	6
Left hemicolectomy	21	Left hemicolectomy	8
APER	8	APER	6

Introduction of the enhanced recovery programme in the last decade has brought about a dramatic improvement in perioperative care. This has allowed many surgical procedures to be performed on a day case basis or with decreased length of hospital stay. This has benefits for the patient, healthcare system and the society. Although individual interventions have been validated by randomised clinical trials, the relative contribution of each in the context of a multimodal rehabilitation program remains obscure.

No studies in the literature have looked at the impact of day of surgery in improving short-term recovery in patients in an enhanced recovery programme. Our current audit has not shown any difference between both groups in terms of postoperative complications. However, there was a significant difference in hospital stay in those patients getting their operations earlier in the week. The reason could be due to reduced staff availability over the weekend. This clearly shows that a successful Enhanced Recovery After Surgery programme requires a dedicated multidisciplinary team approach and should be available every day of the week. With the NHS struggling financially, it may be argued that employing more staff to cover weekends would be costly. However, there will be substantial cost saving when the total bed days saved is calculated. Solly et al.⁹ estimated that if the average length of stay in hospital for patients undergoing laparoscopic cholecystectomy was reduced by one day, there would be an annual saving for the NHS of approximately 35,400 bed days (£8 million, based on a bed day cost of £225).

As our audit shows, there is a definite difference in length of hospital stay. On the other hand, units that have a flexible rota could fit in most of their major procedures earlier in the week once it is suitable for both patient and surgeon.

It could be argued that laparoscopic surgery may have contributed to the decreased hospital stay in the Monday to Wednesday group but there was no

significant difference found for both groups ($p=0.892$) nor for right or left sided resections ($p=0.127$).

In conclusion, the results of this audit should be borne in mind by units practising the enhanced recovery programme if the maximal benefit of this is to be attained.

Declarations

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