



Original article

Colorectal patients and cardiac arrhythmias detected on the surgical high dependency unit

GS Batra¹, Julie Molyneux², NA Scott¹

¹Department of Colorectal Surgery and ²Surgical High Dependency Unit, Hope Hospital, Salford, UK

Introduction: Surgical high dependency unit (SHDU) care is becoming an integral feature of colorectal surgical practice. Routine ECG monitoring is a feature of surgical care in this setting. The aim of this study was to determine the incidence and outcome of cardiac arrhythmias detected in an SHDU population of colorectal patients.

Patients and Methods: 226 patients over a 12 month period were admitted to a 6-bedded SHDU under the care of 3 colorectal surgeons. A total of 29 patients (13%) had significant arrhythmias on ECG monitoring (median age 74 years, range 35–88 years). Pre-existing ischaemic heart disease was present in 9 patients – colorectal cancer and inflammatory bowel disease accounted for the underlying problem in the majority of these patients.

Results: Equal numbers of supraventricular and ventricular arrhythmias were detected – atrial fibrillation being the most commonly detected abnormality. Therapeutic intervention (electrolyte correction and anti-arrhythmic agents) was required in 23 patients. One patient required DC shock for ventricular fibrillation. Seven patients were transferred to the heart care unit or intensive care unit to manage their cardiac problems. Two patients died as a result of their cardiac problem, 27 were discharged home alive – 3 on long-term anti-arrhythmic therapy.

Conclusions: The postoperative environment of colorectal patients has been radically altered by the introduction of the SHDU. If colorectal surgeons are to remain central to the postoperative care of their patients, all surgical staff will require training in the recognition and protocol prevention and management of cardiac arrhythmias. Certification of colorectal surgeons in advanced life support is more relevant to colorectal surgery than certification in trauma care.

Key words: Arrhythmias – High dependency unit – Critical care

The surgical high dependency unit (SHDU) is becoming an increasingly common feature of patient management before and after surgery.^{1–4} The purpose of such units is to detect and correct organ dysfunction

Correspondence to: Mr NA Scott, Department of Colorectal Surgery, Hope Hospital, Stott Lane, Salford M6 8HD, UK

before organ failure intervenes. In the majority of patients, the emphasis of SHDU care is on maintaining adequate respiratory function, including good analgesia, and adequate fluid balance, circulation and renal function.

The specific use of ECG monitoring^{5,6} as a part of surgical high dependency care has been associated with an increasing identification of cardiac arrhythmias in this patient population. The aim of this study was to establish the relative incidence and management of cardiac arrhythmias detected amongst SHDU patients managed primarily by a colorectal team over a 12 month period.

Patients and Methods

Between May 1997 and May 1998, details of all admissions to a 6-bedded SHDU under the care of colorectal surgeons, who also provided general surgery emergency cover, were prospectively recorded on a Microsoft Access database.

Patients noted as having experienced an arrhythmia during their SHDU stay were identified. Those who experienced an arrhythmia which was a continuation of a pre-existing abnormality were excluded, as were cases of sinus arrhythmia and sinus tachycardia. Patients with sinus bradycardia were included if there were no known drugs responsible for bradycardia and if there was no abnormality on pre-operative ECG. Atrial and atrio-ventricular re-entrant tachycardia were included. Ventricular rhythm disturbances were included, as were ventricular ectopic beats if multifocal, runs of two beats or more and if the ratio of ectopic beats to normal beats, unifocal or multifocal, was greater than 1 in 6.¹ Single or multiple isolated ectopic beats were not included.

For each patient with an arrhythmia as defined above, details of age, gender and primary diagnosis were obtained. Evidence of lower respiratory tract infection and/or electrolyte abnormality (potassium, magnesium and calcium) at the time of the arrhythmia was also noted. Details of specific anti-arrhythmia therapy and management for each patient was recorded.

Results

Between May 1997 and May 1998, a total of 226 patients were admitted to the SHDU under care of 3 colorectal surgeons. Fifty-five episodes of significant cardiac arrhythmia were observed on routine ECG monitoring in 29 (13%) colorectal patients. The majority of patients were male and the median age of these patients was 74

Table 1 Patient characteristics

Gender M:F	1.2:1
Median age (years)	74
Age range (years)	35-88
Colorectal cancer	13
Inflammatory bowel disease	6
Other*	10

*Intestinal obstruction, 3; small bowel perforation, 2; strangulated hernia, 1; cholecystectomy, 1; pancreatitis, 2; lower GI haemorrhage, 1.

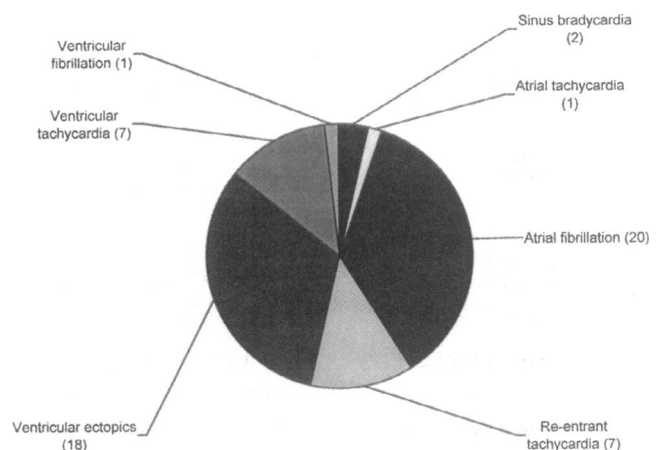


Figure 1 Distribution of arrhythmias

years (range 35-88 years). Nine patients had a history of ischaemic heart disease. Colorectal cancer and inflammatory bowel disease was the underlying diagnosis in the majority of patients (Table 1).

Approximately equal numbers of patients had either a supraventricular or a ventricular arrhythmia detected. The most frequently observed arrhythmia was atrial fibrillation followed by multiple ventricular ectopics and ventricular tachycardia (Fig. 1). A contributing lower respiratory tract infection was present and treated in 11 patients and, in addition, 11 patients had abnormal serum levels of potassium, magnesium or calcium.

Overall, 23 patients (79%) had an arrhythmia that required therapeutic intervention. Six patients required observation only, a single intervention was required in 11 patients and 12 patients needed more than one intervention. Electrolyte correction was required on 19 occasions and anti-arrhythmic drugs were administered on 16 occasions, with one episode of DC shock being used to revert the single episode of ventricular fibrillation (Table 2). Seven patients were subsequently transferred from the SHDU to the coronary care unit or intensive care unit to manage their cardiovascular

Table 2 Intervention for arrhythmias

<i>Electrolyte correction</i>		
Hypokalaemia		12
Hypomagnesaemia		5
Hypocalcaemia		2
<i>Anti-arrhythmic therapy</i>		
Digoxin		6
Adenosine		4
Amiodarone		4
Lignocaine		2
DC shock		1

instability. Two patients died in hospital because of cardiac problems and 3 of the 27 patients discharged home alive required long-term anti-arrhythmic therapy for atrial fibrillation.

Discussion

The stratified care of surgical patients has led to the introduction of the SHDU to monitor and prevent organ failure for patients at risk.²⁻⁴ Bedside cardiac monitoring has become a feature of high dependency care⁵ and, as a consequence, has increased early recognition of cardiac arrhythmia in surgical patients.

In the experience presented here, 13% of patients admitted under the care of a colorectal surgeon developed a significant cardiac arrhythmia. These patients require specific attention to electrolyte disturbances⁷⁻¹⁰ and often need rapid administration of specific anti-arrhythmic agents.^{11,12}

The immediate cover of the SHDU is conventionally provided by the surgical team responsible² for the individual patient. Typically, the surgical team involves junior physicians in the recognition and management of SHDU cardiac arrhythmias. If this model of medical provision for SHDU patients is to continue, then a minimum requirement is the development of robust protocols for the prevention, recognition and immediate

management of cardiac arrhythmias within the SHDU. Such protocols should be augmented by more comprehensive teaching of critical care for surgical trainees. Indeed, our experience of the frequency of cardiac arrhythmias in colorectal patients suggests to us that certification of all grades of surgical staff in advanced life support¹³ may be as relevant to modern surgical management as certification in trauma care.

References

1. The electrocardiograph – a basic guide to interpretation. In: *Care of the critically ill surgical patient. MRCS Course Manual*. London: Royal College of Surgeons of England, 1966; Ch. 4.
2. Crosby DL, Rees GAD, Gill J. The role of the high dependency unit in postoperative care: an update. *Ann R Coll Surg Engl* 1990; 72: 309–12.
3. Crosby DL, Rees GAD. Provision of postoperative care in UK hospitals. *Ann R Coll Surg Engl* 1994; 76: 14–8.
4. Nehra D, Valijan A, Crumplin MKH, Edwards AE. Evolving role of intensive and high-dependency care. *Ann R Coll Surg Engl* 1994; 76: 9–13.
5. Badura FK. Nurse acceptance of a computerised arrhythmia monitoring system. *Heart Lung* 1980; 9(6): 1044–8.
6. Drew BJ. Bedside electrocardiographic monitoring: state of the art for the 1990s. *Heart Lung* 1991; 20(6): 610–23.
7. Weisberg LS, Szerlip HM, Cox M. Disorders of potassium balance in critically ill patients. *Crit Care Clin* 1987; 3: 835–54.
8. Ryzen E. Magnesium homeostasis in critically ill patients. *Magnesium* 1989; 8: 201–12.
9. Iseri LT, Allen BJ, Brodsky MA. Magnesium therapy of cardiac arrhythmias in critical care medicine. *Magnesium* 1989; 8: 299–306.
10. Vukmir RB. Cardiac arrhythmia diagnosis. *Am J Emerg Med* 1995; 13: 204–10.
11. Zilberman A, Rogel S. Haemodynamic evaluation of common cardiac arrhythmias. *Int J Cardiol* 1990; 27: 341–9.
12. Sharma AD, Klein GJ. Pathophysiology and management of atrial and ventricular arrhythmias in the critically ill. *Crit Care Clin* 1985; 1: 677–97.
13. Martens P, Vanhaute O, Mullie A, Bourgeois M. An audit of in-hospital crash team interventions outside critical care areas. *Eur J Emerg Med* 1996; 3: 157–62.