Original article

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Remote surveillance after colorectal cancer surgery: an effective alternative to standard clinic-based follow-up

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Abstract

Aim Most colorectal cancer recurrences are asymptomatic and are detected through routine postoperative clinic surveillance programmes with associated investigations. However, attendance at these clinics has a financial cost and may be associated with an increase in patient anxiety and dissatisfaction. The results of a remote follow-up system developed for selected patients are reported.

Method A remote surveillance programme has been in place in our institution for over 9 years. Patients having elective and emergency treatment for colorectal cancer were enrolled. The timeliness of the investigation, detection of local recurrence and distant metastases and overall 5-year survival rates were determined. A cost review and patient satisfaction survey were performed.

Results The programme was suitable for over 900 patients who had received surgery for colorectal cancer between 2004 and 2012, representing some 50% of the total number of patients treated in this period. Of these, 811 (90%) had investigations carried out on time. Five-year survival rates were comparable with national data. Cost-minimization analysis demonstrated a financial saving of 63% and a 75% reduction in clinic appointments. High levels of overall patient satisfaction (97%) were noted with the programme.

Conclusion A remote surveillance system after colorectal cancer surgery is a safe and cost-effective alternative to traditional clinic-based follow up and has high patient satisfaction.

Keywords Colorectal cancer, follow up, distance surveillance, survival

What does this paper add to the literature?
This paper describes a method of colorectal cancer follow-up that has not previously been reported. It is safe, saves money and results in a high degree of patient satisfaction. It would easily be transferable to other hospitals and to follow-up programmes for other forms of cancer and chronic disease.

Introduction

Colorectal cancer (CRC) is the third most common cancer in the western world [1–3]. Early detection of recurrent disease may lead to favourable outcome. Follow up after CRC surgery is controversial. The majority of CRC recurrences are asymptomatic and typically detected through routine postoperative surveillance programmes [1]. Traditionally, surveillance has been delivered in the context of regular clinic follow-up by clinicians and, more recently, by specialist nurses [2]. There is no evidence that actual attendance at a clinic is necessary for this surveillance to be effective [1]. Moreover, there could be a lack of standardization at clinics because patients may see a different clinician at each visit. Clinic appointments have a financial cost and may be associated with an increase in patient anxiety [3].

Broomfield Hospital in Chelmsford, Essex, provides CRC diagnostic and therapeutic services for a catchment population of around 375 000. In the late 1990s in Broomfield Hospital, follow up was conducted according to a protocol that was supposed to be followed by the attending doctor, who may have been a senior member of the local medical team, an itinerant trainee or even a locum. We believed that the system, as it stood, did not fulfill the requirements of a good cancer follow-up surveillance programme: namely, to detect recurrent disease in a timely manner; to address ongoing symptoms reported by the patient; and to allow

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accurate audit of patients undergoing follow up. It was observed informally that most 'problems' were actually detected as a result of investigations arranged by the clinics, or, if symptomatic, by the patients themselves. We discussed this with our patients and came up with a remote surveillance programme. The proposed scheme was discussed at a series of meetings with general practitioners (GPs) before implementation; there was surprisingly little disagreement, despite some anxieties about potentially increased primary-care responsibility. A further concern was whether to change course for those patients already in the follow-up process. Eventually, both they and we agreed to move everyone directly into the remote programme. This paper describes the surveillance programme that was devised and it presents evidence to confirm that the programme was shown to be effective, inexpensive and acceptable to patients.

We demonstrate that a surveillance programme can be implemented without recourse to clinic visits, whilst providing patients ready access to their specialist team on an *ad hoc* basis. This form of remote surveillance has been used in our hospital since 2004 for patients treated for CRC.

Method

All patients having completed treatment for CRC, both elective and emergency, were considered for enrollment into the remote surveillance programme. Various groups were excluded, leaving some 50% actually enrolled in the scheme. Our exclusion criteria are shown in Table 1. Patients already in the existing follow-up programme were transferred into the new remote programme, meaning that the data presented include some patients who may have had their primary treatment before introduction of the remote programme. Patients excluded were those with ongoing symptoms, those on palliative pathways, those in clinical trials requiring bespoke follow-up regimes and a few (usually the very elderly) who declined follow up. Those enrolled were provided with information outlining their management plan, known locally as 'the planner' (Fig. 1). In addition, patients were reminded of the contact details of the colorectal clinical nurse specialist (CNS) who they could contact should they wish. No further routine clinic follow-up was arranged for these patients.

Table 1 Exclusion criteria.

Participation in clinical trials
Patient unwillingness/follow-up inappropriate
Continuing postoperative problems
Those leaving the protocol, usually because of identification of recurrent or metastatic disease

The surveillance programme lasts for 5 years for colonic cancer and for 7 years for rectal cancer. Blood tests, including serum carcinoembryonic antigen (CEA) and liver function tests (LFTs), CT scans of the chest, abdomen and pelvis (CT-CAP) and colonoscopy are performed at agreed intervals. After completion of treatment, patients receive blood tests at week 6, months 3, 6, 9, 12, 18 and 24, and yearly thereafter. Patients who have not had a full preoperative staging CT–CAP (i.e. if they have undergone an emergency procedure) have a completion scan as soon as possible following surgery. All patients have annual CT scans for the first 3 years of their follow up.

Patients who have had complete colonic imaging preoperatively are scheduled for colonoscopy 3 years after surgery, unless the findings indicate otherwise, and every 5 years thereafter assuming a normal examination. Patients who do not have complete colonic imaging before surgery have this carried out within 1 year of their operation. If adenomas are found, subsequent follow-up is dictated by the local polyp follow-up protocol, according to British Society of Gastroenterology guidelines. Patients found to have polyps therefore have a different colonoscopic follow-up programme from the predefined protocol, but they remain in the standard system with regard to blood testing and scanning. Surveillance endoscopy is discontinued in patients over the age of 75.

A monthly list of patients requiring investigations is generated automatically from a locally designed database. After confirming on the Patient Administration System (PAS) that the patient is alive and not in hospital, the investigations are requested by the CRC surveillance coordinator in advance of the due date, in accordance with the protocol. The results of the surveillance tests are scrutinized by a colorectal CNS. When the test results are normal, a standard letter of reassurance is sent. Abnormal results are taken to the weekly multidisciplinary team (MDT) meeting for discussion, and further management plans are formulated. Patients who subsequently develop recurrent cancer are taken off the remote surveillance pathway. If a result fails to appear on either the radiology or biochemistry results database, the co-ordinator telephones the patient and/or their GP and appropriate action is taken.

Data collection

All data were collected prospectively in a computer database from 2004. Patients already in the follow-up phase were transferred into the new remote programme, so the data presented include patients who had primary

HOSPITAL No: ADDRESS: SURGEON:

NHS NUMBER:

NAME: GP:

DOB:

OPERATION: DATE:

STAGING:

ADJUVANT CHEMOTHERAPY : YES/NO

REFERRED FOR SURVEILLANCE BY:

COMMENCED SURVEILLANCE ON: STAGE OF PATHWAY:

FIVE/SEVEN YEAR SURVEILLANCE PLAN

Rectal Cancers Only

	6 Weeks	3 Months	6 Months	9 Months	1 Year	18 Months	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years
DATES												
BLOOD SCREEN												
SCANS												
COLONOSCOPY												

You will be informed by letter on the results of your tests and investigations – please allow up to 3-4 weeks for your scan results

Figure 1 The planner.

treatment before 2004. Between 2004 and 2012, 900 patients were enrolled in the surveillance program (Fig. 2). Retrospective analysis was performed to measure the timeliness of the tests performed, detection of local recurrence in rectal cancer, distant metastases and overall 5-year survival rates. A cost-minimization analysis was performed to compare remote surveillance with traditional clinic-based surveillance using a similar investigation protocol. A patient satisfaction survey was carried out, using a questionnaire, on a cohort of 100 patients who were actively undergoing surveillance in years 3 and 4 (Appendix S1).

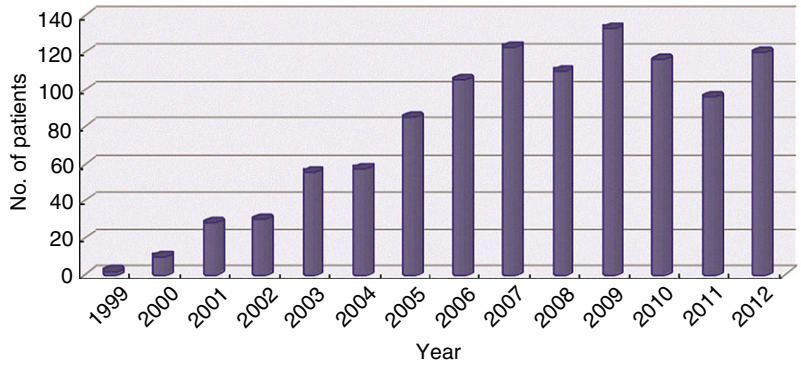

Figure 2 Patients added to the surveillance programme each calendar year (based on the date of their operation). Note that patients already in the existing follow-up programme were transferred into the new remote programme, meaning that the data presented include some patients who may have had their primary treatment before introduction of the remote programme.

Results

Remote surveillance

Approximately 50% of all CRC patients were suitable for remote surveillance. Of these, 90% had their blood tests performed on time and more than 90% had a CT scan within 4 weeks of their due date. Of those who did not have their investigations at the planned time, the follow-up co-ordinator made suitable arrangements after appropriate investigation.

Local recurrence of rectal cancer in the study cohort was 4% at 5 years, and the overall detection rate of distant metastases was 10.3%.

The 5-year actual survival for Dukes A tumours was 92.7%, for Dukes B tumours was 78.8% and for Dukes C tumours was 83.1%. Overall survival for those in the programme was 88.8% Paradoxical survival effect between Dukes B and C staging was caused by a disproportionate number of Dukes C patients not meeting the inclusion requirements and not being added to the database. The cause of death was not specifically analysed in this study.

Cost analysis

A snapshot cost-minimization analysis was carried out to compare remote surveillance with a theoretical standard clinic-based follow-up during 2011. With a standard clinic-based follow-up system, patients would have received a minimum of five clinic appointments in the first year, two in the second year and one annually thereafter, up to 5 years for colonic cancer and 7 years for rectal cancer.

The total number of follow-up appointments to be made in 2011 would have been 1106. The actual number of follow-up appointments made in 2011 was 281, saving 825 appointments. These data imply a saving of 74.5% of clinic appointments and a total of 68.5 clinic sessions (assuming 12 clinic slots per session). The cost of a follow-up clinic appointment is £75. The 825 appointments avoided translate into a saving of £61 875. The administrator responsible for running the remote surveillance programme adds a cost of 45% of the whole time equivalent of a band 4 administration and clerical assistant, which translated, in our institute, to an annual cost of £9280. The calculated and measurable saving made for 2011 was therefore £52 593, or 63%.

Patient satisfaction survey

A patient satisfaction questionnaire was sent independently, to avoid bias, to 100 consecutive patients who were 3–4 years into surveillance; 87% were returned. Most patients expressed a high level of satisfaction (97% overall, 71% very satisfied and 27% satisfied). Ninety-six per cent of patients felt that their tests were performed as indicated in their 'planner' and 95% thought that their test results were communicated in a timely manner. Ninety-four per cent of patients were comfortable or very comfortable in contacting the surveillance team for advice, and 88% of patients found it easy or very easy to contact the surveillance team if they had concerns. Also, 73% felt that it was easy or very easy to ask for advice on sexual dysfunction. In all, 91% of patients were satisfied (71% very satisfied and 20% satisfied) with the level of support provided by the team. When asked directly, only 16% of patients expressed a preference to be followed up by a doctor and 11% by a nurse specialist.

Discussion

Most branches of secondary care are engaged in exploring ways to minimize costs whilst maintaining high-quality care and achieving high patient satisfaction. One way to achieve this is to stop activities that do not add value. Improvements of both diagnostics and screening mean that more patients are offered curative resection for CRC. This results in greater demand for follow up and further stress on limited resources. In the current financial climate, the traditional clinic-based follow-up system may not be sustainable.

Previous studies on breast, lung, oesophageal and CRC follow-up showed improvement of survival after intensive follow-up [4–7]. Therefore, intensive follow-up after colorectal surgery is practiced in most hospitals. A recent study after CRC treatment randomized telephone follow-up by specialist nurses with clinic-based hospital follow-up. This showed that telephone follow-up was an acceptable and feasible option [8]. The study also demonstrated that the patients were more likely to mention their concerns during telephone conversations with the specialist nurse. Another randomized controlled trial of nurse-led follow-up *vs* surgeon-led follow up in rectal cancer showed that patients' satisfaction was equally high for nurses and doctors and showed no difference in time to death or recurrence. The cost analysis showed a 20% saving with nurse-led follow-up. However, the nurse-led clinic consultations took longer and resulted in more investigations [8]. Several studies describe nurse-led or telephone clinics for breast, prostate and lung cancer follow-up [9–11].

Having identified that very little was gained by the actual attendance of our patients at the follow-up clinic, together with informal observations in other cancer follow-up services (it was noted, for example, that recur-

rence in breast cancer follow-up is commonly patient driven and only medically detected after patients called to arrange an early outpatient review), we set about designing a pathway that avoided clinic visits wherever possible. We discussed the concept with patients already in the system, had several meetings with GPs and then implemented the protocol. In this paper we describe the system that fulfills the follow-up objectives for patients after CRC treatment, namely: identifying recurrent disease; managing ongoing symptoms; and maintaining accurate audit. The remote surveillance system described is managed by an administrator under the guidance of a CNS and ultimately the weekly MDT. One of the few negative aspects encountered was that the clinical teams rarely got to see their 'successes'. This was partially addressed by making all efforts to arrange colonoscopy, when required, on the list of the surgeon who previously performed the operation. When discussing our process with colleagues in other organizations we often hear that 'patients like to come to the clinic'. Our experience would not support this and we believe that it is actually the clinical staff who enjoy the opportunity to review successful outcomes. There is, of course, nothing wrong with this. To date, we have not had a single formal complaint about the lack of personal contact, even from those who were transferred between the traditional and new systems in 2004.

Remote surveillance

Only 50% of patients treated for CRC were eligible for inclusion. Although initially this seems rather low, the necessary exclusion criteria make it unsurprising. Of those excluded, > 20% of patients will be palliative at presentation, a number will inevitably have ongoing symptoms which mandate regular face-to-face follow-up and the remainder were entered into clinical trials requiring a specific follow-up regimen. All data presented relate to the 50% who were eligible for the programme. Despite half the population being better served by a different regime, the overall benefits to the efficiency of the unit were considered valuable. It is therefore important to understand that the data presented are not intended to reflect our overall CRC service, but relate only to those within the remote surveillance programme. The overall survival during the study period was 88.8%, which is considerably lower than one would expect from an unselected group of patients treated for CRC, confirming that those followed up in this way did represent a relatively low-risk group.

Since introduction of the programme, feedback has been so positive that very little has had to be changed in terms of process. The only changes have been continuation of blood testing in patients with rectal cancer up to 7 years (after a late recurrence in a patient who had had neoadjuvant therapy) and a reduction in the scope of blood testing (initially a 'full set of bloods' but subsequently just CEA and LFTs). Most (95%) of the patients enrolled in the system had timely investigations according to protocol, which resulted in standardized care. The rate of predictable investigation cannot be compared with activity before introduction of the system because it would have been almost impossible to collect the data from serial clinic appointments without an underlying co-ordinated structure, but we believe it to be a very acceptable rate. Occasionally, patients would call to indicate that they would prefer to discontinue follow-up; these were usually elderly patients. These were dealt with individually, as were other extraneous queries. Surprisingly this does not lead to a heavy workload: a month-long audit demonstrated an average of one telephone call per working day for the CNS regarding routine follow-up. When a patient failed to complete an expected test, the co-ordinator made contact and reacted appropriately.

To avoid potential problems resulting from attempting to contact patients who had died, the PAS was interrogated before sending out request forms for investigations to patients. In fact, it was rare that we were not aware about changes in circumstance because the patient themselves (if able), or family members will usually call the office to inform the co-ordinator or CNS independently.

There have been no complaints from GPs about the system itself, but occasionally patients with problems end up being re-referred into the system inappropriately, occasionally via Choose & Book and even via the 2-week-wait pathway. The rarity of this probably reflects the communication in the initial CNS clinic when all patients are encouraged to make direct contact at any time.

Cost analysis

The cost-saving analysis is difficult to quantify specifically because a saving to the commissioner may represent a cost to the provider, and vice versa, but savings in individual areas of the programme have been clearly demonstrated. In the early years we were unable to achieve funding from the PCT because no actual contact with the patient was made. Convinced that the service was excellent practice we persevered regardless. Subsequently, a fee of £25 was agreed for each remote encounter, equivalent to a telephone clinic. Furthermore, 'savings' for appointments avoided do not translate into actual savings because staff are still working

seeing other new patients. That such a system increases clinical capacity to see new patients cannot be doubted and it helps the hospital new to follow-up ratios.

This system also avoids the cost and inconvenience for the patient of travelling to the hospital, and possibly also provides further saving to the wider economy by reducing the time away from work for the patient and their family.

Patient satisfaction

Patient satisfaction was very high with the surveillance system, and most patients would not have preferred hospital visits to see either a doctor or a nurse specialist. Most patients were also confident in making contact and getting advice from the colorectal nurse specialists when required. This included their willingness to discuss important 'survivorship' issues, such as bowel and sexual dysfunction after surgery, a concern that is regularly expressed by teams from other organisations when discussing the system. Our satisfaction surveys do not indicate that this is a significant problem. The most recent and in-depth survey was conducted independently by our audit department (to minimize persuasion bias) and was sent to patients in years 3 and 4 of follow-up. The timing of the survey in the follow-up cycle may have led to bias in reporting as, at this stage, patients may reasonably have felt that their survival prospects were better than earlier in the process. This period was specifically chosen to ensure that patients were familiar with the system and would be in a position to express survivorship concerns without fear of compromising ongoing care. The return rate from a questionnaire survey of 87% in itself suggests high satisfaction with the service offered.

The remote surveillance system has been used successfully over the last 8 years, providing early and reliable detection of cancer recurrence and accurate prospective outcome audit.

We conclude that the remote surveillance programme is feasible and a cost-effective alternative to traditional clinic-based follow-up. The model can easily be adapted to other cancer follow-up services where there is already good evidence to support telephone-based follow-up with specialist nurses [9–11]. The follow-up system described could also be applicable to a multitude of chronic medical conditions after appropriate pilot trials, saving time and cost for health care providers and patients.

Author contributions

Miss Arifa Siddika, Writing up the manuscript. Mrs. Deep Tolia-Shah, Patients surveillance. Mr. Thomas E Pearson, Editing the manuscript. Mr. Nigel G B Richardson, Design and implementation of project, editing the manuscript. Mr. A H McL Ross, Design and implementation of project, editing the manuscript.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Patient satisfaction questionnaire.