



Original article

## A comparison of two methods of palliation of large bowel obstruction due to irremovable colon cancer

Richard Johnson<sup>1</sup>, Ralph Marsh<sup>2</sup>, John Corson<sup>1</sup>, Keith Seymour<sup>1</sup>

Departments of <sup>1</sup>General Surgery and <sup>2</sup>Radiology, City Hospitals, Sunderland, UK

**Introduction:** Untreated malignant large bowel obstruction is rapidly fatal. Short-term palliation of symptoms can be achieved by formation of a stoma in those patients for whom resection surgery is inappropriate. In the final months of life, a stoma represents a significant burden for both patients and carers. Palliative endoluminal stenting may therefore be an attractive alternative option for this poor prognostic group.

**Patients:** Thirty-six patients were studied of whom 18 had obstructing left-sided colon cancer relieved by placement of endoluminal stents. These were compared with 18 historical controls with similar clinicopathological features that were treated more conventionally with palliative stoma formation in the same hospital.

**Results:** Patients in the two groups had similar sex distribution ( $P = 0.5$ ); however, patients undergoing palliative stoma formation were significantly younger than patients being stented ( $P = 0.0065$ ). As well as being older, there was a trend towards greater co-morbidities, stent patients having higher ASA grades ( $P = 0.01$ ). Both groups of patients gained relief of obstructive symptoms. There were no differences in survival ( $P = 0.5$ ) or in hospital mortality (2 in each group). The median length of palliation is 92 days (42–∞ days) for stenting and 121 days (89–281 days) for palliative stoma formation. Formation of a stoma required a significantly longer stay in ITU ( $P = 0.003$ ) but total hospital stay was similar.

**Conclusions:** As an alternative to palliative surgery, selected patients benefit from colonic endoluminal stenting with relief of obstructive symptoms and no adverse effect on survival. They may be spared the potential problems associated with palliative stoma formation and the morbidity of surgery. Stenting can be offered to the very frail patient who would otherwise be managed conservatively.

**Key words:** Colonic neoplasms – Intestinal obstruction – Prosthesis implantation – Palliative care – Stents

Colorectal carcinoma is a common disease with 25,000 new cases in the UK per year; with 17,000 fatalities, it is the second most common cause of cancer-related death. Of the new cases, 8–30% will present with complete or partial large bowel obstruction – somewhere in the region

of 2000–7500 cases per annum in the UK.<sup>1,2</sup> Three-quarters of the lesions causing bowel obstruction will be found to be in the descending and rectosigmoid as here the stool becomes less fluid.<sup>3</sup> Traditionally, the management of patients with colonic obstruction has been a one or two

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**Correspondence to:** Mr Richard Johnson, Flat 6, 15 Tankerville Terrace, Jesmond, Newcastle upon Tyne NE2 3AH, UK.  
E-mail richjohnson100@hotmail.com

stage surgical procedure to remove or bypass the primary cause of the obstruction and this remains the only curative treatment. However, this often results in a permanent stoma, particularly as many Hartman's procedures are never reversed.

The poor general medical condition and advancing age of this group of patients creates a population with a very high operative risk.<sup>4,5</sup> Large bowel stenosis and occlusion leads to massive fluid shifts, dehydration and electrolyte imbalance and thus exacerbates this risk. Elective colorectal surgery has a quoted 5% mortality, but emergency surgery in this population has mortalities in excess of 25–30%.<sup>6–8</sup> Other metabolic and septic complications are also greatly increased.

Patients presenting with obstruction or obstructive symptoms are at high risk of having advanced disease; 40% have distant metastases and many have direct extension into other structures. Median survival in advanced disease is only a few months.<sup>7,9</sup> Severe comorbidity also adversely influences prognosis.<sup>8</sup> Provision of quality of life is the prime objective in the treatment of these individuals. Avoidance of major abdominal surgery, its associated risks and long recovery time and stoma formation are reasonable objectives for patients with poor prognosis disease.

In this paper, we compare our results of conservative management of obstructing large bowel carcinomas by palliative endoluminal stenting with a control series of patients who underwent palliative stoma formation.

## Patients and Methods

Twenty patients with obstructing colonic cancer were referred for endoluminal colonic stenting to our institution and, of these, 18 had successful stenting. There were 11 males and 9 females of median age 81 years (range, 60–93 years).

Patients were assessed both clinically and radiologically prior to referral for stent insertion. In order to qualify for palliative stenting, patients had to be medically unfit for major surgery (ASA 4 or 5) with irreversible disease or have incurable malignancy due either to radiologically confirmed metastatic disease or locally advanced fixed pelvic tumours. All patients had undergone colonic imaging either endoscopically or by contrast enema to confirm the site and nature of the stenosing lesion. Several patients had severe co-morbidity and confirmed metastatic disease. Co-morbidity was most often long-standing cardiovascular or respiratory disease.

The techniques of colonic stenting have been described in detail elsewhere.<sup>10–13</sup> Stenting was performed by a single interventional radiologist with or without the assistance of an experienced endoscopist as appropriate to

the site of the lesion and the ease of access. Under X-ray screening, a 0.035 guidewire (Terumo, UK) was passed through the tumour followed by a catheter. The guidewire was exchanged for an Extra-Stiff guidewire (Boston-Scientific) to facilitate stent delivery. A stent delivery system was passed over the guidewire until the radio-opaque markers were across the tumour. The stent was then deployed by withdrawal of the delivery system overshoot. Patients were then screened using further contrast, if necessary, to confirm the whole lesion was covered and if needed further stents were placed. Memotherm stents were generally used for more distal lesions while Wallstents, which are of smaller diameter and more flexible, were used for more proximal colonic lesions.

Historical controls from the same hospital population that had undergone surgical palliative stoma formation were identified by hand-searching the hospital's theatre record from January 1998 to December 1990. The successfully stented patients were matched with stoma controls for disease and sex. All resections of the primary tumour whether palliative or not were excluded. A total of 18 stoma control patients were identified, 8 females and 10 males, median age 70 years (range, 36–90 years). Each group was scrutinised and compared for palliation of obstruction, crude survival, hospital and ITU stay, in-hospital mortality and complications.

## Statistical methods

Descriptive summaries for survival were prepared using the Kaplan-Meier method. Survival comparisons were performed using the log-rank statistic. Other comparisons were made for non-parametric data using the Mann-Whitney U-test, with the exception of analysis of comorbidity which was analysed after grouping ASA grades 2+3 and 4+5 using a 2 by k chi squared test for trend.

## Results

### Demographics and co-morbidity

Patients in the two groups has similar sex distribution ( $P = 0.5$ ). Patients undergoing palliative stoma formation were significantly younger than patients being stented ( $P = 0.0065$ ). As well as being older, stented patients had greater co-morbidity with significantly higher ASA scores than stoma patients ( $P = 0.04$ ).

### Palliation of obstruction

Both stenting and stoma formation provided good relief from obstructive symptoms. Of 20 patients referred for

stenting, 18 had a successful procedure. One patient was referred for stenting with a rectal cancer that was too low to take a stent without interfering with the anal canal. The second failure was in a patient with a proximal tumour at the splenic flexure. Both of these patients were subsequently managed by palliative stoma formation. Two patients had long lesions that could not be bridged by a single device; each of these had two devices deployed.

No stented patient has died obstructed; however, two patients have had recurrent symptomatic obstruction due to tumour in-growth through the stents. Both underwent further stenting with successful palliation until death.

Of the 18 matched stoma patients, two were noted to have extensive peritoneal disease. Neither of these patients gained any benefit from stoma formation and rapidly succumbed to their disease.

#### Crude survival

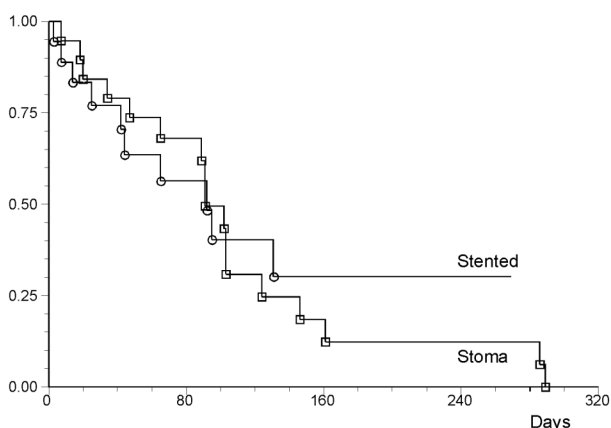
There was no difference in survival ( $P = 0.5$ ). The median length of survival was 92 days (42–∞ days) for stenting and 121 days (89–281 days) for palliative stoma formation. Figure 1 shows the survival curves for the two groups.

#### Hospital stay

There was no significant difference in the duration of hospital stay (Table 1). Stented patients stayed a median of 18 days (range, 9–132 days) while stoma patients remained in hospital for a median of 17.5 days (range, 9–65 days;  $P = 0.65$ ).

#### ITU stay

No stented patient was admitted to ITU (Table 1). Collectively, eight stoma patients spent 19 days on ITU, the median duration of stay was 2.5 days ( $P = 0.003$ ).



**Figure 1** Kaplan-Meier survival curves for stented and stoma patients.

**Table 1** Hospital data and survival

	Stent patients	Stoma patients
Total ITU/HDU days	0	19
Median hospital stay (days)	18	7.5
In-hospital mortality	2	2
Median survival (days)	91	121

#### In-hospital mortality

Following the procedures, there were four in-hospital deaths, two from each group (Table 1). In the stent group, the deaths were related to cardiovascular mortalities, one each of a myocardial infarction with congestive cardiac failure and a cerebrovascular accident. Two stoma patients died from carcinomatosis prior to discharge from hospital. All of the deaths occurred within 7 days of a procedure.

#### Complications

In the stoma group, few surgical complications were identified from a retrospective examination of the notes. A single wound infection was recorded. In the stented groups, two patients have suffered complications from fractured stents. One patient had tenesmus from a stent fragment migrating into the anal canal and this was easily managed by its removal. Another patient re-presented with localised peritonitis and plain X-ray uncovered a fractured stent and free gas. This lady refused surgical intervention and subsequently died. As no post-mortem was carried out, it is unknown if the stent was the source of the perforation but this seems likely. Stents had been *in situ* in both of these patients for > 120 days.

#### Discussion

Our results suggest that there is no survival benefit for either stenting or stoma formation. However, the cohort offered stenting were significantly older and had more severe disease than the historical cohort of stoma patients and could have generally been expected to have had worse outcomes. Likewise, hospital stay was similar although stented patients did not require ITU care. Blinkert *et al.*<sup>14</sup> suggest that use of stents in the colon might be more cost-effective. In their series, hospital and ICU stay was shorter and patients had fewer surgical procedures. Overall, they reported a 20–29% reduction in the costs for stent use as compared with surgery. In our study, the in-hospital costs are likely to be very similar, with the exception of ITU. Hospital stay was not significantly different and the costs of the respective procedures broadly similar. Significant cost savings will

be apparent in the stent group when higher input care and continuing stoma care is taken into consideration. The cost of a HDU/ITU bed space in our hospital is £323–£675 per day; that of stoma care is more difficult to calculate but is estimated at £697.71, on average, for 1 year.<sup>15,16</sup>

It is only in the last decade that stents have been applied to obstruction of the lower GI tract. In 1991, Dohmoto reported the first use of an intra-luminal metal stent for the palliative decompression of malignant obstruction.<sup>17</sup> This was followed by Cwikiel and Andren-Sandberg<sup>18</sup> and Itabashi *et al.*<sup>19</sup> who separately, in 1993, presented small series using oesophageal and endovascular stents, respectively. The first purpose designed stents appeared in the late 1990s.<sup>20</sup> There are several published series describing endoluminal stenting with success rates of 85–92% and complication rates of up to 30%.<sup>11,14,21,22</sup> The largest single-centre UK series published is that by Cole *et al.*<sup>23</sup> who successfully relieved obstruction in 24 of 28 patients attempted.

Stent migration was a major problem with the incidence being up to 50% in the early series.<sup>11,20</sup> The incidence of migration was highest at 50% in the series of Choo *et al.*<sup>20</sup> where the stents were totally covered. The use of uncovered stents has considerably reduced the incidence of this complication.<sup>24</sup> In this series, the only instance of stent migration occurred when a stent fractured and distal fragments migrated and caused symptoms.

The placement of stents has been associated with colonic perforations. The risk of perforation is greatly enhanced if the stricture is pre-dilated before stent insertion.<sup>25</sup> We did not dilate any of the tumours in our patients and have seen no perforations during stent placement. We have now seen a patient present with peritonitis and radiological signs of perforation associated with stent fracture and remain concerned that the fractured stent may have been causal.

Minor complications of stenting do occur, but can usually be easily managed or are short-term problems. These include pain, tenesmus rectal bleeding, diarrhoea and incontinence.<sup>26</sup>

Two patients (10%) developed tumour in-growth in our series and were successfully treated by further stenting. Other groups have described the use of lasers<sup>27,28</sup> to treat tumour in-growth or the formation of palliative stomas<sup>24</sup> when obstructive symptoms recur.

## Conclusions

We have used stenting of stenosing left-sided colonic cancers for palliation of patients. In this paper, we have provided details on hospital stay, costs and survival compared to a historical cohort of patients treated with stoma formation. Data collection was done retrospectively and we do not have good prospective data on palliation of

symptoms. Further prospective randomised trials are warranted.

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