Evaluation of transanal endoscopic treatment of benign canine rectal neoplasia

OBJECTIVES: To evaluate transanal endoscopic treatment in the management of benign canine rectal neoplasia.

METHODS: A retrospective study was carried out to evaluate the response to transanal endoscopic treatment in 13 dogs with extensive rectal neoplasia that was considered inoperable by conventional surgical techniques but was indicated as benign by previous biopsy.

RESULTS: Tumours affected the lengths of rectal mucosa varying from 2 to 13 cm. Between 25 and 100 per cent of the rectal circumference was affected in each case. Transanal endoscopic treatment of canine rectal neoplasia was curative in five dogs, palliative in three and associated with a poor result in the remaining five. Complications of the technique included rectal perforation, leading to peritonitis and death.

CLINICAL SIGNIFICANCE: Transanal endoscopic treatment can be recommended as an alternative to radical, full-thickness rectal excision for the management of extensive but benign canine rectal neoplasia. Owners should be informed that the treatment may be palliative rather than curative and that complications, if they occur, can be fatal. Dogs should be hospitalised for at least five days after treatment and observed for signs of potentially fatal complications such as rectal perforation.

P. E. Holt

Department of Clinical Veterinary Science, School of Veterinary Science, University of Bristol, Langford House, Langford, Bristol BS40 5DU

DOI: 10.1111/j.1748-5827.2006.00254.x

INTRODUCTION

The clinical and pathological features of canine rectal neoplasia are presented periodically in the veterinary literature (Seiler 1979, Holt and Lucke 1985, Church and others 1987, White and Gorman 1987, Valerius and others 1997). The most common tumour is the adenomatous polyp, but other canine rectal neoplasms include adenocarcinoma, lymphosarcoma, leiomyoma/myosarcoma, plasmacytoma and inflammatory pseudopolypsis (Holt and Lucke 1985), with occasional rarities such as ganglioneuroma (Reimer and others 1999). As in human beings (Jass 1987), there may be malignant transformation of benign polyps in the canine large bowel because histology of some polyps can reveal malignant change such as invasion of the muscularis mucosae (Holt and Lucke 1985).

Surgical treatment usually involves excision through the anus and/or cryosurgery (Seiler 1979, Holt and Lucke 1985, Church and others 1987, White and Gorman 1987, Valerius and others 1997), although electrotherapy using snare has also been used to resect small, pedunculated polyps (Church and others 1987, Gualtieri and Monzeglio 1996). Piroxicam has been used as a palliative measure in the management of canine rectal tubulopapillary polyps (Knottenbelt and others 2000).

The results of excision of small tumour masses are encouraging, but problems arise when the neoplasms are extensive, inaccessible and/or malignant. Extensive rectal tumours have been radically excised, usually using pull-through or pull-out technique (Holt and Lucke 1985, White and Gorman 1987, Anson and others 1988, Valerius and others 1997, Danova and others 2006) or excision through a dorsal (Holt and others 1991) or ventral (Davies and Read 1990) transpubic approach. In addition, colostomy has been suggested, with mixed results, as a palliative measure for rectal adenocarcinoma (Hardie and Glison 1997, Kumagi and others 2003).

The prognosis after radical surgery is poor (Church and others 1987). Even with benign tumours, the postoperative morbidity is high, with prolonged tenesmus and faecal incontinence (Holt and Lucke 1985, Anson and others 1988, Gerlach and others 1992). The latter is more likely if more than 6 cm of rectum has to be excised (Anderson and others 1987).

Preliminary results of transanal endoscopic treatment of benign canine rectal tumours as an alternative to radical surgery were encouraging (Holt and Durdey 1999). A more extensive evaluation of this procedure is presented in the present article.
Transanal endoscopic treatment of rectal tumours was performed on 13 dogs referred to the Division of Companion Animals, Department of Clinical Veterinary Science, University of Bristol, between March 1992 and January 2004. Six of these dogs were reported previously by Holt and Durdey (1999). The tumours were considered to be inoperable without radical, full-thickness rectal excision. The breed, sex, age and presenting sign were recorded for each animal. In all but one animal, the duration of these signs was also recorded. Abdominal, pelvic and thoracic radiography was performed in all cases to examine for the presence of metastases, and none was found.

Single biopsies of the tumours from each animal had been obtained previously through proctoscopy. All the biopsies included the muscularis mucosae. At the same time, the extent of the neoplasia was assessed. The cranial and caudal extents of the tumour (expressed as centimetres from the anus) and the mean circumference of the rectum affected by neoplasia (expressed as a percentage of the whole) were recorded. In all cases, the biopsies had indicated that the neoplasms were benign adenomatous polyps of the rectal mucosa, with no inflammatory changes and invasion of the muscularis mucosae, which might indicate malignant change (Holt and Lucke 1985). At the time of biopsy, an attempt was made to exteriorise the affected section of rectum through the anus for possible local or pull-out excision, but this was not possible in all cases because of the extent and/or inaccessibility of the tumour.

Transanal endoscopic treatment was performed using a resectoscope, as described previously (Holt and Durdey 1999). In case 1 (Table 1), extensive tumour resection was performed using the electrode-cutting loop, followed by cautery using the ball-end electrode (Fig 1). In cases 2 to 6, tumour cytoreduction was achieved using predominantly cautery, with the ball-end electrode in combination with minimal resection using the cutting loop. In cases 7 to 13, tumour cytoreduction was performed by cautery, with the ball-end electrode alone (Fig 2). No attempt was made to resect/cauterise all tumour tissue on the same occasion in animals with extensive neoplasia. Instead, the technique was used to treat one-third to two-thirds of the tumour initially (this was difficult to accurately quantify), and further sessions of resection/cautery were used to treat the remaining neoplasia. In one animal (case 10), the small amount of tumour tissue remaining after two endoscopic treatments was surgically resected.

Perioperative and postoperative analgesia and antimicrobial therapy were provided as described previously (Holt and Durdey 1999). Analgesia involved opioids and non-steroidal anti-inflammatory drug administration preoperatively and perioperatively, usually pethidine (Arnolds) or morphine sulphate (Martindale Pharmaceuticals) and carprofen (Rimady; Pfizer). In addition, 5 ml of either local anaesthetic ointment (5 per cent Xylocaine ointment; Astra Pharmaceuticals) or local anaesthetic gel (1 per cent Lignocaine gel; Biorex) were instilled into the rectum at the end of the procedure. Carprofen was administered by mouth for a further five days. Metronidazole (Baxter)
and amoxicillin and clavulanic acid (Augmentin; GlaxoSmithKline) were given intravenously immediately before the treatment and continued by mouth for five days postoperatively. The dogs were hospitalised and monitored for at least two days after surgery and then discharged.

Follow-up information was obtained from repeated endoscopic examinations and by using a standard questionnaire (Holt and Durdey 1999). Owners were asked if their dog was still exhibiting signs related to the rectal tumour (dyschezia/tenesmus and/or haematochezia) or was normal, with no problems associated with defecation. In animals in which clinical signs persisted, the owners were asked which of the following were present: haematochezia, dyschezia/tenesmus, increased frequency of defecation, narrowed diameter of faeces and any other signs. They were also invited to make any additional comments they wished. Animals were followed up for periods varying between one day and five-and-a-half years after the last treatment.

The response to treatment was classified as:
- Cured – complete resolution of the signs, and no evidence of tumour on follow-up proctoscopy.
- Palliative – significant reduction in the severity of clinical signs for a period of at least one year.
- Poor – no improvement in the severity of clinical signs, and/or the animal died or was euthanased.

To attempt to determine if there were any differences in tumour location and extent between animals in these three groups, after checking the data for normality, the mean values of measurements made were compared using two-sample $t$ tests. These tests were used to compare means between the response groups for each parameter. In addition, an assessment of the overall extent of the tumour was made by multiplying its length with the percentage of the rectal circumference affected. Again, the means in this group were compared by two-sample $t$ tests. Statistical significance was taken as $P<0.05$.

**RESULTS**

The details of the animals and the signs they presented are given in Table 1. A variety of breeds were represented, with Labrador retrievers and miniature long-
The authors' preferred technique for treatment of canine rectal adenomatous polyps is surgical submucosal resection through the anus using a pull-out technique. A distinction should be made between the pull-out technique, which is associated with low postoperative morbidity and complications, and the pull-through technique, which involves full-thickness resection of a segment of rectum/descending colon and is associated with a much higher morbidity and complication rate. The experiences of the author are such that he no longer considers radical full-thickness excision and pull-through surgery a humane method of treating extensive rectocolonic neoplasia. The current method of transanal endoscopic resection is reserved, therefore, for animals with tumours considered inoperable without radical, full-thickness rectal excision. These animals were presented with severe clinical signs and frequently extensive rectal neoplasia (Tables 1 to 4), with a poor prognosis associated with the use of a pull-through technique.

Bearing these facts in mind, the response to treatment is good, although more than one-third of the dogs had a poor result associated with serious complications. No adjuvant medical therapy such as piroxicam (Knottenbelt and others 2000) was used in these cases; the responses reported were those to transanal endoscopic treatment alone. Five of the 13 dogs were cured, and palliation was obtained in a further three animals in which it was considered that euthanasia would have been required shortly after presentation without such treatment. The responses obtained did not appear to be associated with the location and/or extent of the tumour. Although the results shown in Table 5 suggest that the further the tumour was from the anus (as judged by its caudal and cranial margins), the poorer the result, these differences were not significant and the mean estimation of tumour extent was least in the “poor” response group. A more extensive analysis of larger numbers of dogs would be required further to evaluate the effects of tumour size and location on the response to treatment.

DISCUSSION

The owners of two animals in this group (cases 8 and 11) decided to stop treatment after five and 10 treatments, respectively, in discussion with the author because of the potential risk of rectal perforation.

In animals that responded poorly to treatment (Table 4), the follow-up period varied from four to 15 days. All dogs in this group died or were euthanased. In two dogs (cases 1 and 9), rectal perforation at the site of treatment was confirmed; this resulted in the death of case 1 and was not treated (the dog was euthanased) in case 9. In case 13, the dog’s death was associated with peritonitis and, although no post-mortem examination was performed, was assumed to be associated with rectal perforation. In case 4, acute paraplegia developed five days after the last treatment and the dog died; unfortunately, no post-mortem examination was performed to determine the cause of this. Euthanasia of case 7 was performed at the owner’s request because the dog developed acute, severe rectal bleeding 15 days after the second treatment. Follow-up conversation with the owner suggested that this was a recurrence of colitis from which the animal had suffered previously, but no post-mortem examination was carried out.

Some problems were found in performing the technique in animals in which 100 per cent of the rectal circumference was affected. Of these six animals (cases 4, 8, 9, 10, 11 and 12; Table 1), it was difficult to pass the resectoscope through the rectal lumen in four (cases 8, 10, 11 and 12). These were all small breed dogs in which the size of the tumour and its circumferential nature resulted in marked stenosis of the rectal lumen. In addition, case 12 appeared to have a stricture of the rectal wall deep to the tumour mass. In these animals, the caudal portion of the tumour was treated first and treatment progressed cranially on subsequent occasions as the rectal lumen became wider.

The location and extent of the neoplasms in the different response groups are given in Tables 2 to 4 and summarised in Table 5. The data were normally distributed. Although there appear to be some differences between the response groups, none of these was statistically significant.

P. E. Holt
Table 2. Details of animals cured by transanal endoscopic treatment

<table>
<thead>
<tr>
<th>Case</th>
<th>Distance of tumour from anus (cm)</th>
<th>Length of rectum affected (caudal edge to cranial edge)</th>
<th>Percentage of circumference affected</th>
<th>Number of treatments</th>
<th>Period over which animals treated</th>
<th>Comments</th>
<th>Follow-up period (after last treatment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Caudal edge 10</td>
<td>Cranial edge 12</td>
<td>2</td>
<td>25</td>
<td>One Two</td>
<td>Six weeks</td>
<td>Some dyschezia later in life associated with perineal rupture and prostate disease</td>
</tr>
<tr>
<td>3</td>
<td>Caudal edge 5</td>
<td>Cranial edge 9</td>
<td>4</td>
<td>50</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>Caudal edge 5</td>
<td>Cranial edge 12</td>
<td>7</td>
<td>50</td>
<td>Three Two plus surgical resection</td>
<td>Eight-and-a-half months Three months</td>
<td>Two months after second treatment, most of the tumour eliminated and remainder was accessible through anus; the remaining tumour was excised through the anus</td>
</tr>
<tr>
<td>10</td>
<td>Caudal edge 1.5</td>
<td>Cranial edge 10</td>
<td>8.5</td>
<td>100</td>
<td>Three Two plus surgical resection</td>
<td>Eight-and-a-half months Three months</td>
<td>Two months after second treatment, most of the tumour eliminated and remainder was accessible through anus; the remaining tumour was excised through the anus</td>
</tr>
<tr>
<td>12</td>
<td>Caudal edge 8</td>
<td>Cranial edge 10</td>
<td>2</td>
<td>100</td>
<td>Two</td>
<td>One-and-a-half months</td>
<td>Dog was doing so well after second treatment, owner was unwilling to risk further anaesthesia and treatment in view of dog’s age. No recurrence of haematochezia, dyschezia or tenesmus occurred. Euthanased at 14.5 years of age — post-mortem examination and histopathological examination revealed slight rectal stricture at site of tumour but no neoplasia noted</td>
</tr>
</tbody>
</table>
Table 3. Details of animals in which transanal endoscopic treatment was palliative

<table>
<thead>
<tr>
<th>Case</th>
<th>Distance of tumour from anus (cm)</th>
<th>Length of rectum affected (caudal edge to cranial edge)</th>
<th>Percentage of circumference affected</th>
<th>Number of treatments</th>
<th>Period over which animals treated</th>
<th>Comments</th>
<th>Follow-up period (after last treatment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6 6 11</td>
<td>5</td>
<td>50</td>
<td>Two</td>
<td>Two-and-a-half months</td>
<td>Did not return for third treatment. Recurrence of haematochezia and dyschezia two years after second treatment occurred. Euthanasia performed two years eight months after second treatment for splenic mass. Post-mortem examination revealed normal rectum, with no evidence of neoplasia but metastatic carcinoma in lymphatics and mesentery. Splenic mass – “haemorrhage” (?haemangiosarcoma)</td>
<td>Two years eight months</td>
</tr>
<tr>
<td>8</td>
<td>2 15</td>
<td>13</td>
<td>100</td>
<td>Five</td>
<td>Six months</td>
<td>Some residual dyschezia because of rectal stricture. Owner and author decided not to risk a sixth treatment (owner believed that the dog was doing so well and was concerned about the risk of rectal perforation)</td>
<td>Three-and-a-half years</td>
</tr>
<tr>
<td>11</td>
<td>6 14</td>
<td>8</td>
<td>100</td>
<td>10</td>
<td>19 months</td>
<td>Dramatic improvement was observed after each treatment and then gradual recurrence of signs occurred. Treatment was repeated when signs recurred. Owners decided to stop the treatments after 10th treatment; dog was euthanased the next day. There was improved quality of life for 18 months</td>
<td>One day</td>
</tr>
</tbody>
</table>
Table 4. Details of animals in which transanal endoscopic treatment gave a poor result

<table>
<thead>
<tr>
<th>Case</th>
<th>Distance of tumour from anus (cm)</th>
<th>Length of rectum affected (caudal edge to cranial edge)</th>
<th>Percentage of circumference affected</th>
<th>Number of treatments</th>
<th>Period over which animal treated</th>
<th>Comments</th>
<th>Follow-up period (after last treatment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 12</td>
<td>7 60</td>
<td>Two</td>
<td>Two months</td>
<td>Four days</td>
<td>Palliative for two months. Died four days after second treatment (rectal perforation and peritonitis)</td>
<td>Four days</td>
</tr>
<tr>
<td>4</td>
<td>12 18</td>
<td>6 100</td>
<td>Six</td>
<td>One year eight months</td>
<td>Five days</td>
<td>Palliative for 12 months. Acute paraplegia and death five days after last treatment (no post-mortem examination)</td>
<td>Five days</td>
</tr>
<tr>
<td>7</td>
<td>15 18</td>
<td>3 70</td>
<td>Two</td>
<td>Seven weeks</td>
<td>15 days</td>
<td>Palliative for six weeks. Normal for 15 days after second treatment and then developed acute profuse rectal bleeding. Owner requested euthanasia (no post-mortem examination was carried out)</td>
<td>15 days</td>
</tr>
<tr>
<td>9</td>
<td>10 12</td>
<td>2 100</td>
<td>One</td>
<td>Five days</td>
<td></td>
<td>Developed vomiting and abdominal distension five days after treatment. Exploratory laparotomy revealed leakage of bowel contents at site of endoscopic treatment. Not treated (euthanasia)</td>
<td>Five days</td>
</tr>
<tr>
<td>13</td>
<td>7 10</td>
<td>3 40</td>
<td>Four</td>
<td>Four-and-a-half months</td>
<td>Five days</td>
<td>Palliative for four months. Died five days after last treatment – ‘peritonitis’ (no post-mortem examination)</td>
<td>Five days</td>
</tr>
</tbody>
</table>
The follow-up period in animals in which transanal treatment was considered to be palliative varied between one day and three-and-a-half years after the last treatment (Table 3). However, a more accurate figure for the duration of palliation may be obtained by including the period over which the animal was treated. For example, case 11 had a follow-up period of only one day (Table 3) because euthanasia was performed the day after the last treatment, but the owners considered that the dog’s quality of life was significantly improved throughout the treatment period of 19 months.

It was intended that treatment of animals in this series be continued until no further presence of neoplasia was detected endoscopically. The post-mortem examination of case 12 (Table 2) suggests that the resolution of clinical signs can be an indicator of elimination of rectal neoplasia. Although this may avoid further anaesthesia in old or debilitated patients, the post-mortem examination results in case 5 (Table 3) suggest that deeper malignancies may be undetected on this basis or, indeed, by follow-up endoscopy.

There is an obvious risk of rectal perforation and potentially fatal peritonitis associated with this method of treatment. An attempt was made to minimise this risk after the experiences in previous cases (Holt and Durdey 1999) by performing less resection. Although rectal perforation was only confirmed in two of the five dogs with a poor result, the results shown in Table 4 suggest that even cautery alone can result in this complication. In theory, the ball electrode is cauterising only the tumour tissue itself, but it is possible that the electric current passes down the blood vessels and results in cautery, vascular occlusion and subsequent necrosis at a deeper level. The potential for rectal perforation may be compounded by poor access to some of these tumours, especially in animals in which the tumour is extensive and occupies 100 per cent of the rectal mucosal circumference. Any attempt to force the resectoscope through a severely narrowed rectal lumen is likely to cause haemorrhage from the tumour, reducing visualisation and thus compromising the safety of the procedure. Most animals with this complication showed no clinical signs until the rectum perforated, which, if it happened, tended to occur about four to five days after treatment. The practice in these cases was to discharge the dogs two days after the treatment because they appeared to recover well after the procedure, with minimal morbidity. It might be prudent, however, to hospitalise animals for at least five days after each treatment so that this complication can be recognised early and treated.

The post-mortem examination of case 5 was interesting (Table 3). Despite the fact that the original tumour was diagnosed histologically as a benign adenomatous polyp and endoscopic treatment eliminated it from the rectum itself, there was evidence of malignancy locally. It may be that before elimination, this tumour underwent malignant change and spread locally outside the rectum or that it was malignant at presentation. Only one biopsy was taken from each tumour, and especially in the case of large neoplasms, this may not have been representative of the tumour as a whole. With the exception of case 5 (Table 3), further histopathology was not performed in animals in which clinical signs recurred to determine if the disease had changed and the effects of cautery on the rectum. In previous studies, several authors have noted the inaccuracy of presurgical biopsies in some instances and the possibility of benign rectal neoplasms undergoing malignant change (Holt and Lucke 1985, Giaullieri and Monzeglio 1996, Valerius and others 1997, Danover and others 2006).

**Conclusions**

Transanal endoscopic treatment can be recommended as an alternative to radical, full-thickness rectal excision for the management of severe but benign canine rectal neoplasia. Owners should be informed that the treatment may be palliative rather than curative and that complications, if occur, can be fatal. Dogs should be hospitalised for at least five days after treatment and observed for signs of potentially fatal complications such as rectal perforation.

**Acknowledgements**

The author is grateful to the anaesthetists and the nurses who assisted in the management of these cases and to the Department of Clinical Veterinary Science pathologists and veterinary colleagues in practice who performed post-mortem examinations. The author thanks John Conibear and Tracey Dewey for photographic assistance. Special thanks are due to Mr Paul Durdey for instruction in the technique used in these animals and to Mr Paddy Smith for the permanent loan of the resectoscope equipment.

**References**


Table 5. Summary of the extent of neoplasia (expressed as mean±sem) in relation to the response to treatment

<table>
<thead>
<tr>
<th>Response to treatment</th>
<th>n</th>
<th>Caudal extent of tumour</th>
<th>Cranial extent of tumour</th>
<th>Length of rectum affected (L)</th>
<th>Percentage of circumference affected (per cent)</th>
<th>L×%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cured</td>
<td>5</td>
<td>5.9±1.45</td>
<td>10.6±0.60</td>
<td>4.7±1.32</td>
<td>65±0.15</td>
<td>330±138.39</td>
</tr>
<tr>
<td>Palliative</td>
<td>3</td>
<td>4.7±1.33</td>
<td>13.3±1.20</td>
<td>8.7±2.33</td>
<td>63±0.16</td>
<td>783±303.22</td>
</tr>
<tr>
<td>Poor</td>
<td>5</td>
<td>9.8±1.77</td>
<td>14.0±1.67</td>
<td>4.2±0.97</td>
<td>74±0.11</td>
<td>310±87.86</td>
</tr>
</tbody>
</table>
Transanal endoscopic treatment of benign canine rectal neoplasia


SEILER, R. J. (1979) Colorectal polyps of the dog: a clinicopathologic study of 17 cases. Journal of the American Veterinary Medical Association 174, 72-75
