Surgical Procedures for Digestive Fistulae Caused by Radiation Therapy

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Abstract

Purpose. We evaluated the effectiveness of surgery to treat ileal fistulations associated with radiation exposure.

Subjects. An ileal fistula developed in eight patients, 13–102 months after 60 Gy of irradiation to the pelvic cavity, given as initial treatment or supportive therapy following resection of the primary tumor. The underlying diseases were cervical cancer in seven women and bladder cancer in one man.

Results. Two patients had an ileorectal fistula, two had an ileosigmoidal fistula, three had an ileovesical fistula, and one had an ileourethral fistula. We performed a partial enterectomy in one patient, a simple bypass operation without exclusion in one, and bypass operations with exclusion in the other six. Intestinal expansion in the exclusion site occurred in one patient, but there were no other complications related directly to surgery, such as sutural insufficiency. The patient who underwent a simple bypass operation died of emaciation 2 months after the surgery, but all of the other patients were discharged capable of oral ingestion.

Conclusion. Our findings showed that surgery was beneficial for alleviating the various conditions related to digestive fistulation following radiation therapy.

Keywords Radiation enteritis · Fistula · Surgical procedure

Introduction

Radiation therapy is commonly used in the treatment of malignant tumors, including cervical cancer, and has made it possible to control their growth. However, complications associated with radiation exposure that require surgical treatment frequently develop in the normal surrounding organs of the digestive and/or urinary tract.1–3 Among these complications, ileal fistulae are a major concern, and the selection of surgical procedures is worthy of investigation. We evaluated the effectiveness of various surgical procedures for ileal fistulations associated with radiation exposure.

Subjects and Methods

Eight patients with ileocolonic or ileourinary fistulation that developed after radiation therapy were enrolled in this study (Table 1). The underlying diseases were cervical cancer in seven women and bladder cancer in one man. All of the patients had received irradiation of about 60 Gy to the pelvic area, either as initial treatment or as adjuvant therapy following resection of the primary cancer, and an ileal fistula developed 13–102 months later.

Results

An ileorectal fistula developed in two patients, an ileosigmoid fistula developed in two, an ileovesical fistula developed in three, and an ileourethral fistula developed in one. We performed a partial enterectomy for the fistula in one patient, a simple bypass operation without exclusion in one, and bypass operations with exclusion in the other six. Since an expansion of the excluded intestine developed as a complication in one patient, additional enterostomy was performed for decompression in three subsequent patients. No complications directly related to surgery, such as sutural insufficiency, developed. The patient who underwent a simple bypass operation died of debilitation 2 months later.
postoperatively, but all other patients were discharged tolerating an ordinary diet.

Discussion

The severity of complications was graded, and fistulae due to radiation exposure were ranked as grade 4, defined as complications requiring surgical intervention. There was a high incidence of rectal injury such as rectovaginal fistula, but ileal fistulation, perforation, and narrowing were also identified in many patients, as we previously reported.

Rectal and/or urinary complications develop in many patients, requiring further operations such as colostomies or urostomies. Therefore, careful consideration is needed for selecting appropriate surgical procedures. The eight patients enrolled in this study each had 0–3 stomas, making a collective total of 15 stomas. We anticipated that postoperative complications such as sutural insufficiency might have been caused by slow healing of the surrounding supportive tissue, contracture of the rectus muscle of the abdominal wall, or subcutaneous panniculitis in the lower abdomen. However, apart from the patient who died during hospitalization, all patients recovered well.

Enterectomy is the simplest surgical procedure for fistulae; however, since abruption is a problem, bypass operations with exclusion have been used for many patients. Ishibashi et al. reported the case of a patient with an ileovesical fistula that developed after treatment of cervical cancer with irradiation. A segmental resection of the ileum with partial cystectomy was performed, but she died of a major postoperative complication. They recommended using palliative procedures, such as bypass operations, for similar conditions.

Expansion of the excluded intestine, caused by insufficient decompression, occurred in one patient, which indicated that we should select surgical approaches that allow for appropriate decompression. However, a stoma is needed for decompression, and the quality of life (QOL) of these patients inevitably declines. Beer et al. warned that if more than 1 m of ileum was resected, malabsorption would become evident in the patient with radiation enteritis. Thus, we must also consider nutrition after the exclusion of a long length of ileum. Fortunately, the survivors in this series required no special nutritional support.

In conclusion, surgical intervention is beneficial for various conditions related to digestive fistulation following radiation therapy; however, better management is required to improve the QOL.

Table 1. Clinical characteristics and outcome of the eight patients with digestive fistula involving the ileum

<table>
<thead>
<tr>
<th>No.</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Primary lesion</th>
<th>Radiation therapy</th>
<th>Fistula; ileum to</th>
<th>Surgical procedure</th>
<th>Total number and types of stoma</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>60</td>
<td>F</td>
<td>Cervical cancer</td>
<td>Initial therapy</td>
<td>Sigmoid colon</td>
<td>Partial enterectomy</td>
<td>0</td>
<td>Alive (216 months)</td>
</tr>
<tr>
<td>2.</td>
<td>70</td>
<td>F</td>
<td>Cervical cancer</td>
<td>Initial therapy</td>
<td>Urinary bladder</td>
<td>Bypass and exclusion</td>
<td>2: Tr. colostomy, ureterostomy</td>
<td>Alive (58 months)</td>
</tr>
<tr>
<td>3.</td>
<td>60</td>
<td>F</td>
<td>Cervical cancer</td>
<td>Initial therapy</td>
<td>Urinary bladder</td>
<td>Bypass</td>
<td>2: Tr. colostomy, ureterostomy</td>
<td>Died of primary cancer after 2 months</td>
</tr>
<tr>
<td>4.</td>
<td>30</td>
<td>F</td>
<td>Cervical cancer</td>
<td>Adjuvant therapy</td>
<td>Sigmoid colon</td>
<td>Bypass and exclusion</td>
<td>2: Tr. colostomy, nephrostomy</td>
<td>Alive (72 months)</td>
</tr>
<tr>
<td>5.</td>
<td>59</td>
<td>F</td>
<td>Cervical cancer</td>
<td>Adjuvant therapy</td>
<td>Rectum</td>
<td>Bypass and exclusion</td>
<td>1: Sig. colostomy</td>
<td>Alive (30 months)</td>
</tr>
<tr>
<td>6.</td>
<td>54</td>
<td>F</td>
<td>Cervical cancer</td>
<td>Initial therapy</td>
<td>Rectum</td>
<td>Bypass and exclusion</td>
<td>3: Tr. colostomy, ureterostomy for decompression</td>
<td>Alive (42 months)</td>
</tr>
<tr>
<td>7.</td>
<td>71</td>
<td>F</td>
<td>Cervical cancer</td>
<td>Initial therapy</td>
<td>Urinary bladder</td>
<td>Bypass and exclusion</td>
<td>2: Ureterostomy, enterostomy for decompression</td>
<td>Died of cerebral infarction after 5 months</td>
</tr>
<tr>
<td>8.</td>
<td>67</td>
<td>M</td>
<td>Urinary bladder cancer</td>
<td>Adjuvant therapy</td>
<td>Urethra</td>
<td>Bypass and exclusion</td>
<td>3: Ureterostomy X 2, enterostomy for decompression</td>
<td>Died of primary cancer after 8 months</td>
</tr>
</tbody>
</table>

Tr., transverse colon; Sig., sigmoid colon