Mini review

Total pelvic exenteration for locally advanced rectal cancer
- a mini review

Kazuo Narushima, Keiji Koda*, Chihiro Kosugi, Hiroaki Shimizu, Masato Yamazaki, Kiyohiko Shuto, Mikito Mori, Isamu Hosokawa, Masafumi Fujino

Departments of Surgery, Teikyo University Chiba Medical Center, Ichihara, Chiba, Japan

*Corresponding author: Keiji Koda, MD, PhD, Department of Surgery, Teikyo University Chiba Medical Center, 3426-3 Anesaki, Ichihara, Chiba 299-0111, Japan, Tel: +81-436-62-1211; Fax: +81-436-61-3961; E-mail: k-koda@med.teikyo-u.ac.jp

Introduction

The treatment strategy for locally advanced middle to lower rectal cancer may differ depending on the tumor spread and/or by country. In the European Society for Medical Oncology guidelines, preoperative treatment is recommended in case a clear circumferential margin is threatened by local tumor extension [1]. The National Comprehensive Cancer Network guideline also recommends that patients receive a preoperative treatment combination of chemotherapy and radiotherapy (CRT), followed by transabdominal resection when a clear circumferential margin is anticipated [2]. If resection is still contraindicated on completion of CRT, additional systemic chemotherapy is recommended [2].

Meanwhile, tumors extending beyond the total mesorectal excision (TME) plane may be suitable for a multivisceral approach if a complete resection (R0) is achievable [3-5]. An R0 resection is thought to be the most important predictor of outcome after surgery for rectal cancer, and surgery needs to be undertaken with the intention of achieving histologically clear resection margins [4-7]. In Japan, total pelvic exenteration (TPE) is widely performed for clinical T4b middle to lower rectal cancer, and favorable results have been reported. In this mini review, we performed a literature search of the outcome of patients who received TPE for locally advanced rectal cancer to evaluate the clinical importance of TPE.

Lateral pelvic lymph node metastasis and chemoradiotherapy

The en bloc resection of lateral pelvic lymph nodes (LLN) is often part of the procedure in the recent surgical approach of TPE [8]. It is reported that the incidence of LLN metastasis from rectal cancers located below the peritoneal reflection are 7.7% in T3, 18% in T4a, and 29% in T4b tumors [9]. Because the typical indication of TPE is clinically T4b middle to lower rectal cancer, it seems reasonable to include en bloc lateral lymph node dissection (LLND) in the TPE procedure. It is reported that the LLND together with TME for LLN metastasis-positive rectal cancers yielded similar postoperative prognosis to those that did not have swollen lymph nodes and on which TME alone was performed [10]. Whether CRT can be substituted for LLND in patients with histologically proven LLN metastases has not yet been determined. However, recent studies have shown that even after CRT, approximately half the patients who had initially been diagnosed as having LLN metastases still have pathologically proven metastasis-positive lymph nodes when they undergo LLND [11]. It is also reported that the swelling of LLN before CRT indicates a high risk of postoperative local recurrence in the LLN area [12]. These reports suggested that LLND is necessary in TPE, although the oncological benefit has not been elucidated [13].

Indication of TPE

In locally advanced colorectal cancer, TPE is indicated when massive direct cancer invasion to the vesical triangle or the neighboring area, such as the prostate, seminal vesicle, or ureters adjacent to the triangle, is strongly suspected pre- or intraoperatively so that urinary diversion is necessary [8]. In most cases, tumors with distant metastasis are contraindicated [14].
Surgical procedure for TPE

The extended surgical management of locally advanced and locally recurrent rectal cancers has developed since the pelvic exenteration for cervical cancer was first described in 1948 [15]. TPE involves the removal of all the internal pelvic organs. The anal sphincter muscles are often removed following an abdominoperineal resection. In females, hysterectomy and oophorectomy are also part of the procedure. The construction of two stomas for fecal and urinary excretion is usually necessary, although there are some exceptional efforts in which either defecatory or urinary functions are reconstructed following TPE [8,16]. The long term functional outcome of these cases has not been reported. To obtain the clear pathological margin, layer oriented en bloc resection, including LLND, has been proposed [8,17] for a better prognosis. Laparoscopic TPE has been performed safely in an advanced facility [18], and robotic TPE for rectal cancer has also begun [19].

Surgical outcome of TPE

Total pelvic exenteration is an aggressive surgical procedure that is associated with high mortality and morbidity. Among 17 original articles on TPE for rectal cancer that were published from 1985 to 2016, surgical morbidity ranged from 17.8% [20] to 77.8% [21] with a median morbidity rate of 40% [22]. Surgical mortality ranged from 0% to 13.3% [21] with median mortality rate of 2.2% [23]. These surgical complications depend highly on patient selection; especially, TPE for local recurrent cases is technically difficult and should be associated with

Table 1. Reviewed reports on pelvic exenteration.

<table>
<thead>
<tr>
<th>First author / year</th>
<th>Tumor status</th>
<th>Ope. method (TPE/other)</th>
<th>Morbidity (%)</th>
<th>Mortality (%)</th>
<th>5-year OS (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takagi (14)/ 1985</td>
<td>primary 13</td>
<td>13/0</td>
<td>NR</td>
<td>7.7</td>
<td>38.5</td>
</tr>
<tr>
<td>Shirouzu (29)/ 1996</td>
<td>recurrent 9</td>
<td>26/0</td>
<td>31</td>
<td>8</td>
<td>Stage II 71</td>
</tr>
<tr>
<td>Hida (30)/ 1998</td>
<td>primary 50</td>
<td>30/20</td>
<td>22</td>
<td>6</td>
<td>Stage III 0</td>
</tr>
<tr>
<td>Adachi (26)/ 1999</td>
<td>primary 0</td>
<td>6/3</td>
<td>44</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>Yamada (25)/ 2002</td>
<td>recurrent 22</td>
<td>55/9</td>
<td>55</td>
<td>1.6</td>
<td>Dukes B, 74.1; Dukes C, 47.4; recurrent (curative), 22.9; recurrent (palliative), 0</td>
</tr>
<tr>
<td>Ike (21)/ 2003</td>
<td>primary 0</td>
<td>45/0</td>
<td>77.8</td>
<td>13.3</td>
<td>14.1 (curative, 31.6; non-curative 7.8)</td>
</tr>
<tr>
<td>Ike (28)/ 2003</td>
<td>primary 71</td>
<td>71/0</td>
<td>66.2</td>
<td>1.4</td>
<td>54.1 (T3, 65.7; T4, 39)</td>
</tr>
<tr>
<td>Saito (24)/ 2003</td>
<td>primary 0</td>
<td>19/24</td>
<td>64</td>
<td>15.8</td>
<td>39 (curative)</td>
</tr>
<tr>
<td>Moriya (31)/ 2004</td>
<td>primary 0</td>
<td>57/0</td>
<td>58</td>
<td>3.5</td>
<td>36 (DSS)</td>
</tr>
<tr>
<td>Takeuchi (22)/ 2005</td>
<td>primary 15</td>
<td>15/0</td>
<td>33.3</td>
<td>0</td>
<td>54.7</td>
</tr>
<tr>
<td>Ishiguro (23)/ 2009</td>
<td>primary 93</td>
<td>83/10</td>
<td>41</td>
<td>2.2</td>
<td>52</td>
</tr>
<tr>
<td>Nishio (32)/ 2009</td>
<td>primary 12</td>
<td>25/0</td>
<td>NR</td>
<td>12</td>
<td>36</td>
</tr>
<tr>
<td>Domes (33)/ 2011</td>
<td>primary 24</td>
<td>28/0</td>
<td>&gt;35.7</td>
<td>3.6</td>
<td>75.1 (3-year OS)</td>
</tr>
<tr>
<td>Nielsen (34)/ 2012</td>
<td>primary 50</td>
<td>90/0</td>
<td>61</td>
<td>5.6</td>
<td>46 (primary)</td>
</tr>
<tr>
<td>Uehara (35)/ 2015</td>
<td>primary 0</td>
<td>30/5</td>
<td>&gt;40</td>
<td>0</td>
<td>76.3 (3-year OS)</td>
</tr>
<tr>
<td>Radwan (20)/ 2015</td>
<td>primary 174</td>
<td>78/96</td>
<td>17.8</td>
<td>1.1</td>
<td>59.3 (R0)</td>
</tr>
<tr>
<td>Koda (8)/ 2016</td>
<td>primary 23</td>
<td>23/0</td>
<td>NR</td>
<td>0</td>
<td>82.3</td>
</tr>
</tbody>
</table>

*TPE with sacrectomy; OS=overall survival; NR=not reported; DSS=disease specific survival;
higher rate of surgical complications [21,24-27]. The cumulative 5-year survival rate ranged from 14.1% [21] to 82.3% [8] with a median value of 52% [23]. The survival rates differ significantly according to tumor stage, lymph node metastases and patient selection. The prognosis of T3 tumors is much better than T4 [28], where the 5-year survival rate of patients with resected T3 tumors was 65.7% and 39% in patients with resected T4 tumors. In addition, negative lymph node metastasis is associated with better prognosis [8, 25, 29, 30]. Palliative pelvic exenteration may be considered; however, the surgical prognosis is not satisfactory, with a 1-year mortality rate of 31% and median survival time of 24 months [27].

Conclusion

For rectal cancer extending beyond the TME layer, TPE is a possible option for cure, although it is associated with high morbidity and mortality. LLND should be part of the TPE procedure because the incidence of metastasis in the LLN area is high in rectal cancer, which is indicative of TPE. In that case, en bloc resection together with other resected organs should be ideal. Whether TPE, chemoradiotherapy, or combination of these two should be selected remains to be seen in the treatment strategy of locally advanced rectal cancer.

References

2. NCCN guideline Rectal Cancer Version 1.2018 [Internet].

