Blood Transfusion Rates and Morbidity of Extended Systematic Lymph Node Dissection in Rectal Cancer Surgery

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Abstract;

Objectives Extended systematic lymph-node dissection (ESLND) is a surgical procedure aimed at decreasing the local recurrence rate of rectal cancer and increasing the survival rate. However, it is criticized because it has not shown the expected effects on survival, and it has been shown to increase the proportion of complications in rectal cancer surgery. This study was designed to determine incidence and patterns of blood loss and complications during curative resection with or without ESLND for rectal cancer.

Materials and Methods; A total of 184 patients with rectal cancer were reviewed with respect to surgical procedures, blood loss, complications, duration of procedures, and survival rates.

Results: ESLND in rectal cancer surgery extends the operation time by an average of 104 minutes. The average blood loss in patients not receiving ESLND is 775 ± 90 ml; while that of patients receiving the treatment is 794 ± 36 ml ($p<0.05$). The ratio of patients needing transfusion was 27.4% for those not receiving ESLND and 37.5% for those receiving the treatment ($p<0.05$).

Conclusion: Operative time and blood loss in patients who underwent ESLND were much greater than conventional resection without ESLND. The morbidity of ESLND, carried out in order to reduce the local recurrence rate and increase the survival rate, needs to be taken into consideration; and the treatment should not be a routine procedure in rectal cancer surgery.

Key words: Rectal cancer, Extended systematic lymph-node dissection, Blood transfusion

Rektum Kanseri Cerrahisinde Genişletilmiş Sistematik Lenf Diseksiyonu Morbiditesi ve Kan Transfüzyon Oranları

Özet;

Amaç: Rektum kanseri tedavisinde, genişletilmiş sistematik lenf nodu diseksiyonu (ESLND) sağkalım süresini uzatmayı ve lokal nüks oranını azaltmayı hedefleyen bir girişimdir. Ne var ki, bu yöntem, sağkalım üzerine beklenen etkileri göstermemesi ve cerrahi komplikasyon oranlarını arttırtırması nedeniyle eleştirilmektedir. Bu çalışmada rektum kanseri nedeniyle küratif cerrahi girişim uygulanan hastalarda ESLND yapılması ve yapılmaması durumunda kan kaybı miktarı, komplikasyonların insidansı ve çeşitliliğinin belirlenmesi amaçlanmıştır.

Gereç ve Yöntem; Rektum kanserli 184 hastaya uygulanan cerrahi işlemler kan kaybı, komplikasyonlar, işlemlerin süresi ve sağkalım oranları yönünden incelendi.

Bulgular: Rektum kanseri cerrahisinde ESLND'nin operasyon süresini ortalama 104 dakika uzattığı; peroperatif ortalama kan kaybının ESLND uygulanmayan hastalarda 775 ± 90 ml iken, uygulanan hastalarda 794 ± 36 ml ($p<0.05$) olduğu gözlendi. Transfüzyon ihtiyacı olan hasta oranınını ESLND uygulanan grupta %37.5 iken, uygulanmayan grupta %27.4 olduğu görüldü ($p<0.05$).

Sonuç: ESLND uygulanan hastalarda, klasik rezeksiyonlara göre operasyon süresi ve kan kaybı miktarı daha fazla idi. Rektum kanserinin tedavisinde lokal nüksü azaltma ve sağkalım süresini uzatılması için yapılan ESLND, morbiditesi dikkate alınarak ihtiyaçlara göre uygulanmalı ve rutin bir tedavi yöntemi olmamalıdır.

Anahtar kelimeler: Rektum kanseri, Genişletilmiş sistematik lenf nodu diseksiyonu, Kan transfüzyonu

Introduction:

Extended lymph node dissection as an addition to the conventional radical surgical approach to rectal cancer was first defined in the 1950s as abdomino-pelvic lymph-node dissection by Deddish and Sauer.[1,2] The authors reported that extended lymph-node dissection reduced the local recurrence of rectal cancer and increased the survival rate over 5 years by 5-8%.[1,2] However, studies published later showed that extended lymphadenectomies increased that rate of complications in rectal surgery and that it was not as effective as expected on the local recurrence of the disease.[3,4] For many years, extended lymph-node dissection was not performed except for in a few centres. In the 1980s, Moriya et al. defined the technical details of extended systematic lymph-node dissection (ESLND) and standardized the procedure as lateral lymph-node dissection.[5] In certain oncological surgery centers, especially Japan, ESLND is still carried out as a curative radical surgical treatment for rectal cancer. In this retrospective study, the effect of ESLND, carried out as a curative surgical treatment of rectal cancer, on bleeding, other complications and survival was evaluated.

Materials and Methods

A retrospective review of 184 patients with rectal cancer operated on by one group surgeons from 1995 to 2002 was conducted. To assess the role of ESLND twenty-four patients who underwent the procedure were reviewed with respect to surgical procedures, blood loss, complications, duration of

procedures, and survival rates and compared with 146 who had conventional resection of rectal cancer without ESLND. This technique of ESLND is in accordance with Moriya's surgical principles of LND.[6] The controls and follow up of the patients were carried out through face-to-face meetings at the polyclinic or by telephone. Variables recorded included age, gender, blood loss, operating time and survival rates. Overall survival and pattern of recurrence were documented. Clinical outcome was assessed every 6 months during the first two years by measuring serum concentration of CEA, CA-19-9 levels, and chest x-ray, colonoscopy, ultrasonography and computerized tomography. The disease free 5-year survival rates after curative surgery were calculated by the Kaplan-Meier method.

Results

The ages of the 184 patients (101 male and 83 female) who took part in the study, varied between 21 and 90, with an average of 57.04 ± 13.09. The age of the male rectal cancer patients was 58.7 ± 11.8; while the average age of the female patients was 54.9 ± 14.2. Eighty-six (54%) of the patients in Group I were male, and 74 (46%) female; while 15 (63%) of those in Group II were male and 9 (36%) female. The average age of patients in Group I was 57.7 ± 12.9, while that of those in Group II 52.2 ± 13.5 (p>0.05).The average follow up time was 32.4 ± 22.4 months. The most frequently occurring symptom in the preoperative period was rectal haemorrhage (87%), then tenesmus (58%). The 160 patients in Group I were given abdomino-perineal resection (APR), low anterior resection (LAR) and other surgical procedures; while the patients in Group II were given ESLND treatment in addition to these conventional operations.

The patients were classified according to the abdominal CT findings, and the distribution is shown in table 1. The median survival of early stage patients (Stages A and B) was 73.57 months; while that of late stage patients (Stages C and D) was calculated at 43.1 months (p<0.05).

The surgical procedures administered to the patients are given in table 2, anterior resection with a low or ultra-low end-to-end anastomosis was carried out in 84 (45%) patients and APR was carried out in 72 (39%) patients.

From Group I, one patient who had received local excision; one patient who had had pelvic exenteration; two patients who had had total proctocolectomy because of cancer related to ulcerative colitis; and ten patients who had had palliative colostomy (a total of 14 patients) were excluded from the study, leaving 146 patients in Group I (see table 2). No patients were excluded from Group II.

When the groups are evaluated in terms of length of operation, the average operation time for all patients was found to be 253 ± 71 minutes: 206 ± 74 minutes for Group I and 310 ± 59 minutes for Group II. The addition of ESLND was shown to increase the operation time by up to 104 minutes.

The number of patients who developed complications as a result of the operation during the operation period was nineteen. These patients displayed thirty complications. The most frequently occurring complication observed in both groups during the operation was bleeding (18% in Group I and 21% in Group II). The distribution of complications identified in the two groups is given in table 3.

The amount of blood lost during operation was an average of 775 ± 90ml for Group I, and 794 ± 36 ml for Group II. Forty-nine patients were given a blood transfusion during the operation because of serious blood loss. The number of patients given blood transfusions and the amounts of transfusion are given in table 4.

While the median survival of patients not receiving a blood transfusion during the operation was 62.29 months; that of the patients receiving transfusion was 29.03 months. The difference between the two groups was statistically significant (p<0.01). Thirty-six patients were given a blood transfusion in the postoperative period due to various anemias. The amount of blood transfused was less than three units for twenty-four patients, and three units or more for twelve. The indication for transfusion in eleven of these patients was postoperative bleeding; and anemia due to various reasons in twenty-five.

Thirty different complications were observed in the patients during the postoperative period, and the total number of complications was sixteen. The distribution of the various complications which arose in the patients both receiving and not receiving ESLND is given in table 5. No significant difference was found between the groups in terms of postoperative complications.

Table 1. Staging of the patients according to the abdominal CT

Stage(Astler-Coller)	Gr I (n=160)	Gr II (n=24)	Total (n=184)
A	2	1	3
B	59	8	67
C	81	10	91
D	18	5	23

Orijinal Makale

Table 2. The underwent surgical procedures in Group I and Group II patients

Surgical procedures	Gr I (n=160)	Gr II (n=24)	Total (n=184)
LAR	71 (44%)	13 (54%)	84(45%)
APR	64 (40%)	8(33%)	72(39%)
Anterior resection	11 (6%)	3 (13%)	14(8%)
Simple colostomy	10 (6%)	0	10(5%)
Total proctocolectomy	2 (1%)	0	2(1%)
Pelvic exenteration	1 (0.5%)	0	1(1%)
Local excision	1 (0.5%)	0	1 (1%)

Discussion

In the present series, the age at which rectal cancer is seen, the tumor stages, and the clinical symptoms are in keeping with the results of other studies.[7,8,9] As in other series, a large majority of the patients are in stage B and C.

On investigation of the curative surgical procedures performed on the patients, the most important factor in determining the choice between APR or sphincter saving procedure (SSP) was observed to be the level of localization of the tumor on the rectum.[7,10,11] The rate of performance of SSP in the current study was 52% for Group I and 67% for Group II, and the distribution is directly related to the level of tumor localization in the patients. The average length of operation time for extended lymphadenectomy carried out in cases of rectal cancer is reported to be between 288 and 312 minutes.[12,13] In the present series, the average length of operation was 206±74 minutes. ESLND was shown to increase the average length of operation by 104 minutes. This drawback should be brought to mind when evaluating the effect of lymphatic dissection on survival.

As can be seen in table 3, when investigating whether or not ESLND increases operative complications, bleeding and other intraoperative and postoperative complications are seen to increase. Similar to other studies; the current study reports an increase in the rate of bleeding and anastomotic leak.[11]

The need for transfusion as a result of intraoperative and postoperative blood loss increases. In the series published by Hojo et al, the average amount of blood lost was 1500ml, and 630 ml in Enker's series.[10,11] In the current series, the amount of blood lost during the operation was 775±90 ml for Group I, and 794±36 ml for Group II. In our study, about 1/3 of the patients receiving ESLND were given a blood transfusion. The increase in the amount of blood lost and necessity for blood transfusion is an important disadvantage of ESLND.

While the median survival for patients who did not receive intraoperative blood transfusion was 62.29 months; the survival of those receiving blood transfusions is statistically significantly decreased to 29.03 months (p<0.01). Based on these findings, it can be said that the life span of patients receiving blood transfusion is reduced, and that this effect is more prominent as the amount of transfusion increases. There is little information in the literature about the decrease in the survival rate of patients given blood transfusions.[13] However, in order to answer the question of whether the assumed factor influencing survival is the transfusion itself or the reasons behind the indications of the transfusion causing the bleeding, it is necessary to perform studies on and analyze effective factors with wider, randomized series.

In the postoperative period, 36 patients were given blood transfusions for various reasons. In eleven of these, the indication for transfusion was postoperative bleeding. No effect of the blood transfusion on the cumulative survival was observed (p>0.05).

Apart from bleeding, other complications such as anastomosis leak, fistula, ileus and wound infections were seen in both groups in the postoperative period after surgical treatment for rectal cancer. Postoperatively anastomosis occurred in six patients from the first group and three from the second group. Apart from anastomosis leak, no other intraoperative or postoperative complication was found to be influential statistically on prognosis, and it was determined that ESLND increased the risk of anastomosis leak (see table 5).

As a conclusion; we think that ESLND is indicated in cases of locally advanced rectal cancer. ESLND could be a complex and long operation according to the conventional LAR and APR. Operative time and blood loss in patients who underwent ESLND were much greater than conventional resection without ESLND. A similar trend was observed in regard to blood loss. The differences in operation time and blood loss between the two groups were statistically significant. The morbidity of ESLND, carried out in order to reduce the local recurrence rate and increase the survival rate, needs to be taken into consideration; and the treatment should not be a routine procedure in rectal cancer surgery

Table 3. Operative complications

Operative complications	Gr I (n=146)	Gr II (n=24)	Total (n=170)
Bleeding from presacral veins	4	2	6
Other serious bleedings	16	3	19
Anastomotic insufficiency	4	1	5
Total	24	6	30

Table 4. Blood transfusion during intraoperative period

Transfused blood	Gr I (n=146)	Gr II (n=24)	Total (n=170)
1 Unit	18	2	20
2 Units	10	5	15
3 Units	7	1	8
$\geq$ 4 Units	5	1	6
Total	40	9	49

Table 5. Postoperative complications

Complications	Gr I (n=146)	Gr II (n=24)	Total (n=170)
Wound infection	16	3	19
Postop. bleeding	11	-	11
Anastomotic leakage	6	3	9
Intestinal fistula	6	1	7
Ileus	6	1	7
Colostomy problems	7	-	7
x^2:0.71		**p:0.39**	

References

1. Deddish MR. 1951. Abdominopelvic lymph-node dissection in cancer of the rectum and distal colon.Cancer;4:1364

2. Sauer I, Bacon HE. 1952. A new approach for excision of carcinoma of the lower portion of the rectum and anal canal. Surg Gynecol Obstet;95:229

3. Hafner GH, Herrera L, Peterelli N. 1992. Morbidity and mortality after pelvic exenteration for colorectal adenocarcinoma. Ann Surg;215:63-7

4. Devine RM, Dozois RR. 1992. Surgical management of locally advanced adenocarcinoma of the rectum. World J Surg;16:486-9

5. Moriya Y, Hojo K. Sawada T. Koyama Y. 1989. Significance of lateral node dissection for advanced rectal carcinoma at or below the peritoneal reflection. Dis Colon Rectum;32:307-15

6. Moriya Y. 1993. Pelvic node dissection with autonomic nerve sparing for invasive lower rectal cancer. Japanese experience. In: Wanebo HJ.ed. Colorectal cancer. St.Louis:Mosby:274

7. Michelassi F, Block GE, Vannucci L, Montag A, Chapell R. 1988. A-5 to 21-year follow-up and analysis of 250 patients with rectal adenocarcinoma. Ann Surg;208:379-89

8. Burgos FJ, Romero J, Fernandez E, Perales L, Tallada M. 1988. Risk factors for developing voiding dysfunction after abdominoperineal resection for adenocarcinoma of the rectum. Dis Colon Rectum;31:682-5

9. Maas CP, Moriya Y, Steup WH, Kiebert GM, Kranenbarg WMK, Velde CJH. 1998. Radical and nerve-preserving surgery for rectal cancer in the Netherlands: a prospective study on morbidity and functional outcome. Br J Surg;85:92-7

10. Enker WE, Heilweil ML, Hertz REL, Pilipshen SJ, Stearns MW, Sternberg SS, Janov AJ. 1986. En bloc pelvic lymphadenectomy and sphincter preservation in the surgical management of rectal cancer. Ann Surg;203:426-33

11. Hojo K. Sawada T. Moriya Y. 1989. An analysis of survival and voiding, sexual function after wide iliopelvic lymphadenectomy in patients with carcinoma of the rectum, compared with conventional lymphadenectomy. Dis Colon Rectum;32:128-33

12. Enker WE. 1992. Potency, cure and local control in the operative treatment of rectal cancer. Arch Surg;127:1396-1402

13. Billingham RP. 1994. Extended lymphadenectomy for rectal cancer; cure vs quality of life. Int Surg;79:11-22

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