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RESEARCH ARTICLE

Evaluation of Colorectal Cancers in Terms of Diagnosis and Treatment Processes

Kolorektal Kanserlerin Tanı ve Tedavi Süreçleri Açısından Değerlendirilmesi

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ABSTRACT

Aim: In this study, it was aimed to compare the results of preoperative clinical staging with pathological staging determined in postoperative resection material in colorectal cancers.

Method: The medical data of 86 patients who were operated for colorectal tumor between January 2013 and October 2020 were retrospectively evaluated. Demographic characteristics of the patients, American Society of Anesthesiology score, presence of comorbidity, tumor location, whether preoperative endoscopy was performed, emergency or elective operation, open or laparoscopic surgery, type of surgery, presence of ostomy, morbidity and mortality, pathological diagnosis, radiological and pathological staging informations were recorded and analyzed.

Results: The most common comorbidity in the study was hypertension, and most of the tumors (36.0%) were located in the sigmoid region. Elective surgery was performed in 66.3% of the patients, resection and primary anastomosis were performed in 76.8% of the patients. Ostomy was created in 85% of the patients over the age of 65. In 82.5 of the patients, the pathological diagnosis was non-mucinous low-grade adenocarcinoma, however, according to the pathological and radiological tumor stage at diagnosis staging, 9 out of every 10 patients were in Stage 2 and Stage 3.

Conclusion: Radiological staging in the preoperative period is compatible with the pathological staging in the postoperative period.

Keywords: Colon, colorectal cancer, surgery, tumor stage, pathological staging, laparoscopy

ÖZ

Amaç: Kolorektal kanserlerde preoperatif klinik tanı ve postoperatif rezeksiyon piyesinde belirlenen patolojik evreleme sonuçlarının karşılaştırılması amaçlanmıştır.

Yöntem: Ocak 2013-Ekim 2020 yılları arasında kolorektal tümör tanısı nedeniyle opere edilen 86 hastanın medikal verileri retrospektif olarak değerlendirildi. Hastaların demografik özellikleri, Amerikan Anesteziyoloji Derneği skoru, komorbidite varlığı, tümör lokalizasyonu, preoperatif endoskopi yapılıp yapılmama durumu, operasyonun acil veya elektif yapılması, operasyonun açık veya laparoskopik yöntemle oluşu, operasyon şekli, ostomi varlığı, morbidite ve mortalite, patolojik tanı, radyolojik ve patolojik evrelemesi bilgileri kaydedilip incelendi.

Bulgular: Araştırmada en sık komorbidite hipertansiyon olup, tümörlerin büyük kısmı (%36,0) sigmoid bölgede yerleşmiştir. Olguların %66,3'üne elektif operasyon uygulanmış, hastaların %76,8'ine rezeksiyon ve primer anastomoz yapılmıştır. Altmış beş yaş üzerindeki olguların %85'ine ostomi açılmıştır. Olguların %82,5'inde patolojik tanı non-müsinöz düşük derece adenokarsinom olup, yaklaşık her 10 olgudan 9'u patolojik ve radyolojik TNM evrelemesine göre Evre 2 ve Evre 3'te idi.

Sonuç: Preoperatif dönemde radyolojik evreleme, postoperatif dönemdeki patolojik evreleme ile uyumludur.

Anahtar Kelimeler: Kolon, kolorektal kanser, cerrahi, tümör evresi, patolojik evreleme, laparoskopi

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Introduction

Colorectal cancers (CRCs) are among the most common tumors in the gastrointestinal tract and are common in Turkey as well as in the rest of the world. In Turkey, it is the most common type of cancer in women and the fourth most common in men.[1]

The majority of CRCs are distally located, and the incidence is higher in men.[2,3] Anamnesis, physical examination (rectal examination), radiology and endoscopic evaluation (such as localization, passage) are important in the diagnosis process and clinical staging of the disease. Tumor stage at diagnosis (TNM) is one of the most important prognostic factors in CRC.[3,4,5] Regional lymph node metastasis is one of the most important parameters in determining treatment and prognosis in CRC. Presence of involvement of lymph nodes affects CRC staging, scope of operation and choice of postoperative oncological treatment. Computed tomography of the abdomen is frequently used in the diagnosis and radiological staging of CRC, and it is seen that computed tomography has a sensitivity of 13-92%, especially in liver metastasis.[5,6] Presence of comorbidity, whether the operation is urgent or elective, tumor localization, and preoperatively detected tumor stage may affect treatment methods and postoperative follow-up period.[2,3,4,5,6]

In our study, it was aimed to compare the radiological staging in the preoperative period with the pathological staging in the resection specimen in CRC.

Materials and Methods

Medical data of 86 patients who were diagnosed as having CRC and operated between January 2013 and October 2020 were evaluated retrospectively. Demographic characteristics of the patients, ASA score, comorbidity, tumor localization, whether or not endoscopy was performed, whether the operation was performed emergency or elective, whether the operation was open or laparoscopic, operation type, presence of ostomy, complication status, postoperative pathological diagnosis, preoperative radiological staging and postoperative pathological staging were recorded. and examined.

Computed tomography images were available in all patients included in the study, and radiological evaluation was obtained with tomography images. In all patients included in the study, oral + IV Dynamic-triphasic sections were obtained by giving contrast material and examination was performed in axial, coronal and sagittal planes.

Ethics committee approval was obtained for the study with the date 24.12.2020 and number 286.

Statistical Analysis

The SPSS version 20 for Windows software package program was used for statistical analysis. Frequencies and percentages were used for descriptive statistics. Chi-square test (Yates correction) was performed in binary comparisons. P value <0.05 was accepted as statistically significant.

Results

In the study, the mean age of our patients who were operated for colorectal tumor was 61.7 (±13.5). Of the patients 53.7% were female and 46.3% were male.

Comorbidity was present in 51.2% of the patients, and ASA2 score was found in 51.2%. It was observed that endoscopic examination was performed in 66.3% of the patients in the preoperative period. During the treatment process, 33.7% of the patients were operated under emergency conditions. Open approach was used in 88.4% of the patients as the surgical method. The rate of ostomy opening was 23.3%. Postoperative complications occurred in 4.7% of patients (anastomotic leakage in two patients, evisceration in one patient, and ureteral injury in one patient). Mortality developed in two patients due to pneumonia and sepsis (Table 1).

When evaluated in terms of age, there was a statistically significant difference between patients with ASA2 and patients with ASA3 (p=0.001), between patients with comorbidity and without comorbidity (p=0.001), and between patients with ostomy and without ostomy (p=0.001). There was no statistically significant difference between patients in whom endoscopy was performed and in whom not performed (p=0.358), between patients who underwent elective surgery and who underwent emergency surgery (p=0.251), between patients who underwent open surgery and who underwent closed surgery (p=0.814), and between patients with complication and without complication (p=0.886) (Table 1).

When evaluated in terms of gender, there was no difference between patients with ASA2 and patients with ASA3 (p=0.679), between patients with comorbidity and without comorbidity (p=0.679), patients in whom endoscopy was performed and in whom not performed (p=0.765), between patients who underwent elective surgery and who underwent emergency surgery (p=0.598), between patients who underwent open surgery and who underwent closed surgery (p=0.300), between patients with ostomy and without ostomy (p=0.289), and between patients with complication and without complication (p=0.402) (Table 1).

The most common comorbidity in our patients was hypertension (15.7%). Type 2 diabetes mellitus was observed

Table 1. Distribution of some interventions by age and gender in patients with colon tumors

Variables		Age			Gender			
		≤64	≥65	P***	Women	Men	Total	P***
		Number (%)*	Number (%)*		Number (%)*	Number (%)*	Number (%)**	
ASA	ASA2	37 (84.1)	7 (15.9)	**0.001**	25 (56.8)	19 (43.2)	44 (51.2)	0.679
	ASA3	9 (21.4)	43 (78.6)		22 (52.4)	20 (47.6)	42 (48.8)	
Comorbidity	Yes	10 (22.7)	34 (77.3)	**0.001**	25 (56.8)	19 (43.2)	44 (51.2)	0.679
	No	36 (85.7)	6 (14.3)		22 (52.4)	20 (47.6)	42 (48.8)	
Endoscopy	Yes	33 (57.9)	24 (42.1)	0.358	30 (52.6)	27 (47.4)	57 (66.3)	0.765
	No	13 (44.8)	16 (55.2)		17 (58.6)	12 (41.4)	29 (33.7)	
Surgery	Emergency	13 (44.8)	16 (55.2)	0.251	17 (58.6)	12 (41.4)	29 (33.7)	0.598
	Elective	33 (57.9)	24 (42.1)		30 (52.6)	27 (47.4)	57 (66.3)	
Surgery type	Open	41 (53.9)	35 (46.1)	0.814	40 (52.6)	36 (47.4)	76 (88.4)	0.300
	Laparoscopic	5 (50.0)	5 (50.0)		7 (70.0)	3 (30.0)	10 (11.6)	
Ostomy	Yes	3 (15.0)	17 (85.0)	**0.001**	13 (65.0)	7 (35.0)	20 (23.3)	0.289
	No	43 (65.2)	23 (34.8)		34 (51.5)	32 (48.5)	66 (76.7)	
Complication	Yes	2 (50.0)	2 (50.0)	0.886	3 (75.0)	1 (25.0)	4 (4.7)	0.402
	No	44 (53.7)	38 (46.3)		44 (53.7)	38 (46.3)	82 (95.3)	
Total *		**46 (53.5)**	**40 (46.5)**		**47 (54.7)**	**39 (45.3)**	**86 (100.0)**	

*row percent, **column percent,***chi-square (yates correction), ASA: American Society of Anesthesiology

in 9.3% of the patients, and the coexistence of hypertension and type 2 diabetes mellitus was observed in 7.0% of the patients (Table 2).

The most common tumor localization was in the left colon and among which the most common was in the sigmoid colon (36%). Of the tumors 12.8% were in the splenic flexure, 10.5% in the rectosigmoid junction, and 10.5% in the rectum (Table 3).

When evaluated in terms of surgery types, 25.6% of the patients underwent anterior resection (AR), 24.4% right hemicolectomy, 20.9% low AR (LAR), and 17.4% Hartmann process (Table 4).

After examining the postoperative resection materials, 82.5% of them were found to be low-differentiated non-mucinous adenocarcinoma, 7.0% moderately differentiated non-mucinous adenocarcinoma, and 10.5% mucinous adenocarcinoma (Table 5).

In terms of pathological staging, 47.7% of the patients were determined as Stage 3, 40.7% as Stage 2, 8.1% as Stage 1, and 3.5% as Stage 4. When evaluated radiologically, 47.7% of the patients were determined as Stage 3, 39.5% as Stage 2, 10.5% as Stage 1, and 2.3% as Stage 4. On the other hand,

Table 2. Distribution of comorbidities in patients with colon tumor

Comorbidity	Number (%)
No comorbidity	42 (48.8)
Hypertension (HT)	15 (17.4)
Diabetes mellitus (DM)	8 (9.3)
Heart failure (HF)	2 (2.3)
DM + HF	2 (2.3)
COPD	1 (1.2)
HF + COPD	1 (1.2)
HT + COPD	3 (3.5)
HT + DM	6 (7.0)
HF + HT	2 (2.3)
Guatr	1 (1.2)
HT +CVA + COPD	1 (1.2)
BPH	2 (2.3)

COPD: Chronic obstructive pulmonary disease, CVA: Cerebrovascular accident, BPH: Benign prostatic hyperplasia

when pathological staging and radiological staging were compared in terms of TNM staging, the similarity was found to be 94.2% (Table 5).

Discussion

Although the incidence and mortality of CRC vary around the world, its incidence is increasing in relation to obesity, low-fiber and high-fat diet, prolongation of life expectancy, and environmental factors. CRCs are ranked 2nd in cancer-related deaths worldwide (1).

One of the important risk factors for the development of CRC is age. It has been shown that 90% of CRCs occur at the age of 50 years or above. In large case series, it was found that CRC peaked around the age of 70.[7,8] In our study, the mean age of patients with CRC was found to be 61.7 (±13.5), which was similar to many other studies.[9,10,11,12]

The majority of the patients in our study were women. Studies have not shown a significant difference between the frequency of CRC and gender, and it has been shown that the risk increases slightly in men as age progresses.[13,14] However, contrary to our study, there are also studies showing that it is more common in males.[15,16]

Comorbidity was present in 51.2% of the patients in our study, and hypertension was the most common comorbidity. However, 48.8% of the patients were scored as ASA 3 in terms of ASA score. In our study, patients who died had an ASA score of 3 and they had comorbidity. The presence of comorbidities and a high ASA score have been shown to increase morbidity and mortality as an independent risk factor.[17,18]

Considering the distribution of tumor localization; it was observed that 36% of the tumors were located in the sigmoid region, 21% in the rectum and rectosigmoid, 12.8% in the splenic flexure, and 11.6% in the cecum. In studies, CRC is most commonly detected in the rectosigmoid region, followed by the left and right colon, respectively.[16,19] However, it has been observed that the incidence of tumors

Table 3. Distribution of tumor localization

Tumor localization		Number (%)
Right colon	Cecum	10 (11.6)
	Ascending colon	2 (2.3)
	Hepatic flexure	8 (9.3)
Left colon	Splenic flexure	11 (12.8)
	Descending colon	6 (7.0)
	Sigmoid	31 (36.0)
Rectum	Rectosigmoid	9 (10.5)
	Rectum	9 (10.5)
Total		86 (100.0)

Table 4. Distribution of surgeries performed in patients with colon tumors (Kars, 2021)

Surgery type	Number (%)
Right hemicolectomy	18 (20.9)
Right hemicolectomy-End ileostomy	3 (3.5)
Anterior resection (AR)	20 (23.2)
AR - ureteroureterostomy	1 (1.2)
AR - protective loop ileostomy	1 (1.2)
Low anterior resection (LAR)	18 (20.9)
Hartmann procedure	12 (13.9)
Hartmann procedure - total abdominal hysterectomy (TAH)	2 (2.3)
Hartmann procedure - liver metastasectomy	1 (1.2)
Subtotal colectomy	6 (7.0)
Subtotal colectomy - end ileostomy	1 (1.2)
Subtotal colectomy - liver metastasectomy	2 (2.3)
Total colectomy - ileoanal J pouch anastomosis	1 (1.2)
Total	86 (100.0)

Table 5. Pathological diagnosis, pathological and radiological TNM staging of patients with colon tumors (Kars, 2021)

	Number (%)
Pathological diagnosis	
Low grade non-mucinous adenocarcinoma	71 (82.5)
Non-mucinous adenocarcinoma moderate	6 (7.0)
Mucinous adenocarcinoma	9 (10.5)
Pathological staging	
Stage 1	7 (8.1)
Stage 2	35 (40.7)
Stage 3	41 (47.7)
Stage 4	3 (%3.5)
Radiological staging	
Stage 1	9 (10.5)
Stage 2	34 (39.5)
Stage 3	41 (47.7)
Stage 4	2 (2.3)
Pathological and radiological staging	
Same phase	81 (94.2)
Radiological stage low, pathological stage high	4 (4.6)
Radiological stage high, pathological stage low	1 (1.2)

located in the proximal colon has increased in recent years.[19,20]

Colonoscopic examination is important in diagnosis of CRC and therapeutic procedures. In our study, endoscopy was performed in 66.3% of all patients and in all elective patients. Preoperative radiological imaging methods are also important because there is a direct relationship between the prognosis and stage of the disease. All patients in the study underwent imaging with computed tomography in the preoperative period and staging was done according to the preoperative TNM staging protocol. As in other gastrointestinal tumors, lymph node detection and staging of the disease by imaging methods are guiding in the treatment of CRCs.[21,22]

Of the surgeries 66.3% were elective and 33.78% were emergency. CRCs constitute an important part of emergency interventions related to the colon. Although debates continue about the fact that laparoscopic resections have better results than open procedures, they are being performed with increasing frequency.[23,24] Laparoscopic resection rates in CRC range from 27.7 to 51.1%.[25] In our study, 11.6% of the patients underwent surgery with laparoscopic method, and we attributed the high number of open surgeries to the high number of patients who were operated on urgently.

The treatment method differs according to the localization of the tumor. In many studies, the general approach in tumors located in the right colon is resection and primary anastomosis.[26,27] In our study, right hemicolectomy and primary anastomosis were most frequently performed in patients with right colon tumor.[26,27] In obstructive left colon tumors, since resection and primary anastomosis in a heavily dilated and dirty colon are considered to be highly risky in terms of anastomotic leakage, stepwise surgical treatment is recommended.[28,29] However, in most studies, it has been stated that resection and primary anastomosis can be performed in emergency left colon surgery if the surgery is performed by experienced surgeons with appropriate indications, and similar results in terms of postoperative mortality and complications are encountered among patients undergoing primary anastomosis with step-by-step surgical treatment.[30,31] In our study, mostly resection and primary anastomosis were preferred in patients with left colon tumors.

In our study, ostomy was created in 23.3% of the patients in the form of ileostomy (5.9%) and in the form of colostomy (17.4%). The presence of ostomy was higher in patients aged >80 (p=0.001). This situation was similar to the studies conducted.[27,8,29,30] In another study, 27.9% of the patients had ostomy in the form of ileostomy or colostomy.[32]

In our study, our complication rate was 4.7% and our mortality rate was 2.3%, which were acceptable when compared to the literature data. In our study, complications were anastomotic leakage in two of the 4 patients, evisceration in one and ureteral injury in one. Although anastomotic leakage is the most common complication after surgical treatment of CRC, especially due to cancer-specific immune system dysfunction and fecal transmission, many complications such as paralytic ileus, evisceration and surgical site infections may occur. In studies, morbidity and mortality rates were determined as 15-50% and 6-15%, respectively in patients who underwent emergency surgery. Morbidity and mortality rates were found 4-14% and 1-7%, respectively in patients who underwent elective surgery.[33,34,35,36] In studies, the postoperative morbidity rate may be up to 23% after laparoscopy and 11-20% after open surgery.[37] However, it was reported that anastomotic leakage was seen at a rate of 2.4-6.8% after open surgery and 2.7% after laparoscopy.[38]

Histological grades of tumors are important in the evaluation of tumor behavior, prognosis and treatment. Tumor stage and histological grade are prognostic factors affecting survival.[39,40,41] When the patients were evaluated in terms of pathological diagnosis in the study, 82.5% of the patients had histopathologically low grade non-mucinous adenocarcinoma. In a study by Kocakuşak et al.[42], it was histopathologically in the form of non-mucinous adenocarcinoma with a rate of 78%.

Study Limitations

In studies, when stages are evaluated in patients with CRC, it has been reported that Stage 3 is the most common.[25,43] In our study, the majority of patients had Stage 2 and 3 in terms of radiological and pathological staging. Similar to our study, in two studies conducted by Sarı et al.[44] and Küçüköner et al.[45], the most common stage was 2 and 3. Similar to studies, we think that the reason for the diagnosis of CRC in advanced stages is the lack of screening for colon cancer in our country.

Conclusion

In conclusion, tumors located in the left colon in Stage 2-3 were more common in our study. It was observed that the staging performed with preoperative radiological imaging during the diagnosis process was consistent with the staging determined after the pathological examination of the resection piece. In this case, it can be said that the staging is highly compatible in terms of both pathological and radiological diagnosis and the diagnostic processes are of high quality. It is thought that radiological staging is important in treatment planning in patients with CRC, and the success of treatment will increase with developing imaging studies.

Ethics

Ethics Committee Approval: Ethics committee approval was obtained for the study with the date 24.12.2020 and number 286.

Peer-review: Externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: H.Ç., T.A., T.Ç., H.E.Ö., B.S., K.B., T.A., D.G., Concept: H.Ç., K.B., Design: H.Ç., H.E.Ö., Data Collection or Processing: H.Ç., T.A.,

Analysis or Interpretation: H.Ç., T.A., D.G., Literature Search: H.Ç., Writing: H.Ç.

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