ORIGINAL ARTICLE

Urgent re-laparotomies in cytoreductive surgery and hyperthermic intraperitoneal chemotherapy

Berke Manoğlu, M.D.,[1] Selman Sökmen, M.D.,[1] Tayfun Bişgin, M.D.,[1] Yasemin Yıldırım, M.D.,[1] Ali Durubey Çevlik, M.D.,[1] Hale Aksu Erdost, M.D.,[2] Funda Obuz, M.D.[3]

[1]Department of Surgery, Dokuz Eylül University Faculty of Medicine, İzmir-*Türkiye*
[2]Department of Anaesthesiology and Reanimation, Dokuz Eylül University Faculty of Medicine, İzmir-*Türkiye*
[3]Department of Radiology, Dokuz Eylül University Faculty of Medicine, İzmir-*Türkiye*

ABSTRACT

BACKGROUND: The objective of the study was to evaluate the morbidity-mortality results in terms of immunscore factors and to predict the outcomes of urgent re-laparotomized patients treated with cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC).

METHODS: Prospectively maintained database of 661 patients treated with potentially curative intent of CRS and HIPEC through the years of 2007 and 2020 was evaluated. URL was done for 28 (4.2%) patients as unplanned re-explorative surgery; 22 (78.6%) of them was female. The median age was 57 year (ranging, 24–76 years). There were 22 (78.6%) elderly patients over 65 years old. All standard clinico-pathological characteristics, re-operative findings, and the morbidity-mortality results were analyzed. The well-known immunoscores such as neutrophil-lymphocyte ratio (NLR), neutrophil-thrombocyte ratio (NTR), and CRP-albumin ratio (CAR) were determined.

RESULTS: The main indication for URL was small bowel anastomotic leak (n=13, 46.4%). The abdominal wall disruption (n=5, 17.9%) was the second indication. The frequent localization of injured organ was again small bowel. The 28.6% of patients (n=8) were re-operated in early postoperative period (in 7 days), while as the rest of them (n=20, 71.4%) in 90 days. There was only one repeat-URL patient in this series. Many of the URL patients (n=16, 57.1%) had more than one co-morbidities. Delving into the overall group, there were Clavien-Dindo (C-D) Grade I-II complications in 104 (16.4%) patients and C-D Grade III-IV in 88 (13.9%) patients, whereas in URL patient group, C-D Grade III-IV complications were seen in 22 (78.6%). In this prospective cohort, the overall mortality rate was 3.2% (n=20) in patients who were not re-explored. Six (21.4%) patients were lost in URL patients, which the main reason for failure-to-rescue was sepsis due to entero-enteral anastomotic leak. In four of them, multiple co-morbidities were affected the post-URL period of complex cancer care. Pre-URL median NLR, NTR, and CAR values were 9.12 (ranging, 1.72–37.5), 0.03 (ranging, 0.01–0.12), and 41.4 (ranging, 4.2–181.3), respectively. NLR and CAR values (4.71 and 28.8) estimated before pre-CRS were also significantly high ($p=0.01$ and $p<0.01$) in patients who were going to be operated for URL. These immunoscores values did not show any association in between pre-CRS and pre-URL mortal patients.

CONCLUSION: The crucial decision-making factors at work were complex and complicated in "unplanned" URL. The overall morbidity-mortality results seemingly depends on the severity and extent of peritoneal metastatic disease. Medically-unfit URL patients with high-risk factors should be selected to a vigilant monitoring and clinical care. Timely surgical intervention and intense management strategy are utmost important issues to lower morbi-mortality results in patients treated with URL.

Keywords: Cytoreductive surgery; hyperthermic intraperitoneal chemotherapy; immunscore; urgent relaparotomy.

INTRODUCTION

Surgeons enjoy to discuss, analyze, and present their successes, but there is an understandable reluctance to publish personal reoperative experiences. Surgical literature about URL is thus really lacking, reticence, and poorly structured.

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Address for correspondence: Berke Manoğlu, M.D.
Dokuz Eylül Üniversitesi Tıp Fakültesi, Genel Cerrahi Anabilim Dalı, Narlıdere, İzmir, Türkiye
Tel: +90 232 - 412 22 63 E-mail: berkemanoglu@hotmail.com

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Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) have become a preferred treatment option for patients with resectable peritoneal metastasis to improve their survival. This treatment option is applied in metastaticaly diseased peritoneum, which is usually caused by carcinomas of ovarium, colon and rectum, appendix, peritoneal mesothelium, gastric and primary peritoneum.[1–6] Sugarbaker[7] pioneered the procedure of CRS and HIPEC, because only systemic chemotherapy was not sufficient for long-term and durable survival in patients with peritoneal metastases (PM).[8,9] CRS is a maraton and complex combination of extended abdomino-pelvic surgical techniques including peritonectomies and/or multiorgan resections and intraoperative HIPEC is particularly attractive for treatment of PM that are amenable to complete Cytoreduction (CC-0).[7,8] Difficulties in critical decision making to operate or not and in URL surgical technique, particularly in a battlefield of CRS and HIPEC is a complex surgical situation.

Complications developed after extended surgical procedures usually cause poor oncologic results, decreased survival, and high costs.[8–10] Maximum efforts must be put in multidisciplinary board to properly select the right patient to minimize the possibility of life-threatening complications. However, relatively high rate of complications can occur in this difficult field of surgical oncology and prompt diagnosis of severe complications and timely management with urgent reoperation can lower the morbidity-mortality rates and even save lives.[11] Despite technical advances in early diagnosis and improvements in surgical care, the mortality rates are still high in URL patients having multi-comorbidities and chemo (-radio)therapy.[11,12]

In recent years, the "failure-to-rescue (FTR)" concept was studied as an important evaluation criterion after surgery.[13] and it was accepted in 2010 by the American National Quality Forum as a quality measure for surgical care.[14] Specific care with standardized management should be dedicated to significantly reduce postoperative complications, mortality, and FTR rate. We analyzed the reasons of the FTR rate in our patients who underwent URL in the clinical setting of CRS and HIPEC.

Human immune system has a complex and multi-faceted role in the development and treatment of cancer. It affects all aspects of the disease process, from tumorigenesis to treatment[15] as well as the results of surgical treatment and postoperative outcomes. Immune cells can act both as suppressors of tumor initiation and progression, and as accelerators of proliferation and metastasis ("stochastic").[16] Several studies had confirmed that clinical immunoscoring predicts outcome in a patient with early[17] or advanced[18] stage cancer. There is a growing body of evidence that chronic inflammation plays a significant role in the development of malignancy tissue. [19] The biochemical parameters such as C-reactive protein (CRP), albumin (ALB), neutrophil, lymphocyte, thrombocyte counts, and the ratios between these values were used in various oncologic studies to assess immunstatus.[18,19] It is thought that by evaluating the immunoscores of URL patients preoperatively can provide logical predictions about morbidity-mortality results.

The aims of our study were (i) to determine the morbidity-mortality results of URL patients operated with CRS and HIPEC treatment and (ii) to search the impact of immunscore evaluation on the outcomes of these patients.

MATERIALS AND METHODS

Prospectively maintained database of 661 patients treated with potentially curative intent of CRS and HIPEC through the years of 2007 and 2020 was evaluated. Approval was obtained from the ethics committee of Dokuz Eylul University Faculty of Medicine for the retrospective analysis of patient data (Reference No: 2022/16-20). The data of the routine pre- and post-operative practices performed by the Colorectal Surgery Unit of Dokuz Eylul University General Surgery Medicine Department were used. No special test, intervention, or examination was performed for the study.

These patients were first evaluated in the multidisciplinary tumor board and carefully selected surgical candidates were allocated for prehabilitation. In this study, we reviewed the postoperative results of patients who underwent an URL in the post-operative period after CRS and HIPEC procedures performed at our center. Urgent reoperation was defined as any unplanned surgery after the initial surgery within 90 days of surgery. These URL patients were compared with the pre-and post-operative results of non-reoperated CRS and HIPEC patients. URL was done for 28 patients as unplanned re-exploration (4.2%); 22 (78.6%) of them was female. Relaparotomy was performed in 28.6% (n=8) of the patients within the first 7 days, and 71.4% (n=20) between 7 and 90 days. All clinico-pathological characteristics, re-operative findings, and final outcomes were analyzed. The well-known immunoscores such as neutrophil-lymphocyte ratio (NLR), neutrophil-thrombocyte ratio (NTR), and CRP-ALB ratio (CAR) were determined.

Patients with URL (Group I) and patients without URL (Group II) were first compared statistically in terms of age and gender, and it was determined that they were homogeneous (Chi-square and t-test). These two groups were then compared in terms of neoadjuvant therapy, co-morbidity, smoking, peritoneal cancer index (PCI) score, completeness of cytoreduction (CC) score, length of hospital (LoH) stay, high grade complication (C-D III-IV), and mortality by univariate analyses. NLR, NTR, and CAR values were initially estimated and compared between the two groups before CRS (Mann–Whitney U test). ROC analyses were performed for NLR and CAR. Cutoff values, sensitivity, and specificity ratios were determined.

RESULTS

The median age was 57 year (ranging, 24–76 years). There were 22 (78.6%) patients over 65 years old. The 28.6% (n=8) of patients were re-operated in early postoperative period (in 7 days), while as the rest of them (n=20; 71.4%) in 90 days. There was only one re-URL patient in this series. 25% (n=7) of the patients in group I were smokers and many of them (n=16; 57.1%) had more than one co-morbidities such as diabetes mellitus and atherosclerotic heart disease. 64% (n=18) of the URL patients were received neoadjuvant chemotherapy and 28% (n=8) had pelvic radiotherapy. The median LoH stay (LoHS) after CRS and URL were 15 days (ranging, 3–94) and 22 days (ranging, 8–130), respectively. After URL, 71% (n=20) of the patients were admitted to the intensive care unit. The average duration of treatment in the intensive care unit was 8 days. When Groups I and II were compared in terms of age, gender, smoking, comorbidities, LoHS, and neoadjuvant treatment, no statistically significant differences were found (Table 1).

Table 1. Demographic and therapeutic characteristics of patients who underwent urgent

Variable	n	%
Sex		
Male	6	21.4
Female	22	78.6
Age, yr		
Median age (range)	57.50 (24 to 76)	
<65 yr	21	75
≥65 yr	7	25
Smoking		
Yes	7	25
No	21	75
Co-morbidities (>1)	16	57.1
Neoadjuvan chemotherapy		
Yes	18	64.3
No	10	35.7
HIPEC in CRS		
Yes	28	100
No	–	–
CC score		
0	23	82
1–3	5	18
Peritoneal Carcinomatosis Index (PCI)		
PCI ≤10	12	42.8
PCI 10–20	8	28.6
PCI ≥20	8	28.6
High grade complication (C-D III-IV)		
Yes	22	78.6
No	6	21.4
Postoperative mortality		
Yes	6	21.4
No	22	78.6

Re-laparotomy (URL); C-D: Clavien-Dindo; CC: Completeness of cytoreduction score; CRS: Cytoreductive surgery; HIPEC: Hyperthermic intraperitoneal chemotherapy.

The cutoff PCI scores of URL, saved-URL, and lost-URL patients were 13, 12, and 14, respectively. During the first operation, the CC-0 score was determined in 23 patients who underwent relaparotomy and CC-1 in 5 patients. The CC score was calculated as 1 in two patients and 0 in four patients who died in the perioperative period after relaparotomy. When Groups I and II were compared in terms of PCI scores and CC scores, no significant differences were found (Table 1).

Delving into the overall cohort group, there were Clavien-Dindo (C-D) Grade I-II complications in 104 (16.4%) patients and C-D Grade III-IV in 88 (14%) patients, whereas in URL patient group, C-D Grade III-IV complications were seen in 22 (78.6%). In this prospective cohort, the mortality rate was 3.2% (n=20) without any re-exploration. However, six (21.4%) patients were dead in URL patients (Table 1). The cardinal reason for FTR was sepsis due to entero-enteral anastomotic leak in URL group (Fig. 1). In four of URL patients, pluri-co-morbidities affected the post-URL intensive care. Fifty percent of mortal patients in URL-treated had neoadjuvant chemotherapy.

The primary indication for URL was small bowel anastomotic leak (n=13; 46.4%). The secondary was the abdominal wall disruption (n=5; 17.9%) (Fig. 2). The frequent site of injured organ was again small bowel (Fig. 3).

For URL-patients, pre-URL median NLR, NTR, and CAR values were 9.12 (ranging, 1.72–37.5), 0.03 (ranging, 0.01–0.12), and 41.4 (ranging, 4.2–181.3), respectively. Interestingly, NLR

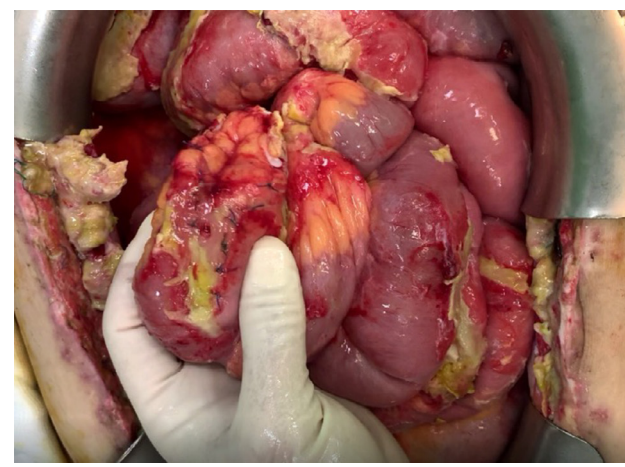

Figure 1. Abdominal sepsis due to entero-enteral anastomotic leak.

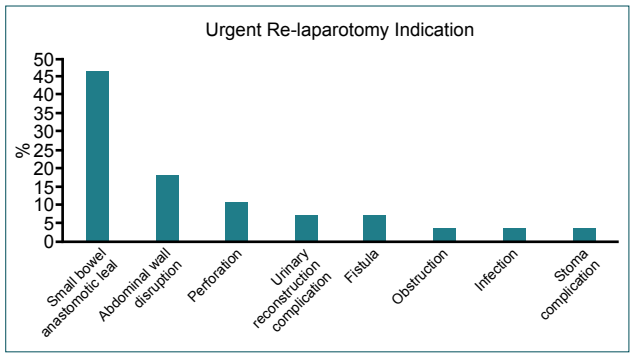

Figure 2. Urgent re-laparotomy Indication.

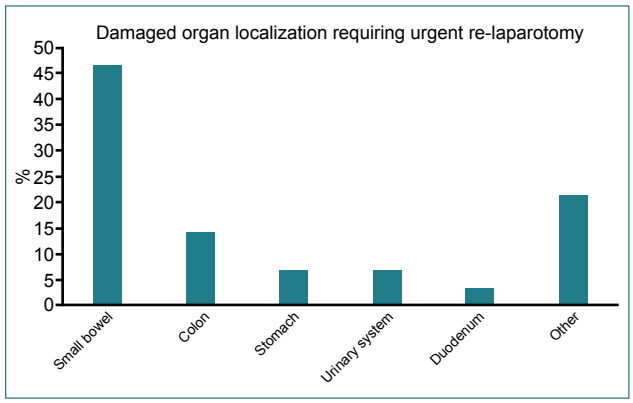

Figure 3. Damaged organ localization requiring urgent re-laparotomy.

and CAR values (4.71 and 28.8) estimated before pre-CRS were also significantly higher (p=0.01 and p<0.01) in patients who were going to be treated with URL (Table 2). The cut-off values of urgent NLR and CAR values before CRS were determined as 4.02 and 17.87, respectively (Table 3). The sensitivity and specificity of the NLR and CAR indices were 82% and 18% and 86% and 16%, respectively. There was no significant difference between the two groups in terms of NTR values. By determining the NLR and CAR values in pre-CRS patients, the potential risk of complications necessitating URL can be foreseen preoperatively. These immunoscore values did not show any association between two groups in terms of mortality.

DISCUSSION

The key prognostic factors to achieve complete CRS of peritoneal metastatic disease followed by HIPEC are the extent of the disease and radical eradication of tumor burden, however, the trade-off will be the increased morbidity, reoperation(s), and mortality. Even though the cytoreductive surgical team did their best for the indications with consummate skill, and judicious care, "unexpected" complications still arise which require urgent relaparotomy. The ability to know when and how to perform URL always brings greater technical difficulty than a first index operation, because anastomic planes are destroyed, dense fibrous-scarring and ceramized adhesions are present. The exhausted patient due to more advanced disease, pluri-cycles of chemotherapy, and malnutrition, the magnitude, and impact of the surgery becomes frequently greater.

URL was defined as surgery performed for a complication after primary surgical condition.[20] In the present study, patients who underwent URL after CRS were analyzed. The patients were divided into two groups as operated on in the early postoperative period (0–7 days) or operated on in the late postoperative period (7–90 days). Published studies of URL for different surgical operations had reported rates between 2% and 21%. It was stated that this variability in incidences stems from the different populations, types of operation, histopathology, immune status of the host, and co-existing diseases.[21–23] On the other hand, the incidence of complications requiring URL has been reported as 1–5.1% in patients undergoing major abdominal surgery.[24,25] The rates

Table 2. Neutrophile-lymphocyte ratio (NLR) and CRP-albumin ratio (CAR)

	NLR	CAR
Pre-CRS median ratio of non-URL group	2.28 (0.13 to 39.37)	2.13 (0.04 to 228.3)
Pre-CRS median ratio of URL group	9.12 (1.72 to 37.5)	41.4 (4.2 to 181.3)

CRS: Cytoreductive surgery; URL: Urgent re-laparotomy; CRP: C-reactive protein.

Table 3. ROC Analyzed NLR and CAR

Risk Factor	AUC (95%)	Cut-off	p	Sensitivity (%)	Specificity (%)
CAR	0.923 (0.886–0.959)	17.87	0.000	85.7	15.8
NLR	0.900 (0.843–0.958)	4.02	0.000	82.1	17.6

ROC: Receiver operating characteristic; NLR: Neutrophile-lymphocyte ratio; CAR: C-reactive protein-albumin ratio; AUC: Area under curve.

of urgent reoperation in vascular, obstetric and gynecology, pancreatic, and colorectal surgery has been reported as 12%,[21] 2.6%,[26] 11%,[27] and 10.4%[28] respectively. This URL rate was 4.2% in the current study. It can be thought to be a quite low rate for such an extensive radical surgery inherently when compared to other "conventional standard surgeries." The multidisciplinary working intelligence and experience resulted with good clinical outcomes.

Significant relationship has been established between URL and male gender.[12,22,29] In contrast, the female gender ratio was high in this study. The reason for this high rate is possibly due to the high incidence of female patients in the ovarian-CRS. No significant difference was found when the patients who underwent URL were compared with those who did not URL in terms of age and gender.

The cardinal causes of URL in the relevant literature were mainly septic complications due to anastomotic leak, intestinal perforation, and/or intestinal ischemic necrosis (32–51.3%), mechanical ileus (25–62.8%), eventration/evisceration (7.2–22%), bleeding (3.3–19%), and others (2–3%), respectively.[11,30] In our study, the main indications for URL were small bowel anastomotic leak (n=13; 46.4%) and the abdominal wall disruption (n=5; 17.9%). The frequent localization of injured organ was again small bowel. Regardless of the incidence, these complications mandated URL with vital indications.

Early detection of complications, vigorous resuscitation, and prompt intervention can save many lives.[24] At present, there is no ideal score system for the prediction of ongoing infection in complicated patients with possible abdominal sepsis after their initial index laparotomy. As in Van Ruler et al.[31] reported, available well-known scoring systems were out of clinical value in this group of patients. However, Pusajo et al.[32] described the score of Abdominal Reoperation Predictive Index (ARPI) and studied the usefulness of ARPI to predict whether to perform URL in case of septic complications. They found that usage of ARPI scoring system was resulted in a reduction in mortality against a control group mainly due to earlier relaparotomy. Studying Pusajo's ARPI criteria to our data of URL series the management would not have been differed. It must be over stressed that the small numbers in the study preclude any firm conclusion about the reliability and effectiveness of ARPI improving our patients' survival.[31–35] However, a scoring system can help in adequate and timely identification of patients for URL, none of the existing and widely used severity-of-disease scores have high performance to identify the patients with ongoing septic complications needing a URL. Even an Artificial Neural Network (ANN) investigations to aid algorithmic diagnostic ITER resulted in controversial findings and APACHE II and expert intensivists' experience were found to be superior in the prediction of patients outcome to the ANN and other tested scoring system.[36–39]

Morbidity rates varied between 30% and 68% and perioperative mortality rates between 3% and 8% in centers where CRS and HIPEC are performed.[40] In this prospective cohort, morbidity and mortality rates were found to be 30% and 3.2%, respectively. Our data were found to be consistent with the literature. Specific to our URL group, the high grade complication (C-D III-IV) rate was 78.6%. Despite early diagnostic work-up and therapeutic progress, mortality following URL is still high, ranging from 15.4% to 61.5%. This high mortality of URL has been reported due to the advanced age, medical unfitness, the aggressiveness of the primary surgery ("impaired wound healing and immune defense, disturbed physiologic reserves") and the severity of complications.[11,12,41] The URL mortality rate in our patients was 21.4% (n=6). In URL patients the overriding factors responsible for high mortality rate were proved to be (1) re-operation and (2) the organ in which the complication was occurred.[21,26,28] The adverse domino effect of primary operation-complication-urgent reoperation sequence on the multiorgan systems of the elderly, essentiality the impending abdominal sepsis, altered consciousness, respiratory, or renal failure, co-morbidities such as diabetes mellitus, and ischemic heart disease, may explain the high rate of mortality in this complex group of patients.[42–44] In this study, many of the patients who underwent URL had at least one of the co-morbidities mentioned above (57.1%, n=16). The general 'first 30-day' mortality rates after URL were ranged from 5.5% to 48%.[10,29,45] Our all complicated 6 URL patients died in exactly the first 30 days.

The FTR concept has gained acceptance as an interesting metric evaluation of quality after surgery.[46] The FTR rate can be associated with overall mortality rates and the other potential variables (surgical experiences, hospital technology, and increasing nurse-to-patient ratio). However, when FTR is evaluated for urgent surgery patients, it is estimated that complications gain much importance.[46,47] When we probed the FTR concept in our study, the overall complications were denominator as in the literature. Since 2007, a standardized perioperative clinical pathway was established at our peritoneal surface cancer center, which focused on patient selection, nutrition, renal protection, pain management, prevention, and early detection of complications to improve morbidity-mortality and oncologic outcomes. Although we assumed that the URLs were done in a timely fashion with proper surgical technique as a result of clinical and radiological evaluations, we lost a significant group of patients (21.4%) in the post-operative period. URLs were performed in four patients for small bowel anastomotic leakage, one patient for gastric perforation, and one patient for small bowel perforation. We failed to rescue our five patients due to abdominal sepsis: These losses depend on the decline of physiologic reserve, progressive multiorgan dysfunction, the prolonged need of ventilatory support, and clinical deterioration in patients' medical condition despite the optimum surgical intensive care support. Sepsis was the single most important prognostic determinant for death in this series. The other pa-

tient was failed to be rescued because of massive pulmonary thromboembolism.

Interest in measuring surgical quality is growing rapidly. Reoperation rate has gained increasing attention as a potential indicator of surgical quality in recent years. Surgical complication that resulted in reoperation is possibly plays a role in worsened outcomes, including postoperative death. In our high volume and complexity academic CRS and HIPEC practice, URL occurred 4.2%. This URL rate was relatively rare and most commonly associated with anastomotic leak. However, there are a lot of mutable risk factors for proper prediction model in the setting of complicated CRS and HIPEC. Unplanned reoperations are often the result of major complications (14%), mostly abdominal sepsis and can be tightly linked to worse patient outcomes as in our study (increased morbidity rate, 78.6%; and mortality rate, 21.4%). Thus, URL carry significant clinical outcome implications. The septic complications, particularly anastomotic leak rate may be a better marker of surgical quality to monitor for quality improvement targets in education and research program at peritoneal surface cancer center.[48]

The median PCI values of the patients who underwent URL and lost after URL were 13 (ranging, 3–29) and 14 (ranging, 5–24). There was no statistically significant difference in terms of PCI scores. When the CC scores were also compared in between alive-URL and dead-URL patients, no significant difference was found.

In the last decade, many biomarkers used to describe the systemic inflammatory response have been subjected to research for detecting clinical progression of solid tumors in the lung and gastrointestinal tract. There are two methods of assessing the systemic inflammatory response: Composite ratios (R) and cumulative scores (S). One approach is to take the ratio of different white blood cells and then set a prognostic threshold for the ratio. The most widely used of these is the ratio of circulating neutrophil-lymphocyte counts (NLR). Other confirmed examples are circulating platelet-lymphocyte (PLR) count and lymphocyte-monocyte (LMR) count ratios. In addition, many studies reported by Glasgow researchers proved that the ratio of acute phase proteins to CRP and ALB (CAR) had an important clinical prognostic significant.[49,50] A disadvantage of this ratio approach is that, depending on the threshold used, an abnormal ratio can be identified with one or two markers with a normal value. A simpler approach is the cumulative prognostic score. A widely used example of this approach is the modified Glasgow Prognostic Score based on two acute phase proteins, namely, CRP and ALB. In addition, neutrophil-platelet score (NPS) has recently been reported using neutrophils and platelets. Apart from these, there are other score systems that used in prognostic evaluation such as neutrophil-lymphocyte score, platelet-lymphocyte score, and lymphocyte-monocyte score. [50] In our study, we evaluated whether the immune scores measured pre-CRS and pre-URL can predict morbidity-mortality in the postoperative period. The immune prognostic ratios measured in our study revealed that NLR and CAR before CRS could significantly distinguish patients who underwent URL from patients who did not undergo URL ($p<0.001$). The NLR and CAR values of these patients who underwent URL before the first surgery were significantly higher than the other patients. Systemic inflammatory status of the host seems to affect the postoperative complicatory course. The immunscores as simple and consistent markers can be reliable predictive factors in the clinical use for CRS&HIPEC patients. They can be used to guide clinical pathways to optimize patients' immune status intensely.

The limitations of this study include its retrospective and case-mixed nature. Peritoneal tumor burden and the extent of tumor and the host factors and management could not be standardized. Being a single center study with small number of URL patients is also another drawback. The strengths of our database are prospective maintenance in the certified peritoneal surface cancer center and the well-controlled the data acquisition. Senior surgeons' experience highlighted many aspects of this type of extensive radical surgery and high-risk urgent relaparotomy.

It has always been our belief that patients undergoing CRS and HIPEC have somewhat limited reserve and capacity to withstand as a "second hit" such as septic or pleuropulmoner complication. Thus, whenever a complicated patient was stable, we always prefer to conservative measures. Nonetheless, URL becomes mandatory for source control, be it anastomotic leak or bleed. URL may really carry a major risk, as reflected in our study results and we cannot tell that URL for complication is not responsible for at least part of the high mortality in the reoperated cohort.

Conclusion

The judgmental factors at work are complex in unplanned URL. Patients with high risk factors and increased inflammatory status could be selected to an intense care pre- and post-operatively. Immune scoring before CRS can help us to predict the risks of urgent relaparotomy. Timely intervention and proper management strategy are utmost important to lower further morbidity-mortality in patients treated with URL. URL requires specialized surgeon who is willing to deal with a broad range of complications and complex problems after a "seemingly routine" standard extensive surgery.

Ethics Committee Approval: This study was approved by the Dokuz Eylul University Non-interventional Clinical Research Ethics Committee (Date: 27.04.2022, Decision No: 2022/16-20).

Peer-review: Internally peer-reviewed.

Authorship Contributions: Concept: S.S., B.M.; Design: S.S., B.M., T.B., Y.Y.; Supervision: S.S., B.M., T.B., A.D.Ç.; Re-

source: S.S., B.M., T.B., Y.Y.; Materials: S.S., B.M., T.B., A.D.Ç.; Data: S.S., B.M., T.B.; Analysis: S.S., B.M., T.B., H.A.E., F.O.; Literature search: S.S., B.M., T.B., H.A.E., F.O.; Writing: S.S., B.M., T.B.; Critical revision: S.S., B.M., T.B.

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ORİJİNAL ÇALIŞMA - *ÖZ*

Sitoredüktif cerrahi ve hipertermik intraperitoneal kemoterapi sonrası acil relaparatomiler

Dr. Berke Manoğlu,[1] Dr. Selman Sökmen,[1] Dr. Tayfun Bişgin,[1] Dr. Yasemin Yıldırım,[1] Dr. Ali Durubey Çevlik,[1] Dr. Hale Aksu Erdost,[2] Dr. Funda Obuz[3]

[1]Dokuz Eylül Üniversitesi Tıp Fakültesi, Genel Cerrahi Anabilim Dalı, İzmir
[2]Dokuz Eylül Üniversitesi Tıp Fakültesi, Anestezi ve Reanimasyon Anabilim Dalı, İzmir
[3]Dokuz Eylül Üniversitesi Tıp Fakültesi, Radyoloji Anabilim Dalı, İzmir

AMAÇ: Sitoredüktif cerrahi (SRC) ve hipertermik intraperitoneal kemoterapi (HİPEK) sonrası komplikasyonlara bağlı acil relaparotomi yapılan hastaların immün skorlamalarla tahmin edilip, edilemeyeceğinin değerlendirilmesi amaçlanmıştır.
GEREÇ VE YÖNTEM: Kliniğimizde 2007–2020 yılları arasında SRC&HİPEK prosedürü uygulanan 661 hasta analiz edildi. Bu hastaların 28'ine (%4.2) acil relaparotomi (URL) yapılması gerekmiştir. Hastaların 22'si (%78.6) kadın, median yaş 57 (76–24) idi. Hastaların 22'si (%78.6) 65 yaş altındaydı. Tüm standart klinikopatolojik özellikler, ameliyat bulguları ve morbid-mortalite sonuçları analiz edildi. Nötrofil-lenfosit oranı (NLR), nötrofil-trombosit oranı (NTR) ve CRP (C-reaktif protein)-albümin oranı (CAR) gibi iyi bilinen immünoskorlar belirlendi.
BULGULAR: URL için ana endikasyon ince bağırsak anastomoz kaçağıydı (n=13, %46.4). İkinci en sık endikasyon ise karın duvarı defektleriydi (eviserasyon-evantrasyon) (n=5, %17.9). Hastalarda patoloji en sık ince bağırsak kaynaklıydı. Hastaların %28.6'sına (n=8) erken ameliyat sonrası dönemde (ilk 7 gün), geri kalanına (n=20, %71.4) 7–90 gün aralığında URL yapıldı. URL hastalarının çoğu (n=16, %57.1) birden fazla komorbiditeye sahipti. Genel gruba bakıldığında, 104 (%16.4) hastada Clavien-Dindo (C-D) evre I-II ve 88 (%13.9) hastada C-D evre III-IV komplikasyon görülürken, URL hasta grubunda 22 (%78.6) hastada C-D evre III-IV komplikasyon görüldü. Bu ileriye yönelik kohortta, URL yapılmayan hastalarda genel mortalite oranı %3.2 (n=20) idi. URL hastalarında altı (%21.4) hasta ameliyat sonrası dönemde kaybedildi ve kurtarılamamanın ana nedeni entero-enteral anastomoz kaçağına bağlı sepsisti. Bu hastaların dördünde çok sayıda komorbidite vardı. URL öncesi medyan NLR, NTR ve CAR değerleri sırasıyla 9.12 (1.72–37.5), 0.03 (0.01–0.12) ve 41.4 (4.2–181.3) idi. SRC öncesi tahmin edilen NLR ve CAR değerleri (4.71 ve 28.8), ameliyat sonrası dönemde çeşitli komplikasyonlara bağlı URL yapılan hastalarda anlamlı olarak yüksekti (p=.01 ve p<.01). Bu immün skor değerleri, SRC ve URL sonrası kaybedilen hastalar arasında herhangi bir ilişki göstermedi.
TARTIŞMA: SRC sonrası URL gerektiren ciddi komplikasyonlar genellikle artan mortalite oranı, kısa sağkalım, primer tümörün erken rekürrensi, merkezin kaynaklarının tükenmesi ve yüksek maliyetlerle ilişkilidir. URL, SRC&HİPEK prosedürü için önemli bir kalite göstergesi olarak kabul edilebilir. URL ile tedavi edilen hastalarda morbi-mortalite sonuçlarını azaltmak için zamanında cerrahi müdahale ve yoğun yönetim stratejisi son derece önemli konulardır.
Anahtar sözcükler: Acil relaparotomi; hipertermik intraperitoneal kemoterapi; immün skor; sitoredüktif cerrahi.

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