Review

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Surgery in Geriatric Oncology

Geriatrik Onkolojide Cerrahi

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ABSTRACT

Surgical treatment of older patients with cancer requires careful evaluation of physiological reserve, frailty, concomitant diseases and individual health conditions. The incidence of cancer in this patient group is increasing and surgery is still considered an effective treatment option in many types of cancer. However, the surgical decision-making process in older individuals can be challenging and is often based on subjective assessments. Comprehensive geriatric assessment analyzes the functional, cognitive, psychosocial and general health status of older patients, contributes to the prediction of surgical outcomes and guides individualized treatment decisions.

Surgery can be successfully applied to older individuals with common cancer types such as breast, colon, stomach, hepatobiliary and pancreatic cancers with careful patient selection and a multidisciplinary approach. While palliative surgery aims to control symptoms and improve the quality of life in patients with advanced-stage cancer, the effectiveness of these interventions also depends on accurate assessment processes. Literature shows that older individuals can achieve similar results to younger patients in terms of morbidity and mortality after surgery. Patients for whom surgery is determined to be an appropriate treatment option should not be excluded from this option due to age-related prejudices. In conclusion, surgical treatment decisions in older patients with cancer should be made according to the general health status and frailty level of the individual, as well as tumor biology. With appropriate assessment methods, surgery can improve the duration and quality of life.

Keywords: Geriatric oncology, surgical treatment, comprehensive geriatric assessment, elderly cancer patients, palliative surgery

ÖZ

Yaşlı kanser hastalarının cerrahi tedavisi, fizyolojik rezerv, kırılganlık, eşlik eden hastalıklar ve bireysel sağlık durumlarının dikkatli değerlendirilmesini gerektirir. Bu hasta grubunda kanser insidansı giderek artmakta ve cerrahi, birçok kanser türünde hala etkili bir tedavi seçeneği olarak kabul edilmektedir. Ancak, yaşlı bireylerde cerrahi karar verme süreci zorlu olabilir ve genellikle öznel değerlendirmelere dayanır. Kapsamlı geriatrik değerlendirme, yaşlı hastaların işlevsel, bilişsel, psikososyal ve genel sağlık durumlarını analiz ederek cerrahi sonuçların tahmin edilmesine katkı sağlar ve bireyselleştirilmiş tedavi kararlarına rehberlik eder. Meme, kolon, mide, hepatobiliyer ve pankreas kanserleri gibi sık görülen kanser türlerinde yaşlı bireylerde cerrahi tedavi, dikkatli hasta seçimi ve multidisipliner bir yaklaşımla başarıyla uygulanabilir. Palyatif cerrahi, ileri evre kanser hastalarında semptom kontrolü ve yaşam kalitesini artırmayı hedeflerken, bu girişimlerin etkinliği de doğru değerlendirme süreçlerine bağlıdır. Literatür, yaşlı bireylerin cerrahi sonrası morbidite ve mortalite açısından genç hastalarla benzer sonuçlar elde edebileceğini göstermektedir. Yaşı ne olursa olsun, cerrahinin uygun bir tedavi yöntemi olduğu belirlenen hastalar, yaşa bağlı önyargılar nedeniyle bu seçeneğin dışında bırakılmamalıdır. Sonuç olarak, yaşlı kanser hastalarında cerrahi tedavi kararları, tümör biyolojisi ile birlikte bireyin genel sağlık durumuna ve kırılganlık düzeyine göre alınmalıdır. Uygun değerlendirme yöntemleriyle cerrahi, yaşam süresi ve kalitesini iyileştirebilir.

Anahtar Kelimeler: Geriatrik onkoloji, cerrahi tedavi, kapsamlı geriatrik değerlendirme, yaşlı kanser hastaları, palyatif cerrahi

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Introduction

The incidence of cancer in geriatric patients is increasing every year. Today, 15.1% of the population consists of individuals aged 65 and over, and this rate is expected to reach 21.4% in 2050. More than two-thirds of cancers are diagnosed in older individuals, and this rate is expected to increase to 70% in the next 30 years (1).

Cancer care in older individuals is a more complex process compared to other patient groups. The main reasons for this are the frequency of concomitant diseases and age-related functional disorders, increased risk of treatment-related toxicity and complications, differences in cancer-related prognostic factors, and the evaluation of non-cancer life expectancy. Failure to adequately address this complex structure may lead to overtreatment or undertreatment in older patients. As a result, more negative clinical outcomes may occur compared to younger patients.

Preoperative Optimization

The increasing incidence and prevalence of cancer in older individuals increases the need for studies on the importance and evaluation of surgical treatments. Although the relationship between aging and cancer is complex and elusive, cancer incidence increases with age, as seen in humans and animal models. As global epidemiological and demographic transitions continue, an increasing cancer burden is projected in the coming years, with more than 20 million new cases expected each year by 2025. With surgery becoming the main curative treatment for many solid tumors, the number of older patients undergoing surgery as part of their cancer treatment regimen is also expected to increase (2). Although surgery is generally considered the most effective cancer ablation treatment, complications and mortality rates, as well as length of hospital stay and need for intensive care, increase with age. This may limit the oncological advantages of surgery. In addition, delays in cancer diagnosis in older individuals lead to more frequent emergency visits, and emergency surgeries are associated with increased morbidity and mortality.

Due to the lack of clear guidelines and concerns about treatment tolerance, the rate of recommending standard cancer treatments that have been proven to increase survival to older patients is lower. Geriatric surgery patients require an approach beyond traditional preoperative assessment methods. At this point, geriatricians evaluate this group of patients with the comprehensive geriatric assessment (CGA), a multidisciplinary method. CGA is a multifaceted diagnostic process that focuses on medical, psychological, physical, functional and social dimensions. The application of CGA before surgery is critical in predicting risks such as mortality risk, postoperative complications, need for nursing home after discharge and prolonged hospital stays (3).

The importance of CGA in predicting surgical outcomes has been emphasized in many studies (4). A study of 261 patients showed that CGA-based frailty after surgery in patients over 65 years of age was significantly associated with early overall complications (5). A longitudinal evaluation of surgical intervention for gastrointestinal cancers in patients over 70 years of age revealed changes in quality of life and independence even after six months, which could be improved with focused supportive care (6).

Surgical decision-making in frail older patients is challenging due to the heterogeneity of their health status and the inadequacy of tools used to predict surgical risks. Most of the common tools currently used to predict postoperative complications focus on a single organ system and ignore the patient's physiological reserve. Therefore, multidisciplinary and holistic approaches are increasingly important in surgical evaluation and decision-making in geriatric patients

Surgical Considerations in Older Adults with Colorectal Cancer

According to the World Health Organization's 2022 data, the prevalence of colorectal cancer (CRC) in individuals over the age of 65 in Türkiye was reported as 10.7%, with 11,689 cases (7). CRC is a disease that is predominantly seen in older individuals, with approximately 50% of cases being over the age of 70, and more than 40% being over the age of 75. Surgical treatment continues to be the primary treatment method for CRC, and is often supported by chemotherapy-based strategies. However, the effects of surgery and adjuvant treatments in this group remain uncertain due to frailty, geriatric syndromes, comorbidities, polypharmacy, and decreased organ function in older individuals (8).

It has been stated that curative colon resection is generally well tolerated in older individuals, and age alone should not be a criterion for less aggressive treatment decisions. However, older patients often have significant comorbidities that increase postoperative mortality and morbidity, such as cardiovascular and pulmonary diseases (9). Therefore, patient selection for surgical procedures is critical, as this group of patients is at higher risk of developing complications (10).

The Association of Colon Proctology of Great Britain and Ireland has included studies confirming the prevalence of CRC in older individuals. It has been shown that the risk of postoperative death in patients aged 65-74 is 3.5 times higher in those aged 75-84 and 5 times higher in those aged 85 and over. However, these rates have not been adjusted for other risk factors, and the results should be interpreted with caution. It has also been reported that advanced-stage colorectal tumors are common in older individuals and that palliative surgeries are performed more frequently in this group (11).

In a study published in 2021 on patients over the age of 80 who underwent colorectal surgery, it was stated that 92.85% of the patients had one or more accompanying diseases and the postoperative complication rate was 15.10%. The mortality rate was determined to be 46.40% during the study period of 4 years, and the conclusion reached at the end of the study was that the results of CRC surgery in geriatric patients were comparable to those in young patients in terms of postoperative morbidity and mortality rates (12). In another retrospective study that included 202 patients over the age of 70 who underwent colon

or rectal cancer resection between 2016 and 2019, the patients were analyzed in terms of 90-day surgical and 1-year oncological outcomes. When 151 patients with a geriatric 8 score of ≥15 were compared with 51 patients with a score of ≤14, it was determined that the group of patients with a score of ≤14 was significantly older, more frequently malnourished, had preoperative anemia, and had more comorbidities. The results of the study showed that overall postoperative morbidity and complications at 90 days and mortality and recurrence rates at 1 year were similar between the two groups (13). These results are strong examples that the management of comorbidities before surgery can affect postoperative outcome.

Diers et al. (14) also conducted a large cohort study of 330,042 CRC patients from all over Germany to evaluate the effect of advanced age (≥80 years) on surgical treatment, postoperative complications, and mortality. The findings of the study revealed significant differences in mortality rates between the different age groups. In particular, the mortality rate after laparoscopic CRC resection in elderly patients aged 80 years and older was 5.6%, compared to 1.7% in patients aged 60-79 years and 0.4% in patients under 60 years. These results highlight the fragility of older patients and underline the need for improved management strategies for this specific group of patients undergoing CRC resection (14).

Supporting all these comments, a recent study found that CGA in adults aged 75 years and older with CRC who were considered for surgery resulted in a significant reduction in postoperative complications, reiterating the positive impact of personalized geriatric assessment on surgical outcomes in the elderly (15).

Data on rectal cancer surgery is more limited. A systematic review comparing rectal cancer treatment outcomes between older and non-young individuals showed that postoperative morbidity rates in older individuals could be as high as 40%, but these rates were not significantly different from those in younger patients. Comprehensive medical and surgical support is especially important during the first year after surgery, as survival rates in older individuals are similar to those in younger patients.

Quality of life after surgical treatment is an important factor. It has been reported that individuals aged 70 years and older who have underwent surgical resection for rectal cancer may not reach their baseline physical function during 2-year follow-up. Although the role of laparoscopic surgery for rectal cancer has expanded over the last 20 years, studies conducted between 1991 and 2011 have not shown significant improvements in early postoperative complications (e.g., anastomotic leakage, wound infection, and sexual, urinary, and fecal dysfunctions) (16-19).

Current data suggest that age alone should not be a criterion in surgical decision-making and that older individuals can achieve similar outcomes to younger patients when appropriate patient selection is made. However, this process requires a multidisciplinary approach, and more data and a practical, precise scoring system are needed.

Surgical Considerations in Older Adults with Breast Cancer

According to the World Health Organization's 2022 data, 6,330 patients with breast cancer have been reported in women over the age of 65 in Türkiye (7). In Western societies, more than one-third of patients diagnosed as having invasive breast cancer and approximately half of breast cancer-related deaths occur in individuals over the age of 70. However, data on the management of breast cancer in older individuals are limited. This is due to the fact that older patients are often excluded from clinical trials due to the prevalence of comorbidities (20,21). It is common practice to delay or completely neglect chemotherapy, radiotherapy, and surgical treatment in this patient group. However, such incomplete treatment approaches can negatively affect treatment outcomes and prognosis. Therefore, an appropriate geriatric assessment is critical to prevent unnecessary incomplete treatment and to protect patients from intolerable toxicities (22).

Surgical resection and ensuring appropriate surgical margins are one of the cornerstones of breast cancer treatment. Thanks to modern surgical and anesthesia techniques, breast cancer surgeries are generally considered safe with low complication rates. However, neglecting surgery may negatively affect treatment outcomes regardless of age, tumor stage, hormone receptor status, and HER2 status. In a study conducted in the United Kingdom on women aged 70 years and older with primary operable invasive breast cancer (T1-4N0-2M0), it was stated that age, frailty, and comorbidities affected decisions for mastectomy and axillary dissection. In addition, it was emphasized that breast cancer surgery was safe in this patient group with low to moderate adverse event rates (19.3%) and no 30-day mortality, but surgery might have negative effects on quality of life and functional independence (23-26). The type and extent of breast cancer surgery generally depend on factors such as comorbidities, functional status, and tumor stage. However, the patient's age remains an independent factor in healthcare professionals' choice of surgery type. In the study by Morgan et al. (27), it was stated that mastectomy rates were higher in the older age group. This is consistent with the retrospective study by Peters et al. (28), who showed that breast-conserving surgery was less frequently preferred in patients aged 70 years and older, and that adjuvant radiotherapy was avoided in order to minimize additional toxicities in these patients.

Surgery without axillary lymph node dissection (ALND) has been shown to be a safe option in older patients with early-stage breast cancer and clinically negative lymph nodes. Mandelblatt et al. (29) evaluated the results of ALND in patients with early-stage breast cancer who were aged 67 years and older, and reported that side effects such as lymphedema, arm pain, and shoulder movement restriction, which negatively affected quality of life, were common. In addition, a randomized study in patients aged 60 years and older with hormonal receptor-positive and clinically negative axillary lymph nodes reported that patients who did not undergo ALND had a better quality of life (30).

Sentinel lymph node biopsy (SLNB) is recommended as a less invasive alternative to axillary surgery, especially in low-risk older patients, with the aim of avoiding unnecessary treatment. However, it has been stated that SLNB may be a useful tool in determining the aggressiveness of adjuvant treatment in suitable older patients. Not performing SLNB should not be generalized to all older patients, as it may increase the risk of regional recurrence but does not have a significant effect on overall survival or breast cancer-specific survival (31-33). Axillary management requires an individualized approach shaped by clinical stage, response to chemotherapy, and SLNB findings. Several studies including older patient groups are ongoing, and it is anticipated that the results of these studies will better guide surgical decision-making processes for different scenarios.

Surgical Considerations in Older Adults with Hepatobiliary Cancer

The incidence of hepato-pancreatobiliary (HPB) malignancies is increasing, with the majority of cases occurring in patients between the ages of 60 and 80. Surgical resection, adjuvant, and neoadjuvant therapies form the basis of treatment for these cancers. Hepatocellular carcinoma is one of the most common causes of cancer-related deaths worldwide. Early studies reported higher mortality after liver resection in older individuals, but in recent years, improved patient selection and advances in surgical techniques have shown that operative mortality rates have decreased. However, the 5-year overall survival rate after liver resection in older individuals ranges from 18% to 76%. Kaibori et al. (34) reported that underlying liver diseases were more common in older patients with HPB cancer, which increased the risk of perioperative complications and worsened the prognosis. It has been stated that laparoscopic liver resection can provide similar results to younger patients without a significant difference in postoperative morbidity or mortality in carefully selected patients (34,35).

According to GLOBOCAN 2022 data, liver cancer is the 14th most common cancer type in Türkiye with 5,039 new cases annually and 9th among cancer-related deaths with 4,929 deaths (36). With the increase in average life expectancy, the number of older patients requiring liver surgery also increases. It is known that the incidence of hepatocellular carcinoma increases with age. However, the decision to undergo liver resection remains controversial due to the high prevalence of concomitant diseases and functional disabilities in older patients. Although age has been defined as an independent risk factor for complications and mortality after liver surgery, recent studies have reported that the postoperative prognoses of older patients are similar to those of young patients.

The results of 133 patients over the age of 65 who underwent liver resection at Memorial Sloan-Kettering Cancer Center between 1991 and 1993 were studied. The mortality rate was 4%, and the mean hospital stay was 13 days, compared with 11.9 days for patients under the age of 65 (p=0.02). Updated results showed that patients aged 75 and over had smaller resections and longer hospital stays. However, major complication rates and overall outcomes were similar between the two groups. However, 90-day mortality rates were noted to be higher in patients over the age of 75 (37).

In a study evaluating 856 patients who underwent major hepatectomy according to age groups (<50 years, 50-64 years, 65-74 years, ≥75 years), it was shown that age was independently associated with mortality (odds ratio: 1.039; 95% confidence interval: 1.021-1.058; p=0.0029) (38). In another study evaluating 7,764 patients who underwent liver resection for colorectal liver metastases, it was found that the 60-day mortality rate and the incidence of complications increased in patients over 70 years of age, while the 3-year overall survival rates decreased (39).

According to GLOBOCAN 2022 data, pancreatic cancer in Türkiye ranks 8th with 8,636 new cases and 4th among cancer-related deaths with 8,415 deaths. The basis of pancreatic cancer treatment is the combination of surgical resection and chemotherapy. However, pancreatic surgery has been associated with high rates of postoperative complications. Although it has been stated that age alone should not be a contraindication for pancreatic cancer surgery, surgeons are generally hesitant to perform these major surgical procedures in older patients.

Previous studies have shown that older patients are at high risk of postoperative complications due to comorbid conditions and functional disabilities. A study evaluating 2,698 patients who underwent pancreaticoduodenectomy reported that age (<80 years, 80-89 years, ≥90 years) was not an independent risk factor for perioperative morbidity or mortality (40). However, a study conducted in the USA between 1999 and 2005 found that in-hospital mortality rates (from 2.4% to 11.4%), length of hospital stay (from 11 days to 15 days), and the need for inpatient care after discharge (from 3.5% to 38.2%) increased significantly with increasing age (41).

In a recent study in which 88 patients aged 75 years and older were included, patients were evaluated using various clinical parameters such as gender, cancer type, stage, performance status, body mass index and CGA using the geriatric prognostic scoring system and it was concluded that it was useful in predicting prognosis and could provide useful information to surgeons in determining treatment strategies in older patients with liver cancer (42).

Surgical treatment in geriatric patients with hepatobiliary cancer poses significant challenges due to comorbidities that increase with age, functional disabilities, and surgery-related complication risks. However, with good patient selection and multidisciplinary approaches, significant results can be obtained from surgical treatment in these patients. Since the number of studies on hepatobiliary cancers is quite insufficient, larger-scale and standardized studies are needed.

Surgical Considerations in Older Adults with Gastric Cancer

According to GLOBOCAN 2022 data, gastric cancer ranks 7th in Türkiye with 12,773 new cases and 3rd in cancer-related deaths

with 10,457 deaths. Surgery is still considered the only curative treatment method for patients with gastric cancer. However, in most studies in this area, older patients have generally been excluded from the studies, which has limited the data. This situation increases the debate about the effectiveness and safety of extensive oncological resections in older individuals. Although perioperative complication rates have not been clearly stated in previous studies, some studies have suggested that the risk of complications after gastric cancer surgery is increased in older population, while other studies have reported that this risk is similar in older patient group compared to younger patients (43,44).

Gretschel et al. (45), who analyzed the effect of patient age and comorbidities on tumor recurrence and survival in gastric cancer, stated that more than 80% of patients over the age of 75 had extensive comorbidities and that this affected their surgical preferences. The study reported that extensive surgeries were performed 28% more frequently in patients under the age of 60; whereas, in patients over the age of 60, narrower procedures, especially subtotal resections, were preferred. In addition, it was stated that despite having the same tumor characteristics, older patients were less frequently subjected to gastrectomy, D2 lymphadenectomy, and splenectomy.

As a result, surgical and non-surgical postoperative morbidity rates in older patients did not show a significant difference compared to young patients; however, it was found that common comorbidities in patients over the age of 75 increased postoperative mortality by 8%. Kang et al. (46), who examined the risk factors for poor surgical outcomes in older patients with gastric cancer, evaluated 247 patients with a mean age of 72.8 years. In the study, 20.2% of the patients (50 patients) had postoperative complications and 8.1% (20 patients) had serious postoperative complications. Postoperative mortality was reported as 2.4% (6 patients). The mean postoperative hospital stay was determined as 17.1 days. In the study, low serum albumin level was found to be a general risk factor and a determinant of serious postoperative complications in older patients with gastric cancer. Other risk factors related to surgery included tumor size, length of operation, and procedures such as total gastrectomy.

In addition to these data, the recently published study by Yüksel et al. (47) has shown the effectiveness of robotic surgery in oncological operations in the older population. The results of the study, in which those aged 70 and over were defined as the old patient group and those under 70 as the young patient group, showed that the postoperative hospital stay, 30-day mortality and 90-day rehospitalization rates were similar in both groups (47). The data from this study once again emphasize the importance of correctly evaluating the patient population and selecting the appropriate treatment method in geriatric patients.

Palliative Surgery in Geriatric Oncology

Palliative surgery is defined as "surgery performed to provide symptom control and improve quality of life in cases where curative surgery is not an option". Such interventions focus on improving the patient's quality of life with minimal intervention and aim to provide the greatest benefit to the patient. In this context, many procedures considered "life-prolonging" have emerged as palliative practices performed to relieve pain and discomfort. The main purpose of palliative surgery in patients with cancer is to relieve symptoms caused by cancer or prevent complications (48).

No surgical intervention is risk-free, and the risk rate of palliative surgery is even higher due to the high morbidity and mortality rates. The most difficult stage in this area is the decision for surgical intervention. During this process, the problems that threaten the patient's life should be carefully evaluated. The main purpose of the surgical intervention to be performed should be clearly determined. The basic principles of palliative surgery in patients with advanced cancer can be classified as a comprehensive evaluation of the disease, providing local control, management of bleeding, discharge, fistula and pain, reconstruction and rehabilitation.

The conditions in which palliative surgery is most frequently required are skin and soft tissue cancers, gastrointestinal system cancers, breast cancer, endocrine cancers and head and neck region cancers. These surgical procedures usually include resection, reconstruction, functional repair, drainage or biopsy. The success of palliative surgery increases significantly when managed with a multidisciplinary approach and by an experienced team.

Conclusion

Surgical treatment of older patients with cancer requires accurate assessment of individuals' physiological reserves, frailty levels, and comorbidities. Although many surgeons today evaluate these factors based on their clinical experience, these approaches are often subjective and may cause some older patients to miss the opportunity for surgical treatment. This situation reveals the need for more objective and comprehensive methods to increase the predictability of surgical outcomes in older individuals.

CGA stands out as a critical tool in surgical planning by providing a detailed analysis of the general health status, frailty level, functional capacity, cognitive skills, and psychosocial factors of older patients. This approach supports the development of personalized treatment strategies by allowing an understanding of not only tumor biology but also the individual needs of the patient.

Surgery should be considered as a treatment option in older patients with cancer where age alone is not a determining factor, and can provide effective results when managed appropriately. The literature shows that with careful patient selection and multidisciplinary approaches, older patients can achieve similar results to younger patients in terms of postoperative morbidity and mortality. For this, frailty, performance status and comorbidities should be included in the surgical decision-making process.

In conclusion, surgery can be safely performed in older individuals with good assessment and adequate perioperative care. Regardless of age, patients for whom surgery is a suitable treatment option should not be deprived of this important opportunity. This

approach will not only improve quality of life but also contribute to preventing age-related inequalities in access to treatment.

Footnotes

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