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Original Article

Prognosis of Elderly Patients with Advanced Gastric Cancer without Serosal Invasion

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Abstract

Introduction: The impact of age on the prognosis of patients with gastric cancer is controversial. This study aimed to investigate the clinicopathologic features and prognosis of elderly advanced gastric cancer patients without serosal invasion compared to their younger counterparts. **Materials and Methods:** We retrospectively evaluated 43 elderly patients with advanced gastric cancer without serosal invasion. The clinicopathologic findings were compared between the elderly (age >70 years) and young (age <36 years) patients. **Results:** Significantly higher numbers of elderly patients had tumours with differentiated histology, whereas more young patients had tumours with undifferentiated histology ($P < 0.01$). Curability (risk ratio, 3.122; confidence interval, 1.242–4.779; $P < 0.001$) was an independent prognostic factor of survival. The 5-year survival rates were not significantly different between the elderly and the young patients according to the absence of serosal invasion (80.0% vs. 77.9%; $P = 0.654$) and undergoing curative resection (82.0% vs. 78.9%; $P = 0.312$). Meanwhile, among the elderly patients, those who underwent curative resection had a better survival rate than those with non-curative resection (82.0% vs. 67.8%; $P < 0.001$). **Conclusion:** Elderly patients with advanced gastric cancer without serosal invasion do not have a worse prognosis than their younger counterparts, indicating that age does not impact the prognosis of advanced gastric cancer. The important prognostic factor was whether the patients underwent curative resection.

Key words: Elderly, gastric cancer, prognosis, survival

Introduction

Although the incidence of gastric cancer is declining in the general population,[1] its incidence in the elderly is increasing. With recent increases in life expectancy, many of these patients are also undergoing surgery for gastric cancer.[2,3] The increasing incidence of gastric cancer in the elderly underlines the need for studies investigating the clinicopathologic features and prognostic factors affecting survival in these patients. However, to our best knowledge, only a few studies have reported on the follow-up of elderly patients with advanced gastric cancer without serosal invasion.

This study aimed to investigate the clinicopathologic features and prognosis of elderly patients (aged >70 years) with advanced gastric cancer without

serosal invasion in comparison with their younger counterparts (aged <36 years).

Materials and Methods

The subjects of the study were gastric cancer patients who were admitted between January 2011 and December 2016. All patients had a primary adenocarcinoma of the stomach and had no evidence of any other malignancy. Patients who had received chemotherapy were excluded. Of the 1833 patients identified, 43 patients aged >70 years were categorised in the elderly group. The clinicopathologic features and prognosis of these elderly patients were then reviewed. Information about age, sex, tumour size, tumour location, nodal involvement, the extent of lymph node dissection, histologic type, tumour stage at the initial diagnosis, operative curability, type of surgery, and survival rate was obtained from the hospital records. This study was approved by the Institutional Review Board (approval number: CNUH-2020-302).

Statistical analysis was performed using the 'Statistical Package for the Social Science (SPSS)' version 12.0 for Windows (SPSS, Inc, Chicago, IL). The survival rates of the patients were calculated using the Kaplan-Meier method, and the relative prognostic importance of the parameters was investigated using the Cox proportional hazards model. The Chi-square test was used to evaluate the statistical significance of differences and $P < 0.05$ was considered significant.

Results

Of the 43 elderly patients, 29 were men and 14 patients were women, respectively, yielding a male: female ratio of 2.1:1. The clinicopathologic characteristics of these patients are shown in Table 1. The mean age at initial diagnosis was 74.1 years (range, 71–86 years). The mean tumour size was smaller in the elderly patients (5.0 cm vs. 5.4 cm), but the difference was not statistically significant. The lower third of the stomach was the most common site of gastric cancer occurrence in both groups. According to the grade of anaplasia, 22 tumours were differentiated, whereas 21 were undifferentiated. Significantly more old patients had tumours with differentiated histology. In contrast, more young patients had tumours with undifferentiated histology (15 out of 21 patients) ($P < 0.01$).

Thirty out of 43 elderly patients had pN0 disease, whereas 13 patients had lymph node metastasis. Dissection above the D2 lymph node was performed in 88.4% of the elderly gastric cancer patients. The curative resection rate was 93.0% (40/43) in the elderly group and 95.2% (20/21) in the young group ($P = 0.736$). Subtotal gastrectomy was the most frequently performed procedure (88.4% of cases) in the elderly group. There were no significant differences in the distribution of nodal involvement and tumour stage at initial diagnosis between the two groups. Forty (93.1%) elderly patients had either Stage I or II diseases at initial diagnosis. Multivariate analysis showed that only curability was an independent prognostic factor of survival in the elderly patients (risk ratio, 3.122; confidence interval, 1.242–4.779; $P < 0.001$, [Table 2]).

There were no significant differences in the 5-year survival rates between the elderly and the young groups according to the absence of serosal invasion (80.0% vs. 77.9%; $P = 0.654$, [Figure 1]) and curative resection (82.0% vs. 78.9%; $P = 0.312$,

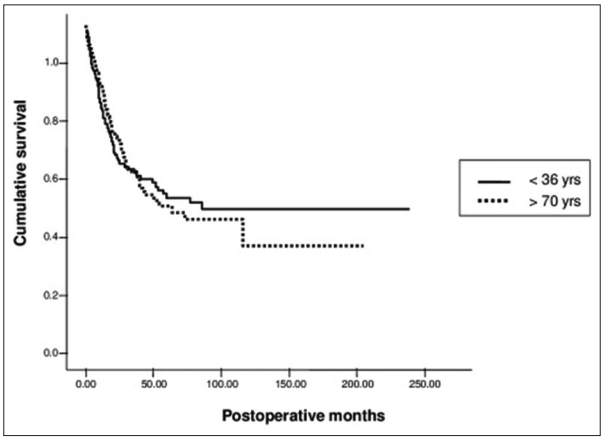

Figure 1: Survival curves of the young and elderly groups. The 5-year survival rates of elderly and young patients did not differ statistically (80.0% vs. 77.9%) (P=0.654)

Table 1: Clinicopathologic features of advanced gastric cancer without serosal invasion between elderly and young patients

Variables	Age >70 years (*n*=43) (%)	Age <36 years (*n*=21) (%)	*P*-value
Gender			
Male	29 (67.4)	10 (47.6)	<0.001
Female	14 (32.6)	11 (52.4)	
Tumour size (mean, cm)	5.0±3.2	5.4±3.3	0.480
Location			
Upper	4 (9.3)	3 (14.3)	0.108
Middle	6 (14.0)	7 (33.3)	
Lower	33 (76.7)	11 (52.4)	
Nodal involvement			
N (-)	30 (69.8)	15 (71.4)	0.893
N (+)	13 (30.2)	6 (28.6)	
Extent of lymph node dissection			
<D1	5 (11.6)	2 (9.5)	0.799
≥D2	38 (88.4)	19 (90.5)	
Histologic type			
Differentiated	22 (51.2)	6 (28.6)	0.009
Undifferentiated	21 (48.8)	15 (71.4)	
Stage			
1 and 2	40 (93.1)	17 (80.9)	0.632
3 and 4	3 (6.9)	4 (19.1)	
Curability			
Curative	40 (93.0)	20 (95.2)	0.736
Non-curative	3 (7.0)	1 (4.8)	
Operative type			
Total	5 (11.6)	5 (23.8)	0.195
Subtotal	38 (88.4)	16 (76.2)	

Table 2: Advanced gastric cancer without serosal invasion: a multivariate analysis of factors associated with age (>70 years)

Variables	Risk ratio	95% confidence interval	*P*-value
Gender (male vs. female).	0.675	0.433–1.492	0.129
Location (upper vs. distal)	0.576	0.332–0.889	0.543
Tumour size (mm) (<50 vs. ≥50)	1.723	0.834–2.756	0.878
Histologic type (differentiated vs. undifferentiated)	2.122	1.786–5.676	0.134
Curability (curative vs. non-curative)	3.122	1.242–4.779	<0.001
Lymph node metastasis (positive vs. negative)	3.676	1.987–6.544	0.909

[Figure 2]). Meanwhile, in the elderly group, those with curative resection had a better survival rate than those with non-curative resection (82.0% vs. 67.8%; $P < 0.001$, [Figure 3]).

Discussion

The prognostic impact of age on gastric cancer remains unclear. In this study, we retrospectively evaluated elderly patients with advanced gastric

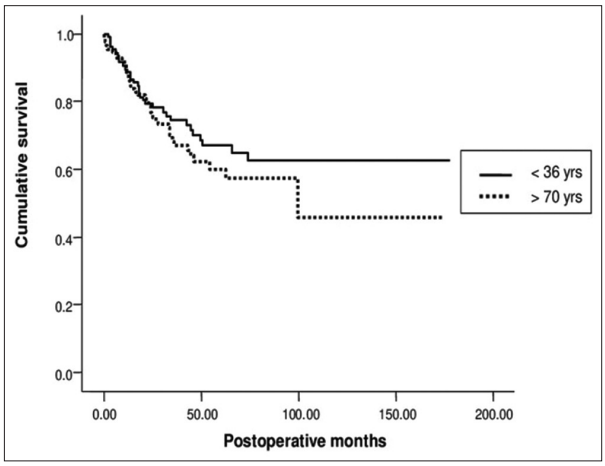

Figure 2: Survival curves of the elderly and young groups without serosal invasion; curative resection patients (82.0% vs. 78.9%) (*P*=0.312)

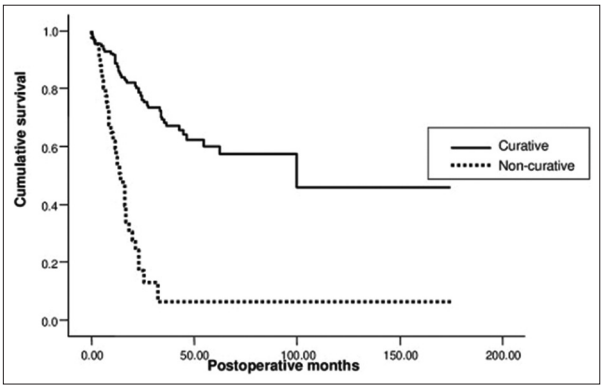

Figure 3: Survival curves of elderly patients according to resectability. Survival curves of elderly patients with curative resection had better than those of patients with non-curative resection (82.0% vs. 67.8%; *P*<0.001)

cancer without serosal invasion and compared their clinicopathologic features with those of their younger counterparts to identify prognostic survival factors in elderly patients with advanced gastric cancer without serosal invasion. We found that the elderly patients with advanced gastric cancer without serosal invasion were characterised by more male patients and differentiated histological types than the young group.

The number of elderly patients undergoing surgery for gastric cancer is increasing due to the increase in life expectancy.[2-4] However, it remains unclear whether the prognosis of gastric cancer differs between young and elderly patients. Some authors have reported an inverse relationship between age and prognosis in gastric cancer.

In our study, the sex ratio differed significantly between the elderly and young patients, with a higher proportion of men among the elderly patients (2.1:1). Several previous studies have reported similar findings.[2,5,6] In contrast, the sex ratio was approximately 1:1 among the young patients (10:11), consistent with the previous studies.[7,8] The causes of this unequal sex distribution are unclear. However, some studies suggested that men may have more prolonged exposure to environmental carcinogens than women, which could explain the predominance of male patients in the elderly group.[9]

Concerning tumour histology, the most common in elderly patients with advanced gastric cancer without serosal invasion is the differentiated type. In consistency with this, significantly more elderly patients in this study had differentiated histology. In contrast, more young patients had undifferentiated histology. Other studies have reported similar findings.[5,7,8,10] A previous analysis of the pathology of gastric cancer in 7031 patients, most of whom were older, found that 45.5% of early gastric cancers were well-differentiated adenocarcinomas, 17.4% were moderately differentiated adenocarcinomas and 37.1% were poorly differentiated adenocarcinomas.[11]

Surgery is the only curative modality for localised gastric cancer and curative resection is the only modality for long-term survival.[11,12] However, the prognostic benefit of surgery in elderly patients with gastric cancer is still controversial. Some studies proposed that a radical procedure should be performed in elderly patients with advanced gastric cancer as age alone should not be an indication for withholding surgical treatment.[10,13] In contrast, others have recommended gastrectomy in keeping with the gastric treatment guidelines for elderly patients with gastric cancer. Elderly male patients with poor nutritional intake have

been found to have a poor prognosis. Thus, only limited surgery should be considered for such patients.[4,14] Other investigators also suggested that D1 resection is an adequate modality and that post-operative chemotherapy may be unnecessary for elderly patients with gastric cancer.[15] In the present study, the curative resection rate in elderly gastric cancer patients is higher than that previously reported at 93.0%. We performed extensive lymph node dissection (D2+) in patients with advanced gastric cancer.

The post-operative mortality rate for gastric cancer patients who undergo resection ranges from 2.0% to 11.9%. However, one study reported comparable rates of operative complications between the elderly patients and a control group.[16] Gastric cancer surgery in elderly patients aged ≥ge years has achieved reasonable long-term survival despite the increased risk of severe complications.[17] In contrast, one study showed a significant association between clinical outcomes and severe post-operative complications in elderly gastric cancer patients. The prevention of these complications may improve survival.[18]

Surgery can be performed in elderly patients with gastric cancer without significant risk of complications. However, the higher prevalence of advanced disease and synchronous tumours in the elderly with gastric cancer highlights the need for careful determination of the extent of surgery.[19] Nonetheless, despite a higher post-operative mortality rate and poorer overall survival, elderly patients with T1-T2 gastric cancer should still be considered for radical surgery. The American Society of Anesthesiologists score may be useful for predicting the outcome of surgical treatment in elderly patients and could assist clinicians in planning individualised treatment strategies.[20] In our study, the rate of post-operative mortality due to resection was acceptable in elderly patients with gastric cancer. Two post-operative deaths (4.7%) occurred after resection, indicating that resection was not associated with an increased post-operative mortality rate in these elderly patients with gastric cancer.

Differences in the survival rate of elderly and young patients have been controversial. Multiple comorbidities have been reported to influence the prognosis of elderly patients possibly and careful follow-up likely improves their overall survival.[21] In the present study, there were no significant differences in the 5-year survival rate between the elderly and the young patients (80.0% vs. 77.9%). However, elderly patients with curative resection had a better survival rate than the elderly patients with non-curative resection (82.0% vs. 67.8%). In contrast, other studies reported a poorer prognosis in elderly patients than in young patients, particularly those with advanced gastric cancer.[13,16] Sex has also been reported to be the only independent prognostic factor for overall survival in elderly patients.[22] However, curability was the only independent prognostic factor for elderly gastric cancer patients in the present study and sex was not.

Survival rates did not differ significantly between elderly patients and young patients with advanced gastric cancer without serosal invasion, indicating that elderly patients do not have a poor prognosis and age has no prognostic impact on survival. The most important prognostic factor, as per this study, was curative resection.

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Authors' Contributions

Conceived and designed the analysis: HGK and DYK. Collected the data: HGK, JHL and DYK. Contributed analysis tools: HGK. Performed the analysis: JHL and DYK. Wrote the paper: HGK and DYK.