

# Characteristics and results of treatment of patients treated surgically with colorectal cancer in old and senile age

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## ABSTRACT:

Colorectal cancer (CC) in Poland is the type of cancer with the highest dynamics of disease growth and is epidemiologically related to age. The analysis involved 353 patients operated on due to CC in senile and old age and compared with younger patients. It was found that people at this age are more often diagnosed with CC. They were more often women, the patients did not differ in the stage of cancer, while they were significantly more often qualified for surgery due to urgent indications. In patients with colonic cancer, the resectability and radicality of the procedures in comparison with patients with rectal cancer was significantly higher, while there were more complications and deaths in the 30-day follow-up in this group. The overall survival in senile and old age was significantly worse. In the first year of follow-up after surgical treatment of patients in this group, complications and deaths were more frequently observed. However, in patients who survived 12 months after the operation, the overall survival rate did not significantly differ.

## KEYWORDS:

Colorectal cancer, aged patients

## INTRODUCTION

In older age, there is a decline in the adaptive abilities of a person with a reduction in independence and an increase in dependence on the environment. Oldness, according to the World Health Organization (WHO), begins after the age of 60. The age from 60 to 75 is elderly age (the so-called early old age), from 75-90, it is old age (late old age) and senile age (longevity) is over 90 years of age. The greatest fears of old people are loneliness and illness.

Colorectal cancer (CC) is epidemiologically related with age and currently in Poland, it is the cancer with the highest growth rate among malignant tumors [1]. It is the most frequently diagnosed malignancy in patients in old or senile age [2]. The prognosis for the risk of CC indicates that in 2025 in Poland, 15,500 men and 9,100 women will suffer from CC and the highest incidence of illnesses should be expected in the elderly population. The highest percentage of deaths (about 80%) due to CC will occur in the oldest age group. Hence, in this age group, particular attention should be paid to the basic clinical symptoms suggestive of CC and the introduction of screening should be considered. In very few reports on screening tests in this age group, the authors suggest improvement of treatment results due to early detection of CC at an earlier staging of cancer [3,4,5].

It is estimated that in the USA by 2030, the incidence of cancer will increase by 45% (from 1.6 million in 2010 to 2.3 million in 2030). The largest increase is in the group of older patients (by 67% compared to 11% in the group of younger patients). The percentage of operated patients in old age in the following decades has increased significantly from 15% in the 1940s to 41% in the 1970s up to 91% in the last decade [3,6,7]. Surgical treatment should be performed safely and give a chance to return to active life [8].

## MATERIALS AND METHODS

A group of older and senile patients were included in the retro-

spective study and were qualified for surgical treatment due to CC in the period from February 1994 to February 2013 in one center. The data was based on hospital treatment documentation and outpatient treatment documentation. The study excluded patients with incomplete medical documentation. The assessment of the clinical stage and the evaluation of the radicality of the operation was based on imaging performed at the Department of Radiology at University Hospital No. 2 in Bydgoszcz and histopathological examinations performed at the Department of Pathomorphology at University Hospital No. 2 in Bydgoszcz. I and II degree clinical stages were considered to be small, III and IV degree stages were considered to be large. All patients with both rectal and colon cancer were qualified for neoadjuvant and adjuvant therapy in accordance with accepted standards.

The results of this group of patients were compared with the group of younger people treated at the same time in the same center. The quantitative parameters were expressed using the mean +/- value deviation and percentage values. A log-linear analysis was used to analyze qualitative variables occurring in old and senile people. Pearson's chi-squared test was used for unrelated variables. The survival analysis was assessed by the log-rank test. The data was analyzed using the Statistica 10 program. Statistical significance was defined as  $p < 0.05$ .

## RESULTS

During 20 years (II / 1994 - II / 2013), 1,710 patients were qualified for surgery due to the first diagnosed CC. Full medical documentation was obtained in 1,378 (80.58%) patients. In this group, every fourth patient (353 / 25.69%) was in old or senile age. The mean age of the whole group (1,378 patients) was 66.26, the standard deviation was at a level of 11.38 years, while in the group of old and senile patients, the mean age was 13 years higher and amounted to 79.64, the standard deviation was 4.22 years. On the basis of multivariate analysis, it was found that the occurrence of CC in old and senile age is associated with the gender of patients. In this

**Tab. I.** The results of a comparative analysis between patients with colorectal cancer in old age and senile age compared to younger patients <75 years of age.

COLON CANCER; N = 1378		AGE <75 YEARS OF AGE N=1024	OLD AND SENILE AGE N=354	P
Gender	Females n=681	478 (46,68%)	203 (57,34%)	0,000541
	Men n=697	546 (53,32%)	151 (42,66%)	
Advanced CC	Small n=723	535 (52,25%)	188 (53,11%)	NS
	Large n=655	489 (47,75%)	166 (46,89%)	
Coexisting diseases	Cardiovascular diseases= 497	363 (35,45%)	135 (37,85%)	NS
	Lung diseases n=43	29 (2,83%)	14 (3,95%)	NS
	Type II diabetes n=221	167 (16,31%)	54 (15,25%)	NS
	Kidney failure n=49	36 (3,52%)	13 (3,67%)	NS
Tumor location	Colon n=839	609 (59,47%)	230 (64,97%)	NS
	Rectum n=539	415 (40,53%)	124 (35,03%)	
	Right part of the colon n=428	303 (49,75%)	125 (54,35%)	NS
	Left part of the colon n=411	306 (50,25%)	105 (45,65%)	

**Tab. II.** The results of a comparative analysis of the treatment of patients with colorectal cancer in old and senile age compared to younger patients <75 years of age.

COLON CANCER N=1378	AGE <75 YEARS OF AGE N=1024	OLD AND SENILE AGE N=354	P	
Urgent treatments n=229	146 (14,26%)	83 (23,45%)	0,000062	
Procedures	Resection n=1199	905 (88,38%)	294 (83,05%)	0,010157
	Radical n=1082	815 (79,59%)	267 (75,42%)	NS
Patients with postoperative complications n=182	117 (11,43%)	65 (18,36%)	0,000892	
Death n=59	32 (3,13%)	2 (7,63%)	0,000310	

age, compared to younger people, CC is significantly more common in women (57.34% vs 46.68%). The location of the tumor in the colon, especially on the right side, was more frequently observed in this group (64.97% vs. 59.47%), these differences were not statistically significant. No differences were observed in the clinical stage of the cancer or in the presence of coexistent diseases Tab. I.

In 229 (16.62%) patients with CC, surgery was performed urgently. The most common reason for the operation was mechanical bowel obstruction - 145 patients (10.52%) and gastrointestinal perforation - 77 patients (5.58%). Urgent treatments, regardless of tumor location, were performed significantly more frequently in patients in old and senile age (23.45% vs. 14.26%). Resection procedures were performed in 1199/1378/87.01% of patients. These procedures were performed significantly more often in the group of younger patients than in the old and senile patients (88.38% vs. 83.05%) and the radicality of these procedures was higher (79.59% vs 75.42%). In 182 / 13.2% of patients, there occurred 335 postoperative complications (anastomosis leakage in 32 / 2.3%, infection of operated area in 168 / 12.2%, urinary tract infection in 81 / 5.9%,

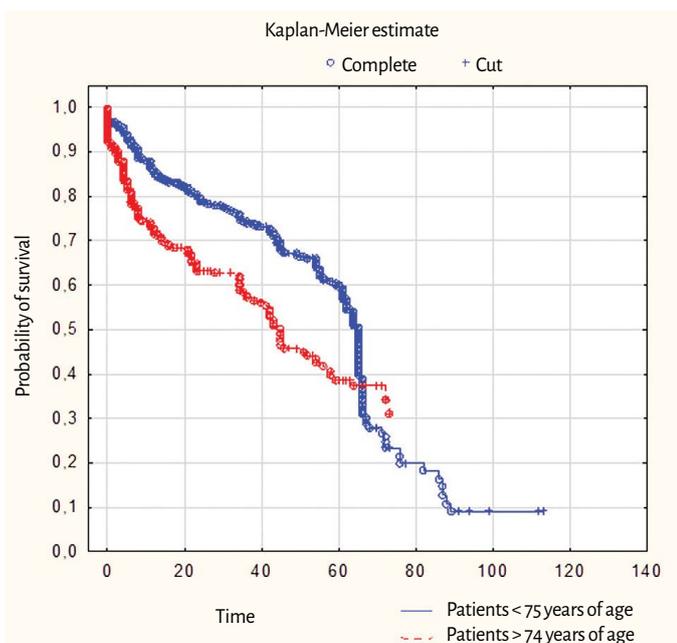
**Tab. III.** Results of a comparative analysis of treatment of patients with colon cancer in old and senile age compared to younger patients <75 years of age.

COLON CANCER N=839	AGE <75 YEARS OF AGE N=609	OLD AND SENILE AGE N=230	P	
Urgent treatments n=173	112 (18,36%)	60 (26,09%)	0,013770	
Procedures	Resection n=749	548 (89,98%)	201 (87,39%)	NS
	Radical n=659	481 (78,98%)	178 (77,39%)	NS
Patients with postoperative complications n=116	70 (11,49%)	46 (20,00%)	0,001453	
Death n=40	20 (3,28%)	20 (8,70%)	0,001033	

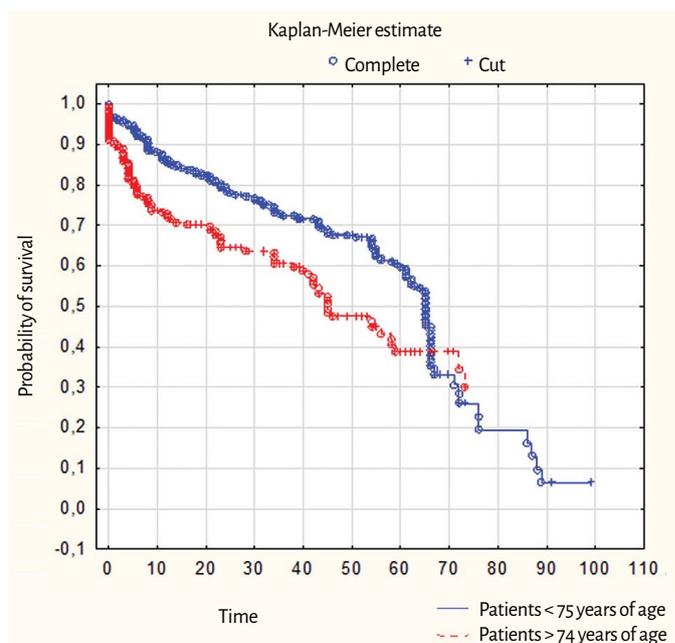
**Tab. IV.** Results of a comparative analysis of treatment of patients with rectal cancer in old and senile age compared to younger patients <75 years of age.

RECTAL CANCER N=539	AGE <75 YEARS OF AGE N=415	OLD AND SENILE AGE N=124	P	
Urgent treatments n= 60	39 (9,40%)	60 (16,94%)	0,019195	
Procedures	Resection n=450	357 (86,02%)	93 (75,00%)	0,003718
	Radical n=423	334 (80,48%)	89 (71,77%)	0,038423
Patients with postoperative complications n = 66	47 (11,33%)	19 (15,32%)	NS	
Death n=19	12 (2,89%)	7 (5,65%)	NS	

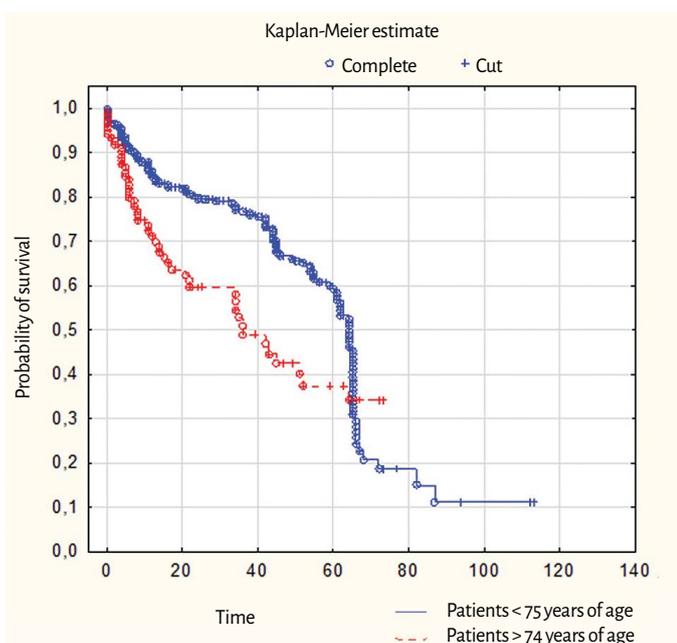
respiratory infection in 54 / 3.9%, others in 14 / 1.0%). Post-operative complications and 30-day mortality occurred more frequently in patients in old and senile age (18.36% vs. 11.43% and 7.63% vs 3.13% respectively) Tab. II.



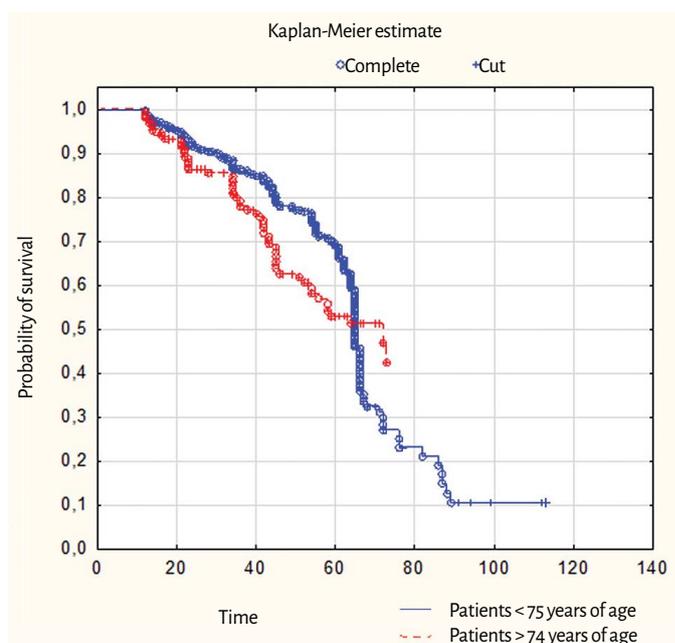
**Fig. 1.** Survival of patients with CC depending on their age.  
Log-rank test WW = -43.27 Total = 513.88 War = 98.171 Test statistics -4.36741  
p = 0.00001.



**Fig. 2.** Survival of patients with colon cancer depending on their age.  
Log-rank test WW = -27.55 Total = 312.87 War = 62.331 Test statistics -3.48894  
p = 0.00048.



**Fig. 3.** Survival of patients with rectal cancer depending on their age.  
Log-rank test WW = -15.46 Total = 198.28 War = 35.187 Test statistics -2.60658  
p = 0.00915.



**Fig. 4.** Survival of patients with CC depending on age after the first year of observation.  
Log-rank test WW = 6.2619 Total = 295.25 War = 49.874 Test statistics 0.8866817  
p = 0.37525.

In the group of old and senile patients, in whom the tumor was located in the rectum, in comparison to younger patients, surgical procedures were significantly more often unresectable and non-radical (25.00% vs. 13.98% and 28.23% vs. 19.52%, respectively). These differences were not observed in patients with colon cancer. However, in patients with colon cancer, postoperative complications and deaths were significantly more frequent (20.00% vs. 11.49% and 8.70% vs. 3.28%, respectively), which was not observed in patients with rectal cancer Tab. III, IV.

The 5-year survival of old and senile patients was significantly wor-

se compared to younger patients (38.8% vs 59.6%) regardless of the tumor location (Fig. 1, 2, 3). The mean survival in the whole analyzed group was 30.64, standard deviation amounted to 23.28 months. This survival was slightly longer in patients with colon cancer compared to patients with rectal cancer (31.08 standard deviation 22.75 vs 29.96, standard deviation 23.85 months). The total survival after treatment of patients with CC in the group of old and senile people is significantly worse, regardless of the location of the tumor (Fig. 1, 2, 3). The average survival time in this group of patients was shorter by 9 months compared to younger patients (23.89 months standard deviation 21.95 vs 32.98 months standard deviation 23.15).

In the first 12 months of follow-up, in the entire group of 1,378 patients, 415 / 30.12% died. These were significantly more often old and senile patients and more frequently patients with rectal cancer (41.53% vs. 26.17%  $p < 0.0001$  and 45.30% vs. 36.45%  $p = 0.002006$ , respectively). In the group of patients who survived the first year after surgery, the median survival rate was 41.58, standard deviation 19.14 months. It was slightly lower in the group of old and senile patients compared to younger patients (37.64 standard deviation 18.98 months vs 42.66, standard deviation 19.06 months). Analyzing the overall survival of this group of patients, a higher 5-year survival rate was found in younger patients, however, this difference was not statistically significant (69.53% vs. 52.98%) (Fig. 4).

## DISCUSSION

In 2030, approximately 70% of all malignancies will be diagnosed in the elderly [9]. Currently, the highest percentage (70%) of CC occurrence is recorded at the age of 65 years, and 40% of patients are over 75 years old [10]. They are mostly patients with a high clinical stage of cancer, burdened with numerous co-morbidities [2,6,11,12,13,14]. There is a domination of women in all studies among elderly people, and in this group, CC is diagnosed more often (on average 53.3%) [3,6,7,13]. In the group of patients with CC, ¼ of patients (353/1378 / 25.69%) are old or senile patients, and women were also dominant in this group (57.34% vs 46.68%). In the works where tumor localization was compared in patients with CC depending on age, it was found that the tumor in the elderly is significantly more common in the right half of the colon (19 - 49.3% vs. 9 - 30.9%) [11, 12, 15]. In our material, when analyzing the location of lesions in the colon (although no statistical significance was shown), this difference was also found (64.97% vs. 59.47%). Most researchers emphasize the higher incidence of co-morbidities in this group of patients, in particular ischemic heart disease and chronic lung diseases [2,6,11,12,13,16]. In the studied group, in 497/1378 / 36.07%, cardiovascular diseases were observed and in 43/1378 / 3.12% there were chronic lung diseases. They were more frequent in the older group of patients, but no statistically significant differences were found. We found a large degree of clinical staging (III and IV degree) in almost half of our patients 655/1378 / 47.54%. As in most publications, we did not find the dependence of the stage of cancer on the patient's age [2,3,6,11,13,15]. Despite the lack of this difference, it is observed that urgent procedures are more often performed in the group of elderly patients. In this group, on average 17.2% (9-33%) have intestinal obstruction, intestinal perforation or tumor hemorrhage [7,12,14,16,19,29]. In the analyzed group of patients, urgent procedures were performed in 229/1378 / 16.62% of patients and they related significantly more frequently to patients in old and senile age (23.45% vs 14.26%) in both patients with rectal and colon cancer.

Recent population studies of surgical treatment of patients with CC in elderly indicate a clear increase in the percentage of both resection (82.9-97%) and radical procedures (up to 72.5%) [3,11,17]. A review analysis of 28 studies (34,194 patients) showed that in patients with CC in elderly age, resection is lower, 67% vs 76% [18]. A multicenter study of 19,080 patients performed in Germany also showed a significantly ( $p < 0.001$ ) lower resection in patients in older age [12]. Despite the lack of differences in the clinical stage of cancer and the prevalence of comorbidities in the studied group of patients in senile and senile age, our study also

found this dependence. In the whole group of patients, in 87.01%, resection procedures were performed and 78.52% of them were radical treatments. In patients in old and senile age, the percentage of resection procedures was significantly lower compared to younger patients (83.05% vs. 88.38%). However, the radicality of these treatments was at the same level.

In our patients after surgical procedures in a 30-day follow-up, 182/1378 / 13.21% had complications and 59/1378 / 4.28% patients died. Both postoperative complications and deaths were significantly more frequent in the group of old and senile patients (18.36% vs. 11.43% and 7.63% vs. 3.13%, respectively). Other researchers also report a high percentage of complications of operated patients in old age. In patients over 80 years of age, they were observed in approximately 21-43.5%, on average in approximately 40.7% [2,3,6,12,15]. In the studies of Marusch et al. and in the studies of Smith et al. ( $p < 0.001$ ), more frequent complications were observed in older patients (above 80 years of age) (43.5% vs 33.9% and 46.4% vs 22, 6% respectively) [12, 15].

In the studied group in patients, both the scope of surgical procedures and the postoperative course were dependent on the location of the tumor. In patients operated on for colon cancer in old and senile age compared to younger patients, postoperative complications and deaths in 30-day follow-up were significantly more frequent (20.00% vs. 11.49% and 8.70% vs 3.28% respectively) with very similar resection and radicality of treatment. However, in patients operated on for rectal cancer in this group, the resection and radicality of the treatments was significantly lower (75.00% vs. 86.02% and 71.77% vs 80.48%, respectively) with no difference in the incidence of postoperative complications and deaths in 30-day observation. This difference is probably due to more cost-effective treatments performed in patients with worse prognoses (old and senile patients) with difficult tumor localization (rectum).

The literature underlines the poorer prognosis of patients with CC in old and senile age compared to younger patients. Postoperative mortality according to the majority of authors is relatively high from 1.0 to 25% [2,3,7,13,19]. 5-year survival rates reported in the literature are much worse and amount to 12-44% [2,6,13,19]. In the analysis of 914 consecutive patients with CC, in the group of old and senile patients, Fontani et al. observed significantly higher post-operative mortality (5.9% vs 2.1%) and a significantly worse 5-year survival rate (16.2% vs. 35.1%) [16]. In our analysis, 30-day mortality was also significantly higher and the 5-year survival rate in the entire study group was significantly worse in the group of old and senile patients compared to younger patients (7.63% vs 3.13% and 38.8% vs. 59.6%, respectively). The average survival rate in this group was 9 months lower (23.89 statistical deviation 21.96 vs. 32.98 vs. 23.16 months).

The majority of patients with CC in the old age group dies within the first year after surgery [20,21]. According to the majority of researchers, the analysis of the overall survival of patients in this age group who survive the first year after surgery did not show a difference in comparison to the group of younger patients [22,23,24,25,26]. In the examined group of patients, 59/1378 / 4.28% patients died in the first 30 days after surgery, and 415/1378 / 30.12% died by the end of the first year of observation. In the group of patients who died during the first year of follow-up, there were significantly more patients in old and senile age (41.53%

vs. 26.17%). Analysis of the overall survival of patients who survived the first year did not show significant differences in survival compared to younger people.

Surgical treatment of patients with CC in old or senile age should be planned individually and performed safely. If, after an operation due to CC, we have a chance to obtain longer life expectancy and a return to an active life, then the patient's age should not be significant in the qualification for surgery. Special attention should be paid to very intensive monitoring of patients in the first year after surgery due to the greatest health and life risks of patients during this period.

## CONCLUSIONS

1. Patients with CC in old and senile age do not significantly differ in the clinical advancement of cancer from younger patients, and they are significantly more often women.
2. In old and senile patients, significantly more operations were

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