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Is increased chronological age a contraindication to debulking surgery for elderly patients with advanced ovarian cancer?

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Is increased chronological age a contraindication to debulking surgery for elderly patients with advanced ovarian cancer?

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이 논문을 의학석사 학위논문으로 제출함
2022년 10월

서울대학교 대학원
의학과 산부인과학 전공
문 재 희

문재희의 의학석사 학위논문을 인준함
2023년 1월

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Abstract

Is increased chronological age a contraindication to debulking surgery for elderly patients with advanced ovarian cancer?

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Although debulking surgery is a significant factor in improving the prognosis of advanced ovarian cancer, it may lead to increased surgical morbidity and mortality in elderly patients. However, some studies suggest that there are other stronger contributing factors to such risk. Through this study, we aim to explore the impact of old age on surgical outcomes and complications.

We collected data of elderly patients aged 65 years and older who underwent debulking surgery for advanced ovarian cancer. A total of 120 patients were identified and classified as follows: group 1, 65–69 years (n = 58); group 2, 70–74 years (n = 38); group 3, 75–79 years (n = 17); group 4, ≥ 80 years (n = 7).

There were no differences in most of the characteristics, surgical extent and outcomes, and postoperative complications between the four groups, whereas polypharmacy was more common (85.7% vs 27.6–34.2%, p = 0.02) and operation time was shorter (median,

194 vs. 285–330 min, p = 0.02) in group 4. Factors related to frailty rather than age, polypharmacy, preoperative albumin level, estimated blood loss, and transfusion increased the risk of postoperative complications.

Thus, increased age is not the determining cause of increased morbidity and mortality in elderly patients. Instead, there are other aspects that can better predict prognosis. In conclusion, increasing old age is not a contraindication to performing debulking surgery in advanced ovarian cancer.

Keywords : aged; ovarian neoplasm; postoperative complications; prognosis; surgical procedure

Student Number : 2020-21641

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Chapter 1. Introduction

1.1. Study background

Although the definition of old age remains controversial in evaluating whether surgery is appropriate, most studies agree that 65 years of age can suffice as the lower limit of the elderly population (Schuurman et al. 2018). The increase in life expectancy in the elderly population has led to a simultaneous increase in various types of cancer, and ovarian cancer has become an issue of deep concern in elderly women because its incidence continues to escalate in old ages with high mortality (Freyer et al. 2013). However, elderly patients with ovarian cancer are expected to have a poor prognosis when compared with younger patients because various factors including underlying diseases and poor general status interfere treatment, leading to less aggressive treatment (Freyer et al. 2013; Tortorella et al. 2017).

Regardless of age, optimal debulking surgery is still the determining factor for improving the prognosis of ovarian cancer, and the criteria for optimal debulking surgery have changed from residual tumor size less than 1 cm to no gross residual tumor after debulking surgery in recent years, suggesting the high preference of gynecologic oncologists for radical surgery (Park et al. 2019). However, it is burdensome to perform radical surgery on elderly patients with advanced ovarian cancer because surgical morbidity and mortality can increase in these patients (Wright et al. 2011; Thrall et al. 2011). On the other hand, other studies suggest that age alone may be not a risk factor for surgical morbidity in elderly patients with advanced ovarian cancer, and only underlying comorbidities may increase surgical morbidity and mortality (Monson et al. 2003; Fanfani et al. 2012; Chéreau et al. 2011).

1.2. Purpose of research

Given this controversy, there is still conflict on the safety of

performing radical surgery in elderly patients with advanced ovarian cancer. Thus, we conducted this study to investigate whether old age may be an independent risk factor of postoperative complications in patients with advanced ovarian cancer.

Chapter 2. Methods

2.1. Patients

The Institutional Review Board of Seoul National University approved this study (No. 1908-168-1058), and the requirement for written informed consent was waived in advance. This is a retrospective and single institutional study including consecutive patients with advanced ovarian cancer treated in our institute between January 2005 and June 2019. The inclusion criteria were as follows: patients aged 65 years and older; those with epithelial ovarian cancer; those who underwent debulking surgery; those with International Federation of Obstetrics and Gynecology (FIGO) stage IIIC to IVB disease; those with the American Society of Anesthesiology (ASA) physical status classification system score 1 to 3 (Mayhew et al. 2019).

We collected the data of all patients as follows: age, ASA score, body mass index (BMI, kg/m2), FIGO stage, histology, grade, preoperative hemoglobin and albumin levels, types of debulking surgery (primary debulking surgery versus interval debulking surgery following neoadjuvant chemotherapy), polypharmacy, and the Charlson Comorbidity Index (CCI) score. All patients were divided according to age as follows: group 1, 65 to 69 years; group 2, 70 to 74 years; group 3, 75 to 79 years; and group 4, 80 years and older and their BMI was categorized based on the Asia-Pacific classification (World Health Organization Regional Office for the Western Pacific 2000). Polypharmacy was defined as five or more medications (Masnoon et al. 2017), and CCI scored patients according to 19 underlying comorbidities, including cardiovascular disease, diabetes mellitus, liver disease, and pulmonary disease, which are weighted based on the gravity of each disease (Charlson et al. 1987; Glasheen et al. 2019).

2.2. Surgical extents and outcomes

We investigated the surgical extent, described as types of surgical procedures, relevant tumor involvement on pathologic examination, and the overall complexity. To evaluate the level of surgical complexity, we modified the Surgical Complexity Score (SCS) system by adding more complicated procedures such as distal pancreatectomy, cholecystectomy, portal triad stripping, adrenalectomy, and lymphadenectomy in the cardiophrenic, internal mammary, and supraclavicular regions (Aletti et al. 2011). In the modified SCS system, 21 procedures were scored from 1 to 3, and total scores divided all patients into the following three complexity score groups: low, ≤3; intermediate, 4–7; high, ≥8 (Table 1). We also collected data on surgical outcomes, including residual tumor size, operation time, estimated blood loss, intraoperative transfusion of red blood cell, and hospitalization.

2.3. Postoperative complications

Postoperative complications occurring within 30 days were quantified with the Memorial Sloan Kettering Cancer Center (MSKCC) Surgical Secondary Events Grading System, which grades the severity of early postoperative complications based on the required intervention (Strong et al. 2015). Based on the system, we graded the severity of postoperative complications within 30 days from 1 to 5, with a higher grade implying more active or aggressive management.

2.4. Statistical analysis

Clinical variables were compared and analyzed between the four age groups using the Kruskal–Wallis with posthoc Mann–Whitney U, Chi–square, and Fisher exact tests. Multivariable logistic regression was further used to investigate factors affecting postoperative complications. All statistical tests were two–sided,

and P <0.05 was considered statistically significant. All statistical analyses were performed using SPSS software version 21.0 (SPSS Inc., Chicago, IL, USA).

Chapter 3. Results

3.1. Characteristics

A total of 120 patients was included, and 58 (48.3%), 38 (31.7%), 17 (14.2%), and 7 (5.8%) patients were categorized into groups 1 to 4 respectively. Figure 1 shows an increasing trend of elderly patients who underwent debulking surgery after 2012 in our institute. Table 2 depicts clinicopathologic characteristics of all patients and there were no differences in ASA score, BMI, FIGO stage, histology, grade, preoperative hemoglobin and albumin levels, types of surgery, and CCI score between the four groups. However, polypharmacy significantly increased in group 4 when compared to groups 1 to 3.

3.2. Surgical extents and outcomes

According to table 3, there was no significant difference in surgical procedures, tumor involvement, numbers of surgical procedures and modified SCS among the four groups. As for surgical outcomes, residual tumor size, estimated blood loss, amount of transfusion, and hospitalization did not differ among the four groups. However, operation time was significantly shorter in group 4 than in the other groups (Table 4).

3.3. Postoperative complications

In terms of postoperative complications within 30 days, there were no differences in heart failure or arrhythmia, pleural effusion, pneumonia, gastroenteritis, ileus, bowel perforation, urinary tract infection, voiding difficulty, pulmonary thromboembolism, deep vein thrombosis, hemorrhage, wound and abdominal infection between the four groups. However, three patients in group 1 died of pneumonia (n=1), bowel perforation (n=1), and urinary tract

infection (n=1), and one patient in group 2 died of septic shock due to wound infection (n=1) (Table 5).

When we evaluated factors that may affect postoperative complications scoring grade 1 and more by using multivariable logistic analysis, BMI, ASA and CCI score, modified SCS, polypharmacy, preoperative albumin level, estimated blood loss, and amount of transfusion were factors that increased the risk of postoperative complications. However, age, FIGO stage, histology, grade, preoperative hemoglobin level, types of debulking surgery, numbers of surgical procedures, residual tumor size, operation time, and hospitalization were not associated with a rise in postoperative complications (Table 6).

Chapter 4. Discussion

The notion that old age may be related to an increase of morbidity or mortality after debulking surgery for advanced ovarian cancer can lead to undertreatment in elderly patients (Schuurman et al. 2018; Jørgensen et al. 2012; Bun et al. 2019). Previous studies have shown that the number of elderly patients receiving the standard treatment for advanced ovarian cancer gradually decreased as age increased, with a significant portion aged 80 years and older not receiving any treatment (Schuurman et al. 2018). Moreover, patients aged 70 years and older were reportedly excluded from both appropriate surgical and medical treatment (Jørgensen et al. 2012). It suggests the inclination to avoid radical surgery for treating advanced ovarian cancer in elderly patients due to an increase in surgical morbidity and mortality after debulking surgery (Schuurman et al. 2018; Tew et al. 2015).

In contrast, this study suggests that old age itself was not a factor for impaired surgical outcomes after debulking surgery for advanced ovarian cancer. Especially, the number of elderly patients aged 65 years and older undergoing debulking surgery increased after 2012 in our institute. This finding is similar to a result from a previous study where no gross residual tumor instead of residual tumor size less than 1 was the preferred criterion for optimal debulking surgery since 2010, suggesting the recent preference for radical surgery even in elderly patients (Park et al. 2019). We also found that most surgical extents and outcomes did not deteriorate with increasing old age. Surprisingly, operation time was significantly shorter in patients aged 80 years and above than other age groups. We thought that operation time could have been shorter because of no complex surgery such as liver resection and cardiophrenic lymphadenectomy in these patients.

On the other hand, old age remains a controversial factor concerning postoperative complications and increased mortality after debulking surgery for advanced ovarian cancer. Some studies

suggested that increasing old age should not be a contraindication for debulking surgery because other factors such as BMI, ASA and CCI scores, preoperative hemoglobin and albumin levels, and polypharmacy were directly related to postoperative complications (Glasheen et al. 2019; Jørgensen et al. 2012; Kumar et al. 2016; Revenig et al. 2015). Moreover, clinical outcomes between young and old patients have been reported to similar after debulking surgery (Fanfani et al. 2012; Chéreau et al. 2011; McLean et al. 2010).

This study also showed that there was no increase in postoperative complications with increasing age, suggesting that old age itself was not a risk factor for postoperative complications. Rather, BMI, ASA and CCI scores, the modified SCS, polypharmacy, preoperative albumin level, estimated blood loss, and amount of transfusion increased postoperative complications. These factors reflect physical frailty, reducing patients' physiological reserve and increasing the vulnerability to disability when surgical stress is applied (Freyer et al. 2013; McLean et al. 2010), thus suggesting that these factors can be considered more accurate factors for predicting morbidity and mortality after debulking surgery (Lin et al. 2016). Furthermore, chemotherapy, not surgery, may be more strongly associated with undertreatment due to an increase in age because old age is known to be related to an increased risk of toxicities and dose reduction in elderly patients with advanced ovarian cancer (Joseph et al. 2015; Hilpert et al. 2007; Hurria et al. 2011).

Although this study has some strengths, including detailed information about surgical outcomes and postoperative complications quantified with scoring systems for objective evaluation, it contains limitations such as a small number of elderly patients and a retrospective design. Thus, further studies using a large number of elderly patients based on a prospective design are required to confirm the results of this study.

In conclusion, the impact of old age on postoperative complications may be minimal when performing debulking surgery

for advanced ovarian cancer. Instead, other factors reflecting the physical frailty of surgical stress should be carefully considered to assess the suitability of debulking surgery.

Table 1. Modified Surgical Complexity Score (SCS) System

Procedures	Scores
Hysterectomy with salpingo-oophorectomy	1
Omentectomy	1
Pelvic lymphadenectomy	1
Para-aortic lymphadenectomy	1
Paracolic peritonectomy	1
Pelvic peritonectomy	1
Diaphragmatic peritonectomy	2
Splenectomy	2
Distal pancreatectomy	2
Cholecystectomy	2
Liver resection/s	2
Portal triad stripping	3
Appendectomy	1
Small bowel resection/s	1
Prophylactic ileostomy	1
Large bowel resection/s above the rectosigmoid colon	2
Low anterior resection of the rectosigmoid colon	3
Adrenalectomy	2
Cardiophrenic lymphadenectomy	2
Internal mammary lymphadenectomy	2
Supraclavicular lymphadenectomy	2
Complexity score groups	Total

	scores
Low	≤3
Intermediate	4–7
High	≥8

Table 2. Characteristics

Characteristics	Group 1 (n=58, %)	Group 2 (n=38, %)	Group 3 (n=17, %)	Group 4 (n=7, %)	P value
ASA score					0.69
1	12 (20.7)	6 (15.8)	2 (11.8)	0 (0)	
2	35 (60.3)	21 (55.3)	12 (70.6)	5 (71.4)	
3	11 (19.0)	11 (28.9)	3 (17.6)	2 (28.6)	
BMI (kg/m^2)					0.97
Underweight (<18.5)	1 (1.7)	1 (2.6)	1 (5.9)	0 (0)	
Normal (18.5–22.9)	15 (25.9)	10 (26.3)	4 (23.5)	1 (14.3)	
Overweight (23–24.9)	19 (32.8)	14 (36.8)	4 (23.5)	3 (42.9)	
Obese (≥25)	23 (39.7)	13 (34.2)	8 (47.1)	3 (42.9)	
FIGO stage					0.82
IIIC	33 (56.9)	20 (52.6)	10 (58.8)	5 (71.4)	
IV	25 (43.1)	18 (47.4)	7 (41.2)	2 (28.6)	
Histology					0.16
HGSC	46 (79.3)	30 (78.9)	14 (82.4)	3 (42.9)	
Non-HGSC	12 (20.7)	8 (21.1)	3 (17.6)	4 (57.1)	
Grade					0.29
1	4 (6.9)	3 (7.9)	0 (0)	0 (0)	
2	2 (3.4)	2 (5.3)	2 (11.8)	1 (14.3)	

3	51 (87.9)	30 (78.9)	12 (70.6)	5 (71.4)	
Unknown	1 (1.7)	3 (7.9)	3 (17.6)	1 (14.3)	
Preoperative hemoglobin (g/dl, median, range)	11.6 (8.8, 15.0)	11.5 (9.1, 14.0)	11.4 (8.6, 12.7)	10.5 (8.2, 11.4)	0.06
Preoperative albumin (g/dl, median, range)	3.9 (2.1, 4.7)	3.8 (2.3, 4.6)	3.5 (2.8, 4.2)	3.6 (3.0, 4.2)	0.15
Types of surgery					0.28
Primary debulking surgery	36 (62.1)	22 (57.9)	12 (70.6)	2 (28.6)	
Interval debulking surgery	22 (37.9)	16 (42.1)	5 (29.4)	5 (71.4)	
Polypharmacy	16 (27.6)[a,b]	13 (34.2)[a, c]	5 (29.4)[b, c]	6 (85.7)	0.02
CCI score					0.38
0	36 (62.1)	24 (63.2)	10 (58.8)	1 (14.3)	
1	9 (15.5)	7 (18.4)	5 (29.4)	4 (57.1)	
2	7 (12.1)	4 (10.5)	2 (11.8)	2 (28.6)	
3	5 (8.6)	2 (5.3)	0 (0)	0 (0)	
≥4	1 (1.7)	1 (2.6)	0 (0)	0 (0)	

[a, b, c] There was no statistically significant difference between the two groups with the same characters.

All patients were divided according to age: group 1, 65 to 69 years; group 2, 70 to 74 years; group 3, 75 to 79 years; and group 4, 80 years and older.

Abbreviations: ASA, American Society of Anesthesiologists; BMI, body mass index; CCI, Charlson Comorbidity Index; FIGO, Internal Federation of Gynecology and Obstetrics; HGSC, High-grade serous carcinoma.

Table 3. Surgical extents

Characteristics	Group 1 (n=58, %)	Group 2 (n=38, %)	Group 3 (n=17, %)	Group 4 (n=7, %)	P value
Surgical procedures					
Hysterectomy with salpingo-oophorectomy	58 (100)	38 (100.0)	17 (100)	7 (100)	-
Omentectomy	57 (98.3)	37 (97.4)	16 (94.1)	7 (100.0)	0.77
Pelvic lymphadenectomy	47 (81.0)	31 (81.6)	10 (58.8)	6 (85.7)	0.21
Para-aortic lymphadenectomy	39 (67.2)	25 (65.8)	9 (52.9)	4 (57.1)	0.71
Paracolic peritonectomy	22 (37.9)	19 (50.0)	9 (52.9)	2 (28.6)	0.45
Pelvic peritonectomy	26 (44.8)	15 (39.5)	8 (47.1)	3 (42.9)	0.94
Diaphragmatic peritonectomy	18 (31.0)	15 (39.5)	4 (23.5)	3 (42.9)	0.61
Splenectomy	9 (15.5)	5 (13.2)	4 (23.5)	2 (28.6)	0.64
Distal pancreatectomy	2 (3.4)	3 (7.9)	0 (0)	0 (0)	0.49
Cholecystectomy	7 (12.1)	2 (5.3)	1 (5.9)	1 (14.3)	0.63

Liver resection/s	2 (3.4)	4 (10.5)	2 (11.8)	0 (0)	0.38
Portal triad stripping	0 (0)	0 (0)	1 (5.9)	0 (0)	0.11
Appendectomy	40 (69.0)	23 (60.5)	11 (64.7)	1 (14.3)	0.05
Small bowel resection/s	6 (10.3)	4 (10.5)	0 (0)	0 (0)	0.44
1 segment	5 (8.6)	4 (10.5)	0 (0)	0 (0)	0.39
≥2 segments	1 (1.7)	0 (0)	0 (0)	0 (0)	0.78
Prophylactic ileostomy	9 (15.5)	4 (10.5)	4 (23.5)	0 (0)	0.41
Large bowel resection/s above the rectosigmoid colon	15 (25.9)	12 (31.6)	4 (23.5)	1 (14.3)	0.77
Low anterior resection of the rectosigmoid colon	12 (20.7)	12 (31.6)	2 (11.8)	1 (14.3)	0.35
Adrenalectomy	1 (1.7)	1 (2.6)	0 (0)	1 (14.3)	0.21
Lymphadenectomy					
Cardiophrenic	3 (5.2)	3 (7.9)	3 (17.6)	0 (0)	0.31
Internal mammary	2 (3.4)	1 (2.6)	0 (0)	0 (0)	0.84
Supraclavicular	1 (1.7)	3 (7.9)	0 (0)	0 (0)	0.29

Tumor involvement					
Uterus	42 (72.4)	28 (73.7)	14 (82.4)	4 (57.1)	0.64
Adnexa	55 (94.8)	38 (100)	17 (100)	7 (100)	0.63
Omentum	41 (70.7)	30 (78.9)	10 (58.8)	5 (71.4)	0.49
Pelvic lymph nodes	24 (41.4)	22 (57.9)	6 (35.3)	1 (14.3)	0.10
Para-aortic lymph nodes	26 (44.8)	20 (52.6)	4 (23.5)	1 (14.3)	0.09
Paracolic peritoneum	18 (31)	18 (47.4)	8 (47.1)	2 (28.6)	0.33
Pelvic peritoneum	23 (39.7)	15 (39.5)	7 (41.2)	3 (42.9)	0.99
Diaphragm peritoneum	17 (29.3)	15 (39.5)	4 (23.5)	1 (14.3)	0.44
Spleen	8 (13.8)	4 (10.5)	4 (23.5)	1 (14.3)	0.65
Pancreas	1 (1.7)	2 (5.3)	0 (0)	0 (0)	0.58
Gall bladder	4 (6.9)	0 (0)	0 (0)	0 (0)	0.22
Liver	2 (3.4)	3 (7.9)	2 (11.8)	0 (0)	0.49
Portal triad	0 (0)	0 (0)	1 (5.9)	0 (0)	0.11

Appendix	29 (50)	20 (52.6)	8 (47.1)	0 (0)	0.08
Small bowel	6 (10.3)	3 (7.9)	0 (0)	0 (0)	0.45
Large bowel	21 (36.2)	17 (44.7)	6 (35.3)	1 (14.3)	0.47
Adrenal gland	0 (0)	0 (0)	0 (0)	1 (14.3)	0.12
Cardiophrenic lymph nodes	3 (5.2)	3 (7.9)	1 (5.9)	0 (0)	0.86
Internal mammary lymph nodes	2 (3.4)	1 (2.6)	0 (0)	0 (0)	0.84
Supraclavicular lymph nodes	1 (1.7)	3 (7.9)	0 (0)	0 (0)	0.29
No. of surgical procedures (median, range)	6 (3, 13)	6 (3, 16)	5 (2, 15)	5 (3, 9)	0.46
Modified Surgical Complexity Score					0.29
Low (≤3)	4 (6.9)	1 (2.6)	4 (23.5)	1 (14.3)	
Intermediate (4–7)	25 (43.1)	18 (47.4)	6 (35.3)	3 (42.9)	
High (≥8)	29 (50.0)	19 (50.0)	7 (41.2)	3 (42.9)	

All patients were divided according to age: group 1, 65 to 69 years; group 2, 70 to 74 years; group 3, 75 to 79 year; and group 4, 80 years and older.

Table 4. Surgical outcomes

Outcomes	Group 1 (n=58, %)	Group 2 (n=38, %)	Group 3 (n=17, %)	Group 4 (n=7, %)	P value
Residual tumor size					0.51
No gross residual	21 (36.2)	14 (36.8)	7 (41.2)	6 (85.7)	
<1 cm	16 (27.6)	12 (31.6)	3 (17.6)	0 (0)	
<2 cm	9 (15.5)	5 (13.2)	3 (17.6)	0 (0)	
≥2 cm	12 (20.7)	7 (18.4)	4 (23.5)	1 (14.3)	
Operation time (min, median, range)	330 (105, 980)[a, b]	327.5 (123, 942)[a]	285 (175, 428)[b]	194 (160, 420)	0.02
Estimated blood loss (ml, median, range)	725 (80, 8300)	1300 (250, 8300)	1600 (150, 9000)	1200 (400, 2800)	0.05
Transfusion (pack, median, range)	2 (0, 22)	2.5 (0, 17)	4 (0, 15)	3 (0, 8)	0.15
Hospitalization (day, median, range)	12.5 (7, 143)	13.5 (5, 89)	13 (7, 22)	15 (7, 35)	0.82

[a, b] There was no statistically significant difference between the two groups with the same characters.

All patients were divided according to age: group 1, 65 to 69 years; group 2, 70 to 74 years; group 3, 75 to 79 years; and group 4, 80 years and older.

Table 5. Postoperative complications based on the Memorial Sloan Kettering Cancer Center (MSKCC) Surgical Secondary Events Grading System

Complications	Group 1 (n=58, %)	Group 2 (n=38, %)	Group 3 (n=17, %)	Group 4 (n=7, %)	P value
Heart failure or arrhythmia					
≥ Grade 1	2 (3.4)	1 (2.6)	0 (0)	0 (0)	0.84
Pleural effusion					
≥ Grade 1	8 (13.8)	8 (21.1)	1 (5.9)	2 (28.6)	0.38
≥ Grade 3	3 (5.2)	5 (13.2)	1 (5.9)	0 (0)	0.42
Pneumonia					
≥ Grade 1	2 (3.4)	0 (0)	0 (0)	1 (14.3)	0.13
≥ Grade 3	2 (3.4)	0 (0)	0 (0)	0 (0)	0.54
≥ Grade 5	1 (1.7)	0 (0)	0 (0)	0 (0)	0.78
Gastroenteritis*					
≥ Grade 1	1 (1.7)	1 (2.6)	1 (5.9)	0 (0)	0.77

≥ Grade 3	1 (1.7)	0 (0)	0 (0)	0 (0)	0.78
Ileus[a]					
≥ Grade 1	10 (17.2)	1 (2.6)	2 (11.8)	1 (14.3)	0.19
≥ Grade 3	2 (3.4)	0 (0)	0 (0)	0 (0)	0.54
Bowel perforation					
≥ Grade 1	3 (5.2)	1 (2.6)	0 (0)	0 (0)	0.68
≥ Grade 3	3 (5.2)	0 (0)	0 (0)	0 (0)	0.35
≥ Grade 5	1 (1.7)	0 (0)	0 (0)	0 (0)	0.78
Urinary tract infection					
≥ Grade 1	4 (6.9)	1 (2.6)	1 (5.9)	1 (14.3)	0.63
≥ Grade 3	2 (3.4)	0 (0)	0 (0)	0 (0)	0.54
≥ Grade 5	1 (1.7)	0 (0)	0 (0)	0 (0)	0.78
Voiding difficulty					
≥ Grade 1	4 (6.9)	2 (5.3)	1 (5.9)	2 (28.6)	0.18

≥ Grade 3	0 (0)	2 (5.3)	0 (0)	1 (14.3)	0.07
Pulmonary thromboembolism					
≥ Grade 1	3 (5.2)	1 (2.6)	1 (5.9)	0 (0)	0.85
Deep vein thrombosis					
≥ Grade 1	1 (1.7)	3 (7.9)	0 (0)	0 (0)	0.29
Hemorrhage					
≥ Grade 1	1 (1.7)	1 (2.6)	2 (11.8)	0 (0)	0.21
≥ Grade 3	0 (0)	1 (2.6)	2 (11.8)	0 (0)	0.05
Wound infection					
≥ Grade 1	6 (10.3)	6 (15.8)	0 (0)	0 (0)	0.25
≥ Grade 3	6 (10.3)	4 (10.5)	0 (0)	0 (0)	0.44
≥ Grade 5	0 (0)	1 (2.6)	0 (0)	0 (0)	0.54
Abdominal infection					
≥ Grade 1	6 (10.3)	6 (15.8)	2 (11.8)	1 (14.3)	0.89

≥ Grade 3	4 (6.9)	1 (2.6)	0 (0)	0 (0)	0.50

[a]Among patients complaining of abdominal discomfort, patients with a step-ladder sign on abdominal x-ray were diagnosed with ileus while those with no such sign but require management were evaluated as gastroenteritis

Table 6. Factors affecting ≥grade 1 postoperative complications based on the Memorial Sloan Kettering Cancer Center (MSKCC) Surgical Secondary Events Grading System

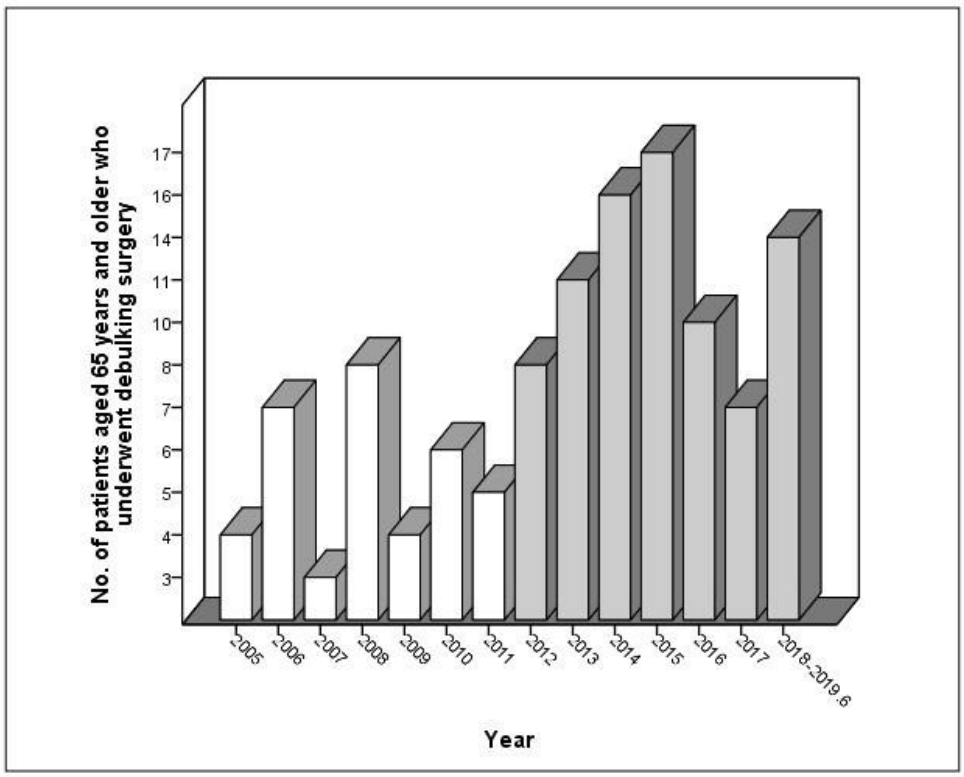
Complication	BMI	ASA score	CCI score	Modified SCS	Poly-pharmacy	Albumin	EBL	Transfusion
Heart failure or arrhythmia	-	-	-	-	-	-	-	1.27 (1.06-1.51)
Pleural effusion	-	-	-	1.18 (1.06-1.31)	-	0.34 (0.14-0.87)	-	-
Pneumonia	-	-	-	-	-	-	-	-
Gastro-enteritis	-	-	-	-	-	-	-	-
Ileus	-	0.35 (0.12-1.00)	2.16 (1.24-3.76)	-	-	-	-	-
Bowel perforation	-	-	-	-	-	-	-	-
Urinary tract infection	-	-	2.13 (1.04-4.36)	-	-	-	1.00 (1.00-1.001)	-
Voiding difficulty	1.23 (1.00-1.51)	-	-	-	-	-	-	-
Ureter injury	-	-	-	-	-	-	-	-
Pulmonary thrombo-	1.86	-	-	-	-	-	-	1.37

embolism	(1.21−2.85)							(1.11−1.70)
Deep vein thrombosis	–	–	–	–	–	–	–	–
Hemorrhage	–	–	–	–	–	–	0.24 (0.05−1.08)	–
Wound infection	–	0.29 (0.09−0.88)	–	–	–	–	–	1.16 (1.02−1.31)
Abdominal infection	–	–	–	1.15 (1.02−1.31)	0.68 (0.50−0.92)	–	–	–

All values were shown in adjusted odds ratio with 95% confidence interval.

Abbreviations: ASA, American Society of Anesthesiologists; BMI, body mass index; CCI, Charlson Comorbidity Index; EBL, estimated blood loss; SCS, Surgical Complexity Score.

Figure 1. Number of elderly patients who received debulking surgery annually between January 2005 and June 2019.



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초 록

진행성 난소암 환자의 예후를 개선하기 위해 종양감축술을 시행하는 것은 중요하다. 그러나, 고령 환자에서는 수술 후 합병증과 사망률이 높을 수 있다는 이유로 종양감축술을 시행하는 것이 쉽지 않다. 고령 자체보다는, 고령에 동반되는 기저질환이 종양감축술 후 예후의 위험인자라는 일부 연구결과가 있지만, 아직 근거가 부족하다. 따라서, 본 연구진은 진행성 난소암 환자에서 종양감축술 후 예후에 고령이 미치는 영향을 조사하고자 하였다.

진행성 난소암 진단을 받고 종양감축술을 받은 65세 이상의 환자에 대해 후향적으로 자료를 수집하였다. 총 환자수는 120명이었으며, 나이에 따라 다음과 같은 네 그룹으로 나누었다: 그룹 1, 65–69세 (n = 58); 그룹 2, 70–74세 (n = 38); 그룹 3, 75–79세 (n = 17); 그룹 4, ≥ 80세 (n = 7). 수술 전 변수들은 그룹 간 유의한 차이를 보이지 않았다.

수술 전 변수, 수술 범위, 수술 결과, 수술 후 합병증에 대해서는 그룹 간 차이를 보이지 않았다. 반면, 그룹 4에서는 다른 그룹에 비해 다약제 복용 빈도 가 더 높았으며 (85.7% vs 27.6–34.2%, p = 0.02), 수술 시간은 더 짧았다 (중앙값, 194 vs 285–330분, p = 0.02).

노쇠를 반영하는 인자, 다약제 복용, 수술 전 알부민 수치, 추정실혈량 및 수혈량은 수술 후 합병증의 위험을 유의하게 증가시켰으나, 노년은 유의한 상관관계를 보이지 않았다.

따라서, 고령은 난소암 환자에서 종양감축술 후 합병증을 증가시키는 인자가 되지 않으며, 노쇠를 반영하는 수술 전 인자들이 더 많은 영향을 주는 것으로 생각된다. 결론적으로, 고령 자체는 진행성 난소암 환자에서 종양감축술의 금기가 되지 않는 것으로 보인다.

주요어 : 고령; 난소암; 수술 후 합병증; 예후; 수술 방법
학 번 : 2020-21641