RESEARCH

EVALUATION OF POSTOPERATIVE COMPLICATIONS IN ELDERLY PATIENTS UNDERGOING PLASTIC SURGERY ACCORDING TO THE MODIFED CLAVIEN-DINDO CLASSIFICATION

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Abstract

Aim: Although age is not encountered as a contraindication for surgery, performing the surgical procedures in shortest time possible is essential in order to avoid complications and facilitate management of the coexisting comorbidities. The aim of this study is to determine the complication rates and to evaluate the risk factors according to the modified Clavien Dindo classification in elderly patients over 80 years of age who received plastic and reconstructive surgery.

Material and Method: 184 patients over 80 years of age who were treated in the Plastic Reconstructive and Aesthetic Surgery Clinic between January 2015 and December 2018 were included in the study. The diseases were examined in five different groups consisting of acute or chronic wound (pressuresores, diabetic wounds, vascular trauma, trauma, etc.), malignant skin tumors, benign skin tumors, craniomaxillofacial trauma and others (hand trauma, temporamandibular joint dysfunction,etc.).

Results: When the complications were evaluated, it was observed that a total of 50 patients had medical or surgical complications. According to the Dindo Clavien classification, the most common complication was vascular compromise of flaps or wounds tha tnecessitated debridement application under local anesthesia in 17 patients with stage IIIA. The total complication rate was 27.1%.

Conclusion: Age is not a contraindication for the elderly in cases when plastic surgery procedures should be performed. Evaluating comorbidities and the preoperative medical conditions delicately, choosing the appropriate anesthesia method and performing the shortest possible surgical procedure with the aim of shorten the duration of surgery is essential in order to reduce and prevent postoperative complications in elderly patients.

Keywords: Aged; Complication; Surgery.

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INTRODUCTION

Life expectancy is increasing worldwide as a result of the improvement in socioeconomic status as well as development of medical and surgical treatments. These demographic changes lead to increased proportions of old and elderly people in the general population.

Therefore, the applicability and number of surgeries considered to be risky in elderly patients are increasing. This can lead to impaired functional organ capacity in elderly patients and increased rates of complication (1,2). Although age is not typically considered a contraindication for surgery, performing the surgical procedures in the shortest time possible is essential to avoid complications and facilitate management of coexisting comorbidities (3,4).

The Clavien classification system is frequently used to provide standardization for patients to be informed of complications and for grading and evaluating complications. This classification was first established by Clavien et al. (5) in 1992 to evaluate complications of general surgical procedures. Because this classification system did not consider the duration of hospitalization and was insufficient in classifying life-threatening complications as well as evaluating permanent complications, it was modified by Dindo and Clavien (6) in 2004.

Finlayson and Birkmeyer retrospectively evaluated operative mortality in millions of patients aged 65–99 years who underwent major elective surgeries and found that the mortality rate increased with age and the surgical mortality rate in patients over 80 years was twice as high as that in patients aged 65–69 years (7).

To the best of our knowledge, there are no studies in the literature researching the complications and risk factors of elderly patients undergoing surgical interventions in the field of plastic surgery. This study aims to determine the complication rates and evaluate the risk factors according to the modified Clavien–Dindo classification in elderly patients aged over 80 years who underwent plastic and reconstructive surgeries.

MATERIALS AND METHOD

After the approval of the local ethics committee, 184 patients over 80 years of age who were treated in the plastic reconstructive and esthetic surgery clinic between January 2015 and December 2018 were included in the study. Clinical data obtained from the hospital management information system and patient records involving age, gender, type of disease, laboratory parameters (hemoglobin, albumin, and white blood cell count), systemic diseases (hypertension, diabetes, pulmonary diseases, and cardiovascular diseases), treatment method (conservative or surgery), surgical procedure, anesthesia type, postoperative complications, and hospitalization period were retrospectively evaluated. Only the initial applications were considered in patients who had recurrent applications. The diseases were examined in five different groups consisting of acute or chronic wound (pressure sores, diabetic wounds, vascular trauma, trauma, etc.), malignant skin tumors, benign skin tumors, craniomaxillofacial trauma, and others (hand trauma, temporamandibular joint dysfunction, etc.).

The comorbidity status of the patients was evaluated utilizing the American Society of Anesthesiologist (ASA) performance status (PS). ASA PS is a scoring system used to describe the risk of anesthesia.

The laboratory parameters of the patients were taken into consideration in their first hospital visits, and abnormal values were controlled following consultations to the relevant departments during hospitalization. Conservative care was given predominantly to the patients in the wound group by means of dressings and vacuum-assisted closure (VAC) therapy. Surgical treatment was performed especially in skin tumor patients under local or general anesthesia as excision–primary repair as well as reconstruction with graft and/or flap ac-

cording to tumor size and the resultant defect following tumor removal. Complication rates were evaluated according to the Clavien–Dindo classification (Table 1).

In the present study, according to the Clavien–Dindo classification, follow-up of the performed surgical procedure (flap circulation follow-up, wound care, hemorrhage, hematoma, etc.) was accepted as grade 1, while additional drug use for systemic diseases (hypertension, diabetes mellitus [DM], etc.) was accepted as grade 2. Surgical procedures performed under local anesthesia (e.g., wound debridement) were accepted as grade 3A, while surgical procedures performed under general anesthesia were accepted as grade 3B.

Statistical methods

All data were analyzed using the SPSS 24.0 statistical package program. Minimum, maximum, mean, and median values were calculated.

Fisher's exact test was used compare the complication rates between independent variables. Multiple logistic regression analysis was performed to evaluate the risk factors in postoperative complications. P?0.05 values were considered as statistically significant. Odds ratios (ORs) and 95% confidence intervals of the variables were determined.

RESULTS

One hundred and eighty-four patients over 80 years of age were included in the study. The mean age of the patients was 88 (80–99 years); 88 (47.82%) were females, and 96 (52.17%) were males. The mean hemoglobin value was calculated as 11.9 (8.3–16.4), while the mean white blood count value was 9.28 (3.77–60.28), and the mean value of albumin was 3.52 (1.2–4.9). Systemic diseases of the patients were also determined (Table 2). During the hospitalization period, the necessary departmental consultations were requested, and appropriate treatments were initiated subsequently.

According to the type of diseases, it was found that the highest number of patients were treated for malignant skin tumor (105 patients), followed by wounds (DM, peripheral vascular disease, pressure sore, and trauma), craniomaxillofacial traumas, benign skin tumors, and others (hand trauma, temporamandibular joint dysfunction, etc.) (Table 3). The majority of patients with malignant and benign skin tumors were treated by surgical intervention under local or general anesthesia, while wounded patients were treated with conventional dressings or VAC after debridement.

When the patients were evaluated according

Table 1. Clavien–Dindo classification.

Grade	Complication
1	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic, and radiological interventions
2	Requiring pharmacological treatment with drugs other than those allowed for grade 1 complications
3A	Requiring surgical, endoscopic, or radiological intervention not under general anesthesia
3B	Requiring surgical, endoscopic, or radiological intervention under general anesthesia
4A	Single-organ dysfunction (including dialysis)
4B	Multiorgan dysfunction
5	Death of a patient

Table 2. Patient characteristics.

Patients	Number (n = 184)
Age (years)	
Mean	88±2.34
Range (min-max)	80–99
Sex	
Female, n (%)	88 (47.8%)
Male, n (%)	96 (52.1%)
ASA PS	
≤2, n (%)	89 (73.5%)
≥3, n (%)	32 (26.4%)
Hemoglobin (g/dL)	
Mean	11.9±1.26
Range (min-max)	8.3–16.4
Leukocytes (white blood cells) (µL)	
Mean	9.28±3.62
Range (min-max)	3.77–60.28
Albumin (g/dL)	
Mean	3.52±1.35
Range (min-max)	1.2–4.9
Systemic Disease	
Hypertension	72
Diabetes mellitus	56
Pulmonary disease	18
Cardiovascular disease	68

Minimum: min, maximum: max

Table 3. Distribution of disease types.

Disease	Number of Patients
Malign skin tumor	105
Wound (diabetes mellitus; pressure sore)	56
Maxillofacial trauma	5
Benign tumor	6
Other	12
Total	184

Table 4. Distribution of patients according to treatment modality, anesthesia type, and duration of surgery

Patients	Number (n)
Treatment modality	
Surgery	121
Medical treatment/wound care	63
Surgical Method	
Tumor excision + primary repair	64
Skin graft	28
Local flap	13
Debridement	8
Fracture repair	3
Amputation	3
Tendon repair	2
Anesthesia type	
Local	94
General	27
Operation duration (min)	
< 60	80
≥ 60; < 120	32
≥ 120	2

to treatment method, it was observed that 121 patients were treated surgically, while the other patients were followed with medical treatment or dressing. When surgical treatment methods were considered, primary repair after skin tumor excision was found to be the most frequent, followed by skin grafting, local flap, debridement, and fracture repair procedures.

Of the patients undergoing surgical treatment, 94 had local anesthesia, and 27 had undergone surgery under general anesthesia. Local anesthesia was mostly preferred since it is more appropriate for the prevention of complications due to existing systemic diseases in elderly patients. The operation length was mostly less than 60 min, just as the operation length was longer than 120 min only in two patients (Table 4).

Table 5. Complication distribution by the Dindo–Clavien classification

Clavien–Dindo Grade	Years				
	2015	2016	2017	2018	Total
I	2	3	6	4	15
II	2	3	3	2	10
IIIA	1	7	6	3	17
IIIB	1	3	2	2	8
Total	6	16	17	11	50

I—Flap follow-up: follow-up surgical procedure; II—Additional medical treatment following the performed surgical procedure besides systemic diseases such as diabetes and hypertension; IIIA—Additional surgery (wound debridement) under local anesthesia; IIIB—Wound debridement under general anesthesia; IV and V—not seen.

Table 6. Effect of Risk Factors on Complications.

Risk Factors	Complications (n:50) %27.1	Univariate p
Diabetes		
Absent	48 (%36.9)	= 0.16
Present	2 (%3.70)	
Pulmonary Disease		
Absent	47 (%28.31)	= 0.09
Present	3 (%5.55)	
Cardiovasculare Disease		
Absent	48 (%41.37)	= 0.18
Present	2 (%2.94)	
Hypertension		
Absent	47 (%40.17)	= 0.12
Present	3 (%4.16)	
Type of Disease		
Malign skin tumor	17 (%16.1)	
Wound (diabetes mellitus; pressure sore)	28 (%50)	< 0.05
Maxillofacial trauma		
Benign tumor	1 (%25)	
Other	1 (%16.6)	
Operating room time (min)	3 (%25)	
< 60		
≥ 60; < 120	18 (%22.5)	
≥ 120	30 (%93.75)	< 0.05
ASA PS	2 (%100)	
≤2		
≥3	18 (%20.2)	
	32 (%100)	< 0.05

Table 7. Risk Factors for Postoperative Complications.

Variables	OR	95% CI	p-values
ASA PS			
≤2, n (%)	1 (ref)		
≥3, n (%)	2.64	1.32-5.23	0.01
Operation duration (min)			
< 60	1 (ref)		
≥ 60; < 120	2.19	1.19-3.37	
≥ 120	4.76	1.90-8.79	< 0.05
Types of disease			
Other*	1 (ref)		
Ulcer**	2.72	1.53-4.87	0.01

* Others: traumatic injuries, tumors, orscars ** Ulcers: PAD, pressure ulcers, necrotizing fasciitis, other ulcers (those associated with diabetes, collagen, radiation, etc.)

When the complications were evaluated, it was observed that a total of 50 patients had medical or surgical complications. According to the Dindo–Clavien classification, the most common complication was vascular compromise of the flaps or wounds that necessitated debridement application under local anesthesia in 17 patients with stage IIIA. Medical complications were observed in patients who underwent surgery lasted more than 60 min via general anesthesia and also in patients who received additional drug medication due to hypertension and cardiovascular disease (Table 5). The total complication rate was 27.1%.

Surgical and medical complications were found to be related with ASA PS, duration of operation and type of disease. Increased complication rates were determined in patients with peripheral arterial disease, pressure ulcers, and other types of ulcers as well as patients whose ASA PS≥3, and duration of surgical operation was longer than 60 minutes. (P <0.05) (Table 6,7).

DISCUSSION

Compatible with that of the world, the elderly population in our country is also increasing. According to recent researches in Turkey, from 2012 to 2016, the elderly population (aged ≥65) increased by 17.1%, and the elderly population became 6,651,503, while it was 5,682,003 in 2012. It has been demonstrated that 60.3% of the elderly population were within the 65–74 age group, while 32.5% of the elderly were between 75 and 84, and 7.1% of them were ≥ 85 years old in 2012. The distribution of the elderly population in 2016 was as follows: 61.5% were between 65 and 74 years old, 30.2% were in the 75–84 age group, and 8.2 % were ≥ 85 years old (8).

There is also an outstanding increase in diseases such as chronic ulcers and skin tumors related to aging. In order to improve the quality of life in patients with such disorders, hospitalization time and surgical operation rates are also increasing. Therefore, it is crucial to evaluate the risk factors for postoperative complications in elderly patients (4,9).

Aging is characterized by progressive atrophy, fibrosis, and loss of elasticity in organs and tissues. Elderly patients have different characteristics in terms of physiological, pharmacological, psychological, and social aspects when compared to young patients (9,10). Evers et al. emphasized that

the effect of age on different organs and systems generally did not affect normal functions, and they also denoted that organs of the elderly met the basal needs when there is no chronic disease in the elderly concurrently with the decreased functional reserve capacity (11). In case of stress, elderly people cannot respond well enough. Surgery and anesthesia are also a source of stress. According to the American Society of Anesthesiologists classification, age alone is not a strong factor in the emergence of side effects due to anesthesia (12,13). Age is a minor risk factor. Examination of comorbid diseases are mainly associated with age is essential (14). The most important factors affecting perioperative morbidity and mortality in the elderly are the presence comorbid diseases of the cardiovascular, pulmonary, endocrine, and neurological systems and presence of malnutrition as well as immune system disorders (9,15). In this study, the vast majority of the patients had a history of at least one or more chronic diseases.

Nowadays, the rate of surgical interventions in the elderly population is increasing due to the development of surgical methods, operative techniques, and improved postoperative care. Meticulous preoperative assessment, individualized optimal surgical technique, and proper anesthetic method are crucial in geriatric surgery. To decrease anesthesia-related issues, preoperative evaluation, accurate assessment of existing comorbidities as well as the main surgical problem, and selection of the appropriate drugs and anesthetic method are gaining importance (1,9,16). In our study, local anesthetics was administered in 51% of the patients by injection, while general anesthesia was used in 14.6%.

Chung et al. reported that patients had fewer postoperative confusion and delirium after regional anesthesia in geriatric patients compared to those who had general anesthesia. Lower morbidity rates and less blood loss and postoperative thromboembolic complication rates have been reported after regional anesthesia (17). A decrease in perfusion of the skin and soft tissue in the elderly patients makes them more sensitive to pressure-induced ischemia. Reduction of cardiac and respiratory functions is further worsened by the cardiodepressive effect of inhaled drugs. Drug elimination is prolonged along with impaired liver and kidney functions. The sensitivity of the cerebral cortex to narcotic and hypnotics increases in advanced ages (18).

Fukui et al. has shown that the duration of operation has the strongest effect on the risk of complications in terms of both medical and surgical complications in elderly patients undergoing plastic surgery procedures. In addition, they reported that low serum albumin levels increased the frequency of complications, especially in patients with ulcers (pressure sores, PAD, necrotizing fasciitis, and diabetic ulcers), and they developed more frequent postoperative complications compared to other patients (19). In our study, it is seen that there was a significant relationship between the complication rates and the disease type, just as the correlation between the duration of surgical operation and ASA ps score.

According to the Dindo–Clavien classification, the most common complication was observed in 17 patients of grade III as impaired flap circulation necessitated debridement under local anesthesia. Moreover, patients who needed additional medical treatments were found to be composed of the ones who underwent operation via general anesthesia over 60 min and/or those having comorbidities.

As a result, age is not a contraindication for the elderly in cases when plastic surgery procedures should be performed. Evaluating comorbidities and the preoperative medical conditions delicately, choosing the appropriate anesthesia method, and performing the surgical procedure with the aim of shortening the duration of surgery are essential in order to reduce and prevent postoperative complications in elderly patients.

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