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Nursing risk assessment of postoperative complications in patients aged over 75, qualified for cardiosurgery operations

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Abstract:

Aim: The aim of the work was to assess the risk of postoperative complications in patients aged over and under 75 undergoing cardiac surgery, with a view to optimize perioperative care and minimize the incidence of complications.

Material and methods: The retrospective study encompassed n=5,419 patients (1,822 women and 3,597 men), aged 16-103 (mean 63.3±11.6) who underwent surgery between 2010 and 2014. The patients were divided into: Group1 <75, n=4,583 (1,429 women and 3,154 men), aged 16-74 (mean 60.6 ±10.5) and Group2 ≥75, n=836 (393 women and 443 men), aged 75-103 (mean 78±3.0). The prevalence of cardiac and non-cardiac diseases in both groups was comparable.

Results: The following, statistically significant postoperative complications were observed in Group ≥ 75: neurological (14.4%), predominantly psychosis (8,1%); renal (11.4%) with creatinine increase >200mg% (9.5%); pulmonary (11.4%) with pleural fluid evacuation (6.3%); reoperation (10.4%), mainly due to haemorrhage (5.6%), and gastrointestinal tract dysfunction, including intra-intestinal nutrition (9.7%).

Conclusions:

1. In patients> 75 years of age eligible for cardiac surgery, co-morbidity often occurs.
2. Age, however, is not a contraindication for cardiac surgery, although it is an important risk factor for mortality and postoperative complications.
3. Cardiac surgery for patients over 75 years of age is subject to a perioperative risk rating.

Key words: geriatrics, cardiac surgery, complications

BACKGROUND

The growing number of geriatric patients has been a challenge for the world medicine. A careful analysis of indications for surgery is a crucial element of the planned operation. The aim of the heart team is to ensure that only those patients in whom the expected benefits outweigh the perioperative risks, undergo surgery.

Perioperative injury or wound healing are a source of pain requiring the use of analgesics and cause a considerable energy strain on the body. Extracorporeal circulation is connected with the need for blood transfusion, coagulation disorders and the systemic inflammatory response syndrome (SIRS), leading to multiple organ dysfunction in the postoperative period (1-3).

Older patients more frequently undergo epicardial artery bypass, with indications compliant with the accepted standards. However, obtaining graft material may be more challenging due to the presence of varicose veins or a previous harvest of lower limb veins. The use of the internal thoracic artery may be compromised due to chest wall deformation. Calcification of plaques in coronary arteries or the ascending aorta may also cause technical problems. In such cases, OPCAB should be opted for, thus avoiding a number of complications. Increasingly frequently, older patients undergo hybrid surgery which consists in combining surgical techniques with catheterization (8-11).

In older patients, there is an increase in valve surgery with severe aortic stenosis or mitral insufficiency. In patients >75, with numerous diseases, the risk connected with the classic method is considerable. The percutaneous and transapical techniques of artificial aortic valve implantation have raised the most interest. The transcatheter aortic valve implantation (TAVI) method, which can also be used in aortic stenosis, is reserved for high-risk surgical patients (Logistic EuroSCORE > 20% or STS > 10%), with severe symptomatic narrowing of the valve, with a number of concomitant diseases (4-7).

AIM

Contemporary cardiac surgery sets increasingly high standards for the qualification of high-risk patients for extensive surgical procedures, particularly in elderly patients with many concomitant diseases.

The aim of this work was to assess the risk of perioperative complications in patients aged over and under 75, with a view to propose an algorithm for the diagnosis and qualification of patients over 75 awaiting cardiac surgery and to optimize perioperative care. The efficiency of the proposed algorithm was then assessed, and the effect of the treatment method on minimizing perioperative complications was analysed.

MATERIAL AND METHODS

The retrospective study encompassed n=5,419 patients (1,822 women and 3,597 men) aged 16-103 (mean 63.3±11.6) who underwent cardiac surgery between 2010 and 2014. The patients were divided into two groups. Group 1 <75 years old, n=4,583 (1,429 women and 3,154 men), aged 16-74 (mean 60.6 ±10.5). Group 2 ≥75 years old, n=836 (393 women and 443 men), aged 75 -103 (mean 78±3.0) (Table I).

The patients underwent: epicardial artery bypass, valve replacement and/or valvuloplasty, combined surgery – epicardial artery bypass and valve replacement and/or valvuloplasty, thoracic aortic aneurysm surgery.

Complications included: reoperation due to haemorrhage, cardiac tamponade, sudden circulatory arrest; pulmonary complications - ARDS, fluid – pleural cavity puncture/drainage, pneumothorax, pneumonia; neurological complications – psychosis, encephalopathy, CNS stroke, brain death; septic complications – SIRS, sepsis; renal complications - creatinine>200 mg%, hemodiafiltration; gastrointestinal tract complications: haemorrhage, visceral ischemia, parenteral or intraintestinal nutrition, death.(Table II)

RESULTS

The entire study group:

The study encompassed n=5,419 patients (n=3,597 men, n=1,822 women), aged 16-103 (mean 63.3 ±11.6), with CCS II, NYHA II, EF=49 % on admission. Arterial hypertension was present in 74.3%. One in three patients suffered from overweight, lipid disorders, past transmural myocardial infarction – one in ten patients within 30 days before admission to the cardiac surgery clinic.

One in five patients was treated invasively with coronary angioplasty with/without stent implantation. One in two patients smoked in the past, whilst one in three was an active smoker at the time of admission. More than half of the patients had a family history of circulatory diseases. Non-cardiologic diseases included: diabetes in one in three patients, and in one in ten patients - peptic ulcer, acute/chronic kidney failure, and diseases of cerebral, carotid and lower limb arteries.

Epicardial bypass was performed in more than half of the patients. One in five patients underwent valve replacement or valvuloplasty. One in ten patients underwent a combined procedure of epicardial bypass and valve replacement/valvuloplasty. Aortic aneurysm, TAVI and heart transplant concerned <5% of the patients.

The most frequent postoperative complications were: gastrointestinal tract dysfunction with the use of intraintestinal nutrition (9.3%); pulmonary complications (8.6%) with pleural fluid evacuation (4.9%); neurological complications (8.4%) with psychosis (4.2%); reoperation (8.3%), mainly due to haemorrhage (4.6%), renal complications (7.1%) with creatinine increase >200mg% (5.2%). Tables I- II

Group 1 - patients <75 years old

Group 1 was composed of n=4,583 patients (n=3,154 men, n=1,429 women), aged 16-74 (mean 60.6±10.5), with CCS II, NYHA II, EF=49 %, arterial hypertension (74.1%), overweight, lipid disorders (30%), past transmural myocardial infarction – one in ten patients within 30 days before admission.

One in five patients was treated invasively with coronary angioplasty with/without stent implantation. One in two patients smoked in the past, whilst one in three was an active smoker. More than half of the patients had a family history of circulatory diseases. One in three patients suffered from diabetes, one in ten from peptic ulcer, chronic kidney failure, and diseases of cerebral, carotid and lower limb arteries.

Epicardial bypass was performed in more than half of the patients. One in five patients underwent valve replacement or valvuloplasty. One in ten patients underwent a combined procedure of epicardial bypass and valve replacement/ valvuloplasty. Aortic aneurysm, TAVI and heart transplant concerned <5% of the patients.

The most frequent postoperative complications were: gastrointestinal tract dysfunction with the use of intraintestinal nutrition (9.2%); pulmonary complications (8.1%) with pleural fluid evacuation (4.6%); neurological complications (7.3%) with psychosis (3.5%); reoperation (7.9%), mainly due to haemorrhage (4.4%), and renal complications (6.3%) with creatinine increase >200mg% (4.4%). Tables I- II

Group 2 - patients ≥75 years old

Group 2 was composed of n=836 patients (n=443 men, n=393 women), aged 75-103 (mean 78.0± 3.0) with CCS II, NYHA II, EF=48.9% before surgery, arterial hypertension (80.6%), overweight, lipid disorders (30%), past transmural myocardial infarction (40%), of which 13% within 30 days before surgery.

One in five patients was treated invasively with coronary angioplasty with/without stent implantation. One in two patients smoked in the past, whilst one in three was an active smoker. More than 40% of the patients had a family history of circulatory diseases. One in three patients suffered from diabetes and chronic kidney failure; one in ten patients suffered from peptic ulcer and diseases of cerebral, carotid and lower limb arteries.

Epicardial bypass was performed in more than half of the patients. One in five patients underwent valve replacement/valvuloplasty A combined procedure of epicardial bypass and valve replacement/valvuloplasty was performed in 14%. Aortic aneurysm, TAVI and heart transplant concerned <5% of the patients.

The most frequent postoperative complications were: neurological complications (14.4%) with psychosis (8.1%); renal complications (11.4%) with creatinine increase >200mg% (9.5%); pulmonary complications (11.4%) with pleural fluid evacuation (6.3%); reoperation (10.4%), mainly due to haemorrhage (5.6%); and gastrointestinal tract

dysfunction with the use of intraintestinal nutrition (9.7%). Tables I, II

Comparison of results in Group 1 and Group 2

A total of 5,419 patients underwent cardiac surgery. There were more patients in Group 1 than in Group 2. In both groups men were predominant. There were significantly more women aged >75 (47%) than women aged <75 (31.2%). In both groups, the patients had CCCS II, NYHA II, and a comparable EF of approx. 50% on admission.

Few patients (approx.10 % in both groups) had a low EF<35%. Data concerning past transmural myocardial infarction and invasive treatment of coronary disease with coronary angioplasty with/without stent implantation was similar in both groups, although there were significantly more older patients with myocardial infarction <30 days before surgery.

Patient history in Group 2 revealed arterial hypertension, paroxysmal/permanent atrial fibrillation, diabetes (treated mainly with oral hypoglycemic drugs), chronic renal failure, respiratory failure, and diseases of cerebral and carotid arteries. However, patient history concerning cerebral incidents, such as stroke or TIA were comparable in both groups.

Lower limb atherosclerosis and peptic ulcer were diagnosed in approx. 10% of patients in both groups. By contrast, lipid disorders, family history of heart diseases and tobacco smoking were predominant in younger patients.

Epicardial bypass was performed in more than half of the patients in both groups; one patient in five underwent valve replacement/valvuloplasty. Combined procedures of epicardial bypass and valve replacement/ valvuloplasty was performed significantly more frequently in older patients; the same was true with regard to aortic aneurysms and TAVI. Reoperation was necessary in one in ten patients, significantly more frequently than in the younger group. However, the frequency of haemorrhage and tamponade was comparable in both groups. Sudden circulatory arrest, intra- or post-operative, was sporadic and comparable in both groups (0.4%).

The main postoperative complications significantly more frequent in the older patients were: neurological complications (14.4%) with psychosis (8.1%), CNS stroke (2.8%) and encephalopathy (2.4%); renal complications (11.4%) with creatinine increase >200mg% (9.5%); pulmonary complications (11.4%) with pleural fluid evacuation (6.3%); gastrointestinal tract dysfunction with acute visceral ischemia (2.3%). Death was sporadic in both groups (2.5%), although significantly more frequent in Group 2 (3.8%).Tables I- II

DISCUSSION

Improve living conditions, including health care mainly in highly developed countries it contributed to increasing the population of the elderly.

According to the Central Statistical Office in Poland, in 1989, the population aged 75-79 was 2.2%, over 80 years old 2.0%, and already in 2014 the population aged 75-79 accounted for 2.3% and the age of 80 Already 2.5%, 1.4% over 85, and in 2002 - respectively 1.3% and 0.9% (1). According to data of the National Consultant on Cardiac Surgery in 2011, 4091 surgeries were performed in all Polish cardiac centers in patients over 75 years, which is almost 700 more than in the previous year, including 1171 patients aged> 80 years (more than 325 Among elderly seniors, low ejection fractions of EF below 30% presented 887 patients, ie 117 more than in 2010. Also, a growing number of seniors with a low mortality rate of 3.8% have been reported in the Saracen group, with a low mortality rate of 3.8% in the group of 75 or more, which results in many cases using minimally invasive methods, including transvaginal aortic valve replacement (TAVI) introduced in 2008 (11).

According to the European scale of EuroScore risk assessment and logistic EuroScore age isan important, independent risk factor for mortality and postoperative complications.

A number of studies have examined the relationship between age and perioperative mortality and cardiovascular complications, both in short- and long-term follow-up. Many authors have pointed to the important role of elderly patients as an independent factor predisposing to severe postoperative complications and increased mortality. Curtis et al. Mortality in patients above 80 years of age. Was significantly higher in the age group of 70-79 years (14.7% vs. 4.2%) (2) .

Fruitman et al. Showed a 7.9% mortality in the 80-year-old group undergoing CABG surgery and was higher than in younger age groups (3). Similar results were reported by Tsai et al. (10.6%) and Cane et al. (9.1%). Carey et al. report that in-hospital mortality is higher in older patients but only in patients subjected to a complex surgical procedure and not to patients with isolated CABG (6-7). The authors also point out the significant improvement in quality of life after surgery. Other publications also point to the safety and benefits of surgical treatment, while stressing that it is not the patient's age alone, but rather the degree of operational risk, including the presence of co-morbidities, has an impact on postoperative morbidity mortality.

Aortic stenosis (AS) is the most common valve defect in the elderly population. It occurs in about 5% of patients over 75 years of age. The main cause of aortic stenosis in this group of patients is calcification or degenerative changes of the flakes. In recent years the frequency of aortic valve replacement surgery has increased sick. Because of the high risk of thromboembolic complications and hemorrhagic complications in people over seventy years of age, implantation of biological valves is preferred. Bessone et al. And Ruygrok et al. mortality is higher in elderly patients operated on due to aortic valve defect and correlates with symptoms of heart failure (7.7% NYHA class III patients vs. 16.4% in NYHA class IV) (7-8).

As a result, the Heart Team makes decisions about the replacement of the aortic valve by the TAVI method. In our Center, in 2010-2012, TAVI was performed in 73 patients

aged 76 ± 9 (52-90), in 51% of men and 49% of women, with a mortality rate of 3.4%. By contrast, the number of deaths after surgical valve replacement in patients aged ≥75 was as high as 21.9% (8-11).

Among the most frequent complications, the authors mention: heart failure, respiratory failure with prolonged mechanical ventilation, renal failure, neurological disorders in the form of transient cerebral ischaemia (TIA), stroke or delusional syndrome. The results of this study confirm the above observations. Occurrence of complications it significantly increases the duration of stay in the Intensive Care Unit and the total duration of hospitalization.

CONCLUSIONS

1. In patients> 75 years of age eligible for cardiac surgery, co-morbidity often occurs.
2. Age, however, is not a contraindication for cardiac surgery, although it is an important risk factor for mortality and postoperative complications.
3. Cardiac surgery for patients over 75 years of age is subject to a perioperative risk rating.

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Tab.1 Risk factors

RISK FACTORS	Group 1	Group 2	p
Arterial hypertension	73,1	75,6	0,130
Diabetes mellitus	27,9	29,7	0,376
Chronic renal failure	12,4	16,9	0,856
Chronic obturative pulmonary disease	8,6	10,1	0,074
Carotid artery disease	8,2	10,3	0,692
PVD	11,3	11,8	0,130

Tab.2 Posoperative complicantions

Kind of complications	Group 1+2	Group 1	Group 2	p
Pleural fluid	4,9	4,4	11,4	0,000
Psychosis	4,2	3,2	8,1	0,000
Reoparations	8,3	6,8	10,4	0,000
Renal failure	7,1	6,32	11,4	0,000
Death	2,5	2,3	3,8	0,000