

Features of the course of myocardial infarction in the elderly

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Abstract

Cardiovascular disease is a major contributor to morbidity, mortality and quality of life in people aged 60 and over. However, this age group of patients was not sufficiently included in large studies, in this regard, the management of elderly patients is an urgent problem in modern medicine.

The purpose of this review is to analyze literature data on the characteristics comorbid pathology and senile asthenia as a predictor of unfavorable course and outcomes of acute myocardial infarction in patients 60 years of age and older.

To analyze the literature, we searched for information on this issue in PubMed/MEDLINE, PMC, Web of Science, Scopus, The Cochrane Library.

Recent research data show that there are plenty of risk factors for worsening the course of AMI in patients aged 60 and over. The most important of them are considered to be high comorbidity, multivessel lesion of several pools, the presence of senile asthenia. All together lead to difficulties in diagnosing myocardial infarction, to forced polypharmacy and in some cases refraining from early invasive strategy, which worsens the course of the disease, increases the duration of hospital treatment, leads to frequent complications, thereby affects the prognosis of the disease and leads to the development of early disability in patients 60 years of age and older

In the vast majority of elderly patients, the development of acute myocardial infarction occurs against the background of a high prevalence of comorbid pathology, which in turn accelerates the development of senile asthenia and its progression.

Key words: acute myocardial infarction, advanced age, senile asthenia, comorbidity, unfavorable prognosis

Introduction

According to WHO statistics cardiovascular diseases (CVD) are the main cause of high levels of morbidity, disablement and mortality globally, causing negative effects in economics and social development. 31% of all deaths are caused by cardiovascular diseases [1].

To date coronary artery disease is one of the most challenging problems in developed countries, especially the most dramatic type of CVD - myocardial infarction. According to Kazakhstan's official statistics in 2019 the mortality rate from cardiovascular diseases was 163,14 per 100 000 of population, of these 58,25 per 100 000 accounts for coronary artery disease. Mortality from acute myocardial infarction (AMI) constitutes 8% of patients discharged from hospital [2].

The majority of patients with AMI are elderly and senile individuals. Age range of patients' data classified by

the WHO: elderly age from 60-75 years old, old age from 75-90 years old, centenarians over 90 years old. Thus, the doctors most frequently deal with management of this cohort of population in clinical practice. As it is known this age group is often underrepresented in large randomized clinical trials, hence, management of elderly and senile patients is a pressing issue in medicine. Elderly and senile people constituted as low as 6,7% out of 719 922 patients from 593 published trials from 1966 to 2000. This suggests that more data must be gathered on management of elderly and senile patients with acute coronary syndrome (ACS) to provide precise clinical recommendations [3].

Higher life expectancy is leading to an increase in elderly population worldwide. Thus, in 2012 the percentage of elderly people out of 7 billion people was 562 million people (8,0%). By year 2015 this number increased to reach 8,5% or increased by 55 million elderly people [4].

According to statistics the percentage of elderly people will reach 25% of total population by year 2050. This tendency proves that the ageing of the population will be observed in a future [5]. Kazakhstan's statistical data shows similar tendency: in 2014 the proportion of elderly people was 6,8% of total population, this number increased to 7,5% by the end of 2018. As observed there was an increase of proportion of elderly age group in 4 years period. According to demographic data the proportion of elderly people in Kazakhstan is expected to double by 2050 from 7,5% to 14,1% [6].

Taking into account the annual increase of the proportion of CVD and the ageing of population there is a need to further investigate the problem of myocardial infarction in Kazakhstan and worldwide.

The purpose of this review is to analyze of literature data on the characteristics of risk factors, comorbid pathology and senile asthenia as a predictor of unfavorable course and outcomes of acute myocardial infarction in patients 60 years of age and older.

To analyze the literature, we searched for information on this issue in PubMed / MEDLINE, PMC, Web of Science, Scopus, The Cochrane Library. The search depth was 13 years: from 2008 to 2020.

Unfavorable risk factors for worsening the course of AMI in patients over 60 years of age

The incidence and mortality from AMI among elderly and senile remains high. Considering increase in elderly population this tendency is likely to progress [7,8].

According to R.D.Lopes et al., patients aged 65–79, 80–84, 85–89 и 90 years and older have shown the one year mortality rate of 13,3; 23,6; 33,6 и 45,5 % respectively after first myocardial infarction [9].

Patients of advanced age have numerous risk factors for a worse outcomes in AMI. Most important risk factors are presence of comorbidities, multivessel stenoses, fragility and compromised metabolism. This causes challenging diagnostics of myocardial infarction, polypragmasy and leads to unfavourable outcomes of the disease.

Impact of high comorbidity on AMI

The course of the main disease in patients older than 65 years is usually accompanied by comorbidities. As it is known, patients aged 65-76 years have a comorbidity rate of 62%, patients older than 85 years have a 82% comorbidity rate [10, 11]. Similar data were reported in a number of publications, including the research of M. Fortin, et al, W.A. Rocca et al [12, 13]. Therefore, there is an increase in structure and severity of comorbidities with age.

As noted from many literary sources, among the most common comorbid pathologies in AMI patients, arterial hypertension, hyperlipidemia, type 2 diabetes mellitus, chronic kidney disease, chronic heart failure are often found. In the structure of comorbid pathology, chronic obstructive pulmonary disease and gastric ulcer should also be distinguished [14-17].

As it is noted in most publications, the presence of comorbidities has a negative impact on disease outcomes lowering life expectancy for a number of years compared to individuals without comorbidities [18].

Recent studies showed that patients with myocardial infarction have high comorbidity rates, which is a predictor of unfavourable outcomes of the disease [19]. Most patients with

myocardial infarction acquired more comorbidities with age. In other words, most patients with AMI and high comorbidity rates were of advanced age. Thus, these patients require close attention as they have an increased risk of death, stroke, prolonged hospitalisation and development of new myocardial infarctions with complications [20-23].

Another study has shown that patients of advanced age with combination of myocardial infarction and arterial hypertension have a 50% increased 5-year mortality rate, type 2 diabetes also constitutes to a worse outcome [24].

Clinical portrait of patients with AMI and high comorbidity rates frequently shows painless course of a disease, symptoms are somewhat unclear and atypical and mimic the clinical course of a comorbidity rather than the main diagnosis. This makes diagnosis challenging and leads to erroneous hospitalisations to secondary hospitals significantly delays the initiation of reperfusion therapy [25-27].

It is therefore obvious that comorbidities significantly worsen general health status of an elderly patient with myocardial infarction leading to difficulties in diagnosis due to atypical presentation of a disease, worsens prognosis and quality of life, and leads to high mortality rates which are up to 82% according to certain data. The predictive factors of a fatal outcome are systemic inflammatory reaction due to compromised microcirculation and inflammatory phenomenon [28, 29].

Multifocal atherosclerosis as one of the predictors of an unfavorable outcome of AMI

According to research patients of advanced age with AMI have a combination of two major vascular catastrophies. Patients with haemodynamically significant atherosclerosis of coronary arteries have a 30% rate of brain vessels involvement. This leads to a significantly worse prognosis in patients with coronary artery disease in general population (survival rate is about 50%). Atherosclerosis of coronary arteries is diagnosed in 30–60% of patients with acute ischemic cerebrovascular accidents . Multifocal atherosclerosis is a common pathogenetic factor of myocardial infarction and ischemic stroke [30].

Interrelation of high comorbidity and senile asthenia

In management of patients of advanced age, it is important to keep in mind the presence of senile asthenia which is associated with high comorbidity rates.

NICE recommendations suggest detection of senile asthenia as a method of establishing patients with high comorbidity rates who may benefit from individualized treatment approach [31,32].

Senile asthenia (of frailty, R54 ICD-10)- is an age related syndrome in which the decline of physiologic reserves of the organism leads to a decline of multiple system functions, this in turn increases the susceptibility of an elderly patient to multiple factors and high invalidization, morbidity and other unfavorable outcomes. High comorbidity rates constitute to development and progression of senile asthenia. However, early detection of senile asthenia may lead to the involution of this state and enables better management of a patient [33].

Along with age, risk factors for the formation of senile asthenia are the presence of several comorbid pathologies, chronic inflammation, polypharmacy, decreased physical activity, decreased immune function, malnutrition, depression, frequent hospitalizations, social factors (unfavorable relations with relatives, low income, marital status, low level education) [34,35].

The vast majority of patients with senile asthenia syndrome have a number of concomitant diseases. The relationship between senile asthenia and cardiovascular diseases has been determined [36].

The role of senile asthenia in the course of AMI

According to recent studies, senile asthenia increases the risk of CVD and death by 2.5-4 times [37].

Senile asthenia is a complex clinical syndrome of high susceptibility to stress factors, that results in a decline in multiple system functions. This leads to partial or total imbalance between chronological and biological age. Individuals with low functional ability and physiological reserve are at higher risk of homeostasis imbalance in case of a stress, particularly myocardial infarction [38,39].

Accordingly, the severity of senile asthenia in patients with ACS increases the degree of interleukinemia of proinflammatory cytokines and neuroimmunoinflammatory mediators of inflammation in the blood serum, which adversely affects the course of ACS. The interaction of senile asthenia and ACS forms a neuroimmunoendocrine imbalance, which leads to further progression of senile asthenia syndrome [40]. High levels of natriuretic peptide (BNP) and interleukin-6 (IL-6) are markers of short-term and long-term unfavorable outcome in AMI [41].

Risk stratification of elderly and senile patients with AMI

In daily clinical practice, the cardiologist does not carry out the identification of frailty in elderly and senile people with ACS, but this is very important for determining unfavorable predictors of this disease [42].

Cardiologists and doctors of other specialties must acknowledge the role of senile asthenia in patients of advanced age hospitalized with ACS. This needs to be fulfilled in aforementioned age group of population. It is important to study elderly people more and establish treatment strategies and methods taking into account the senile asthenia [43].

There is an evidence gap in management of patients with various comorbidities and the treatment of this cohort of patients remains mostly empiric.

The development of a database with information on how to manage patients with multiple comorbidities is needed for

doctors to provide an evidence based approach in treatment of this cohort of patients [44].

The aims of treatment in patients with senile asthenia are maximal maintenance of the functional status, self-sustainment and quality of life [45], which will provide positive effects on medication tolerance, compliance and prognosis [46].

Over the past few years there is a surge in effort oriented on comorbidity minimization and reduction of its negative effects. The main goals of these activities are to detect and further manage high-risk patients. Risk stratification is of major importance for an optimal management and strategy selection in treatment and diagnosis as well as prevention of unfavourable outcomes in patients of elderly and senile age [47, 48].

Conclusion

The totality of the elderly is not the same, the prognosis is influenced not only by age, but also by the presence of chronic diseases, senile asthenia syndrome and multivessel disease in several pools.

To date, the presence of a comorbid pathology in a patient is quite relevant. Many diseases included in the structure of comorbidity have common risk factors and pathogenetic links with coronary artery disease, which significantly affects the course, outcome and development of possible complications, worsening the prognosis of patients with AMI.

In most elderly patients, AMI develops against the background of a high prevalence of comorbid pathology, which in turn, together with age-related changes, accelerates the development of senile asthenia and its progression. The presence of an unfavorable combination of risk factors, high comorbidity and senile asthenia leads to difficulties in the diagnosis of myocardial infarction, forced polypharmacy and, in some cases, abandonment of an early invasive strategy, leads to an increase in the duration of inpatient treatment, the development of disability, an increase in complications after surgical interventions, and requires high costs for diagnosis, treatment, rehabilitation of AMI.

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