

Review

Ethical considerations in elderly patients with acute coronary syndrome

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Abstract

Acute coronary syndrome (ACS) is one of the main causes of mortality and morbidity in the elderly. The prevalence of ACS increases with age and patients with advanced age have some co-morbidities that require an individualized approach, which includes a comprehensive geriatric assessment. Ageism is a matter of great concern. In this scenario, some ethical conflicts may arise which should be anticipated, considered, and solved. Clinicians will need to prioritize and allocate resources, to avoid futility/proportionality, which is not always easy to assess in these patients. This review aims to summarize the evidence regarding ethical conflicts that may arise in the management of patients with ACS and advanced age. We will discuss how to choose the best option (which frequently is not the only one) with the lowest risk for harm, considering and respecting the patients' decision. The four basic principles of bioethics (beneficence, non-maleficence, autonomy, and justice) are thoroughly reviewed, and discussed, regarding their role in the decision making process.

Keywords: Ethics; Acute coronary syndrome; Ageism; Prioritization; Futility

1. Introduction

Acute coronary syndrome (ACS) is one of the main causes of mortality and morbidity in the elderly. The prevalence of ACS increases with age and is associated with a poor prognosis [1,2]. The lengthening of life expectancy, and the appearance of new treatments that improve the survival of patients with ischemic heart disease have increased the number of elderly patients with ACS. Patients with advanced age have co-morbidities [3,4] that make individualized management essential. In this complex scenario, some ethical conflicts may arise which should be anticipated, considered, and solved.

This review aims to summarize the published evidence regarding ethical conflicts that may arise in the management of elderly patients with ACS and how they can be managed according to different bioethical principles [5–7]. Decisions in elderly patients with ACS, as in their younger counterparts, should be based on the basic principles of bioethics (beneficence, non-maleficence, autonomy, and justice) [5]. This implies that clinicians should choose the best option for each patient to avoid harm, and to consider and respect his/her decision using the proper allocation of resources. Topics such as ageism, prioritization, and futility will also be reviewed.

2. Ageism, professionalism, and the principles of beneficence and autonomy

2.1 Ageism and its influence on health

Ageism is the practice of stereotyping, prejudice, and/or discrimination against individuals or groups based on their age. It includes any attitude, action, or institutional structure that discriminates against a person or group of people exclusively because of their age [8]. Given that age is only a weak predictor of outcomes in critically ill patients, the decision to treat based only on the patient's age is unacceptable [5]. Ageism is a widely spread attitude that has a detrimental effect on health [9–11]. There are three of components of ageism that can affect health: (1) discrimination when receiving certain treatments (unjustified do-not-resuscitate-orders [12], administration of cheaper treatments [13], lower quality treatments [14] ...); (2) negative stereotyping; and (3) negative self-perception of aging itself. These components influence psychological and behavioral mechanisms. Ageism might be structural (promoted by institutions), and individual (due to assimilated negative beliefs about age) [9]. In a recent meta-analysis [9] both structural and individual ageism influenced health through different domains, with a worse health outcome involving ageism in 96% of the analyzed studies. Structural attitudes include exclusion from clinical trials and research studies,



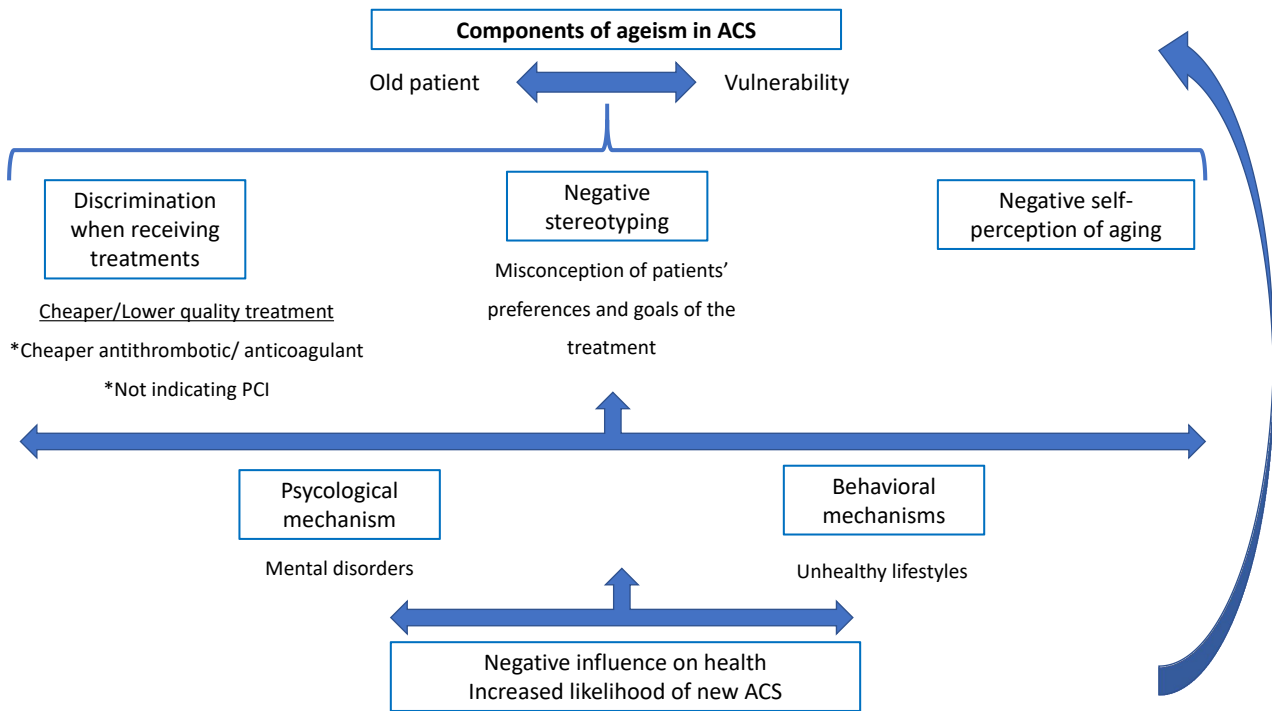


Fig. 1. Components of ageism and its influence on outcomes in acute coronary syndrome. Ageism is well related to the concept of vulnerability, and it has three components that can be noted in the management of acute coronary syndrome. The elderly may receive lower quality treatment due to its price; the preferences and goals of the patient may not be considered, and a negative self-perception of aging may appear. These may lead to mental disorders and unhealthy lifestyles with an increased likelihood of a new acute coronary syndrome.

denial of medical assistance or treatment, and non-medical attitudes such as devaluation of life and lack of employment opportunities. Surprisingly, the detrimental effect of ageism on health is even stronger than the well-known negative effect of racism [15].

Ageist attitudes, especially in medicine, might be related to the misconception of elderly people as vulnerable individuals. This misconception is derived from negative stereotypes of advanced age in terms of helplessness and dependence. Vulnerability [16] is defined as increased susceptibility to damage. Advanced age is not a synonym of vulnerability. Most elderly persons have reached sufficient maturity and passed certain stages of life that would allow them to increase their economic relevance, cultural influence, and political representation. However, aging increases the probability of suffering injury due to low reserve and frailty. Nevertheless, the elderly maintain development potential and can acquire capacities to fight against certain aggressions, so chronological age should not be considered the only vulnerability criterion.

The different components of ageism found in the ACS healthcare process and their influence on major outcomes are shown in Fig. 1.

2.2 Ageism and management of ACS

The incidence of ACS will progressively increase with aging of the population, and will produce an increase in the number of elderly patients admitted with ACS. Thus, it is very important to consider the correct decision-making processes to follow for this specific population [17]. Ageist attitudes may arise at different points in the diagnosis and treatment of ACS, either when deciding on antithrombotic medical treatment, the indication for percutaneous revascularization, or the site of admission (cardiology ward versus acute care units). Table 1 details ageist attitudes in the healthcare process involving patients with ACS.

Current guidelines recommend coronary angiography and, if indicated, percutaneous coronary intervention (PCI) [18,19] in patients with ST-segment-elevation myocardial infarction (STEMI) and non-ST-segment elevation of myocardial infarction (NSTEMI) irrespective of age. However, in the case of NSTEMI, the elderly population is underrepresented in clinical trials [20], even more so in patients with advanced age and geriatric syndromes [21] and comorbidities. Thus, PCI in this population could be controversial and requires careful individual assessment. The lack of evidence and some ageist attitudes may explain why the elderly are less likely to be treated with PCI than younger patients, even when confounding factors are con-

Table 1. Ageist attitudes in the health care process of acute coronary syndrome.

Moment of the process	Ageist attitudes	Ethic principles
Investigation	The elderly population is underrepresented in clinical trials Comparing the results of a study between age groups	Principle of justice
Treatment planning	Assume survival as the goal of the treatment (some patients may prefer the quality of life) Consider the proxies' preferences (instead of patients' preferences)	Principle of autonomy
Percutaneous revascularization	Do not do even if indicated Long and technical informed consent with small letters and without enough time to consult the family	Principles of beneficence, non-maleficence, autonomy, and justice
Medical treatment	Not administering optimal treatment due to high cost	Principles of beneficence, non-maleficence, and justice
Place of admission	Not admitting patients to an acute care unit if needed	Principles of beneficence, non-maleficence, and justice
Discharge	No secondary prevention due to age	Principles of beneficence and justice

sidered [22]. The cost and staff required for PCI, and its invasive nature, could be some of the reasons for this discrimination. The elderly have a higher risk of adverse events than middle-aged and younger patients, and they are less likely to receive optimal medical treatment and to undergo coronary angiography and PCI [23].

In the elderly, it is essential to consider the goals of the treatment [24]. ACS at an advanced age is a high-risk condition due to the high risk of adverse events, procedural complications, and mortality [25]. However, comparing the results of a study between age groups solely based on mortality might lead to ageist attitudes. As age is a non-modifiable risk factor, the question is whether the elderly benefit from a certain treatment, not whether the benefit is higher or lower than in younger patients. Therefore, the correct attitude would be to compare different treatments in similar age groups to avoid ageist attitudes [26]. In addition, we should reflect on all the outcomes of the studies, such as quality of life, since mortality alone might not be the most important objective in this age group.

Some randomized clinical trials compared invasive versus a conservative strategy in elderly patients with non-ST-segment-elevation ACS. The After Eighty Study [27], which included 457 patients aged 80 years or older, suggested that an invasive strategy was superior to conservative management, but a large number of patients were excluded due to logistical reasons; so that there may have been an element of selection bias. In addition, the benefit decreased with age, without a clear benefit in nonagenarians. The Italian Elderly ACS trial [28], which included 313 patients aged 75 years or older, failed to show such a benefit. However, NSTEMI patients managed with an invasive strategy had a 57% reduction in the primary endpoint. The Revascularization or Medical Therapy in Elderly Patients With Acute Anginal Syndromes (RINCAL) trial [29], which included 251 patients ≥ 80 years, was ter-

minated prematurely due to slow recruitment. The early invasive intervention group showed less reinfarction but there was no improvement in survival. In addition, a recent meta-analysis showed that an invasive strategy was associated with a reduction in myocardial infarction [30]. In summary, these studies showed that we should not preclude elderly patients from an invasive strategy based only on chronological age. ACS in the elderly presents with more complex coronary anatomy and a higher risk of associated complications, especially geriatric syndromes (comorbidities, polypharmacy, physical frailty, and cognitive impairment) so that an individual assessment with a patient-centered decision making process is mandatory [31,32]. This should include an invasive approach and revascularization in patients with geriatric syndromes, since a positive influence on outcomes can be achieved [33–39]. The MOSCA trial [40] included 106 patients aged 70 years or older with comorbidities. The results showed that an invasive strategy in older patients with at least two comorbidities did not improve long-term events, although it did decrease mortality at 3 months. The Invasive Versus Conservative Strategy in Frail Patients With NSTEMI (MOSCA-FRAIL) is an ongoing trial involving patients aged 70 years or older with frailty criteria [41]. When it is published, it will help to clarify the appropriate management in frail elderly patients with ACS [41]. However, the previous results from LONGEVO suggested that the benefit in the frail elderly population could be inferior [42].

One reason to avoid an invasive approach or revascularization would be the patient preferences. Although few studies analyzed this issue, most data suggest that the elderly usually accept invasive management when properly explained [26]. In a recent study [43] individual knowledge, preferences, and priorities in invasive cardiac care were noted in 628 patients according to age (<75 years vs. ≥ 75 years). Older patients had less knowledge of invasive

care and were less willing to consider cardiac catheterization or PCI. In addition, maintaining cognitive function was a top priority for this population (29% of patients ≥ 85 years prioritized symptom relief, and losing mental capacity was the top concern). A previous qualitative study including 38 patients [44] showed that elderly patients were likely to follow their cardiologists' recommendations. Although the elderly usually preferred drug treatment to invasive management, they even accepted surgery when needed. Interestingly, this study showed that elderly patients felt that age was a barrier to access a cardiologist consultation, a clear example of ageism. Community-dwelling adults are aware of the potential harms or complications [45]. Stroke is the least acceptable outcome followed by major myocardial infarction, cognitive dysfunction, renal failure, death, prolonged ventilator support, heart failure, angina, sternal wound infection, major bleeding, re-operation, prolonged recovery, cardiac readmission, minor myocardial infarction, and PCI. Of note, clinical decisions were more sensitive to the potential risk of harm than to the potential benefit.

An important issue in older patients undergoing coronary angiography and PCI is informed consent, a materialization of the principle of autonomy. Informed consent is a right of all patients and is regulated by different legislations. It has 7 components: (1) Competence: the ability to understand and decide; (2) Voluntariness: absence of controlling influences among which are coercion, persuasion, and manipulation; (3) Provide and explain the information; (4) Recommend a plan; (5) Understanding the information and the plan; (6) Decision; and (7) Authorization [5]. In some countries, informed consent forms used in cardiology procedures have ethical deficiencies [46]. In older patients, the approach and management may be different resulting in ethical challenges that should be solved using clear communication and eliminating potential obstacles. The elderly should be considered capable of handling their healthcare and making their own decisions, age does not impair the ability to decide. However, information should be individualized, and we should confirm patient comprehension [47,48] since an impaired understanding could be present [49]. Thus, the informed consent should be adapted to patient understanding and linked to the level of education, and personality. Potential communication barriers such as sensorial deficits, cognitive impairment, and other conditions should be considered and an attempt should be made to overcome them by providing aids [47,48]. Communication with a family member may reduce anxiety and facilitate the process. More concise forms with fewer technicalities and larger print would be especially helpful for the elderly population. Focusing on the whole decision-making process, effective communication, and a proportionate and individualized approach to consent could improve the experience of many cardiology patients [50]. However, it is important to consider that in life-threatening conditions such as STEMI;

time to treatment is critically important, and delaying it due to informed consent may lead to shock and death. In this scenario, clinicians must make a quick and individualized decision and informed consent may be problematic.

Some recommendations on professionalism and ethics have been recently published by the American Heart Association and the American College of Cardiology [51] and should be considered when treating elderly people with ACS and deciding about invasive cardiac care. The concepts of "patient-centered care" and "shared decision process" are of greater interest in this field. Patient-centered care should be "respectful care that responds to the individual preferences of the patient, their needs and values, ensuring that the patient guides all clinical decisions" [52]. The shared decision process is a "structured process that involves the patient and the doctor to generate decisions based on the best evidence and patient preferences" [53]. Signing the informed consent is not enough, we should consider other recommendations to adequately guarantee respect for patients' autonomy: (1) Medical care must be aimed at optimizing results and supporting the values that are most important to the individual. This recommendation is simple when the patient's wishes coincide with the best medical decision. On the other hand, it requires further study, ensuring that the patient understands the situation, in the event of a disagreement. It is also important to explore the cultural values of the patient as imposing patient-centered care in certain cultures may not help and may even be harmful. (2) Clinicians must obtain and document the preferences and values important to the patient, including the goals of treatment. It is important to document the preferences in the medical record so that other team members are aware of them. Also, it is important to develop communication skills to engage in this type of conversation with the patient. (3) The structured shared decision process should be reserved for decisions with significant benefits within reasonable options. (4) The tools to support the formal shared decision process should be designed by a multidisciplinary team, which should include clinicians and patients. (5) Payers and health systems should support policies and infrastructures that facilitate patient-centered care, including the shared decision process when appropriate. The main limitations to implementing this care amongst health care professionals are the lack of time, space, and skills to carry it out, so it must be considered within their work and their remuneration.

Talking to patients about their goals and preferences is essential. In this sense, it may be important to discuss with the patient if he or she wants to live longer or to live better. There is a broad belief that older people prefer the quality of life over the length of life. However, the published results are heterogeneous, and some studies reported the desire of older people to live longer even with poor health [54]. Moreover, families and healthcare providers tend to underestimate these patients' desires for extending

life [55]. When discussing the quality of life, we should be very cautious and avoid personal preferences or the patient's social worth. It is difficult to state criteria of quality of life with sufficient precision, but some strategies could be considered. For instance, intellectual disability is usually not relevant in determining if the treatment or procedure is in the patient's best interest. Also, and especially for proxies, we should avoid confusing the quality of life for the patients with the value of the patient's life for others [5]. In this sense is important to be cautious to prevent moving to involuntary euthanasia for unconscious or incompetent, non-dying patients, based on the arbitrary and inappropriate quality of life judgments (among them elderly patients) [56]. Quality, results, patient experience, and the reduction of unnecessary tests and procedures are the responsibility of the clinician and should be a high priority [51].

The optimization of medical treatment in ACS could also have ethical implications. In the acute phase of ACS, anti-platelets and anticoagulants are needed [18,19]. However, as previously seen, elderly patients are usually excluded from clinical trials [36]. In this population, clinicians should carefully evaluate bleeding risk [36], comprehensive geriatric assessment, and comorbidities. This assessment should guide the decision regarding the type of P2Y₁₂ inhibitor, dose, time, and duration (but not the price of the drug). Clopidogrel is the most commonly used anti-platelet agent among the elderly population [57], due to the results of the Study of Platelet Inhibition and Patient Outcomes (PLATO) [58] and in the Trial to Assess Improvement in Therapeutic Outcomes by Optimizing Platelet Inhibition With Prasugrel–Thrombolysis In Myocardial Infarction 38 (TRITON-TIMI 38) [59], due to the increased risk of fatal and intracranial bleeding in this population with prasugrel. In addition, there is a loss of benefit in older patients with prasugrel [60]. However, conflicting results regarding the optimal antithrombotic therapy in the elderly are reported [61–63]. A recently published meta-analysis showed that potent oral P2Y₁₂ inhibitors in elderly patients with ACS reduced the risk of cardiovascular mortality with an increased risk of bleeding events [64]. Secondary prevention should also be considered after discharge.

In the healthcare process, we could also commit ageism when deciding the place of admission (cardiology ward vs. acute care units). Older patients should receive optimal healthcare assistance and should be admitted to an acute care unit if needed. The LONGEVO-SCA registry [65] analyzed 80-year and older patients admitted due to NSTEMI. Almost 30% of patients were admitted to intensive cardiac care units. Those patients were younger, had acute heart failure or poorer left ventricular ejection fraction, were troponin positive, and had higher punctuation in the ischemic risk scores. Also, they were less frail, had a lower prevalence of other geriatric syndromes, and had more frequently undergone a previous PCI. Those patients with a high risk and higher proportion of invasive treatment

had the same clinical outcomes at 6 months as those admitted to the cardiology ward. The authors considered that this might be due to an adequate selection of patients, as those with higher risk had the same prognosis after being admitted to the acute care unit than patients with lower risk admitted to the cardiology ward. A French observational study [66] compared 311 octogenarians and 92 nonagenarians admitted to an intensive care unit for ACS. 5-year mortality was higher for nonagenarians, but no significant difference was found for 5-year cardiovascular mortality. Nonagenarians were less frequently treated with ticagrelor than octogenarians. Older age was related to all-cause mortality (as expected due to the life expectancy at their age) but was not a risk factor for cardiovascular mortality. Although evidence is scarce, chronological age should not be the reason for not admitting patients to acute care units [67–75]. An increasing number of elderly patients are being admitted to intensive care units [76]. The clinical decisions in these units should be based on shared decision-making considering patients' preferences. We should also use a time-limited trial, which means all appropriate intensive care is used and the patient's progress is carefully evaluated to assess if the "maximum" care is continued whether we should consider withdrawing the treatment [76].

However, sometimes there is a need to prioritize patients (as the COVID-19 pandemic has shown) or resources are scarce, and we should decide the treatment for different patients (of different ages) at the same time. In this scenario, we should consider the principle of justice, including social justice, as we will discuss in the next section.

3. Prioritization, allocation of resources, and the principle of justice

Prioritization regulates the distribution of limited resources. It does not mean that a person's life is worth more than another, it means allocating the available resources in the most effective way, and to those patients who are most likely to benefit [77]. Resources are limited, so we must prioritize patients respecting the principle of justice.

The principle of justice was initially attributed to Aristotle and states that equals must be treated equally, and unequals must be treated unequally. This is a formal definition that invites some criticism as it does not provide criteria for determining whether two or more individuals are equals or unequals [5]. The term "distributive justice" refers to "fair, equitable, and appropriate distribution of benefits and burdens determined by norms that structure the terms of social cooperation" [5], which is a much clearer concept that addresses the issue of prioritization and considers "social justice" [51]. Social justice is the belief and commitment to guarantee access to quality healthcare for all, which would include the elderly population. The principle of justice requires that physicians and the healthcare systems provide high-quality care to all patients, regardless of their sociodemographic characteristics.

Table 2. The use of age in prioritization.

Strategy	Definition	Ethics consideration
Medical utility	Probability of success with the treatment/procedure Length of time the patient is expected to survive Quality-adjusted life-years	Unfair and affects the health of the elderly
Health economics	Cost-effectiveness and cost-utility analysis Maximize the action that gets the greatest health benefit for the money expended	Utilitarian goal and discrimination
The “prudent person” theory	Considers the perspective of an entire life Resources are allocated throughout all stages of life	Unfair with the elderly, it would mean to shift resources to the treatment of younger people
The “fair innings” argument	Considers a person’s whole lifetime experience Everyone has an equal chance to get fair innings up to a threshold	Even more, discrimination that health economics system

Although the concept may be clear, there are some difficulties in prioritizing, some of them according to age. The decisions regarding the allocation of a certain budget can have some effects on other allocations [5]. This may lead to deciding which diseases should receive a priority ranking, and is likely to involve elderly patients. A major problem is allocating scarce resources/treatments for different patients of different ages. Table 2 summarizes the different prioritization strategies according to age. These decisions are even more difficult when an illness is life-threatening and the scarce resource is potentially lifesaving [5], as can happen in a patient suffering from ACS. A hypothetical situation could be deciding which patient (one younger than the other but both with similar medical conditions and functional status) should get a PCI or which of them should be admitted to an acute cardiac care ward. Although this situation is very rare, the COVID-19 pandemic has involved similar situations and priority was given to decisions that maximized survival to discharge and the number of life-years saved [78–81].

Various arguments have been proposed to justify the use of age in prioritization. Some of them are based on the probability of success with the treatment or the procedure, which means medical utility. Judgments of the probability of success may include the length of time the patient is expected to survive (shorter for an older patient than for a younger patient) or a strategy of quality-adjusted life-years (younger patients will typically fare better than older patients in the allocation). These forms are unfair and affect the health of the elderly and can result in worsening of their condition. It also results in some uncertainties as to how to judge gains in quality of life. Another strategy is the one that emerged from health economics. This means allocation based on a cost-effectiveness and cost-utility analysis, maximizing that action which results in the greatest health benefit (anticipated health gains) for the money expended. This last strategy also raises objections due to their utilitarian goal and the potential for discrimination [5].

There are different theories to solve this problem: “the prudent person” theory and “the fair-innings” argument

[5,82]. The prudential individual decision [83] considers the perspective of an entire life. Resources should be allocated “prudently” throughout all stages of life within a social system that provides a fair lifetime share of health care for each citizen. This would mean choosing to shift resources that might otherwise be consumed in prolonging the lives of the elderly to the treatment of younger persons. With this theory, the individual chance of living a normal life span (at least) is increased [5]. The “fair-innings” argument considers a person’s whole life experience in the context of efforts to achieve equality in the distribution of healthcare. It requires that everyone has an equal chance to get fair innings up to a certain threshold amount; but having reached the threshold, one is no longer entitled to receive socially supported healthcare [5]. This latter theory would mean even more discrimination to the elderly than the ones derived from health economy indicators [84].

On the contrary, other authors are against prioritizing by age [8,85], giving each patient the chance to live to the fullest state, admitting those patients who will benefit the most, independent of age or even the presence of chronic diseases. However, this is not easy to assess, and clinicians may make judgments about the value of each person’s life [82]. Considering age to prevent early deaths is supported by a consensus of perspectives (although this does not stop being questionable): prudent individual choice, maximization of societal benefits, and reduction of health disparities [82].

Evidence on prioritization in ACS is scarce. A Swiss study tried to assess which ACS patients’ characteristics played a role in prioritizing access to the ICU. They found that prioritization was age-dependent and that the relation between age and probability of admission to the ICU was not linear, with both extremes of age being less likely to be admitted. This age-dependent admission did not change after the implementation of clinical practice guidelines. The authors concluded that rationing is common in clinical practice and that clinical practice guidelines are not completely applied in elderly patients [86]. A previous study had shown similar results in patients with unstable angina [87].

In summary, although allocating sources is not easy, a careful evaluation of each patient should be carried out. Conversations with older patients before admission would strengthen beneficence and autonomy [88]. Patients with a minimum expected benefit should not be admitted to intensive care units and even a more careful evaluation is required for those patients with reduced life expectancy [89].

4. Futility, proportionality, and the principle of non-maleficence

Medical futility refers to procedures or treatments unlikely to benefit the patient. It is a very frequent problem with ethical implications and concerns about the respect of the principles of non-maleficence, autonomy, and justice [90]. Physicians have no obligation to provide futile treatment. Typically, the term futile refers to a situation in which further treatment provides no medical benefit or is hopeless. It is a term that is related to “proportionality”. This refers to that treatment or procedure which is likely to be more burdensome than beneficial, and warrants withdrawing or withholding treatment. This latter involves balancing benefits and risks to the patients. The term “potentially inappropriate” is wider accepted and is used when interventions have at a minimum some chance of success but are not ethically accepted [5].

Concerning futility, we should also consider the “treatment-risk paradox” which means that the higher the patient’s risk, the greater the absolute and relative survival advantage from treatment. In patients suffering from ACS, those with higher ischemic risk are those with higher benefits from invasive treatment. However, they are the ones with more conservative management. In the elderly population it could be even more striking as the risk is usually higher. Clinicians are forced to consider the possibility of futility when deciding probably due to healthcare system procurement, infrastructure, and funding. Balancing profit and futility is difficult and decisions should be carried out by multidisciplinary teams [91,92].

In elderly patients with heart disease, futility or non-proportionality of both treatments and procedures must be considered. A comprehensive geriatric assessment [21, 93] and a multidisciplinary team decision are essential to achieve this goal and balance risks and benefits, although this is not always possible in urgent cases. Physicians are not ethically obligated to provide a treatment/procedure that will not benefit their patients [10]. At his point, a conflict between the patient’s autonomy and the physician’s autonomy may arise. In such a case it would be a conflict between two principles: the principle of non-maleficence and the principle of autonomy. Patients’ autonomy is not absolute and the other principles—beneficence, non-maleficence, and justice—should contribute to solving this issue through a shared decision process [94]. However, palliative interventions should be continued in these end-of-life care situations.

5. Conclusions

Elderly patients presenting with ACS have some comorbidities that make their treatment a challenge. In this process, different ethical conflicts regarding ageism, prioritization, and futile healthcare may arise. Ageism in the ACS healthcare process could affect the decision of invasive treatment or the admission to the acute care unit. In this regard, the training of physicians in the peculiarities of the elderly patient, comprehensive geriatric assessment, functionality, and frailty are essential for correct decision-making. Resource allocation is complicated, but clinicians should consider biological age over chronological age, and age per se should not determine prioritization. Finally, we should avoid futility, but this must be evaluated very carefully since, in many cases, the most seriously ill patients benefit the most from the treatment. Finally, in elderly patients with ACS, it is important to make decisions using a multidisciplinary team, that allows discussion of ethical conflicts to make decisions in the most appropriate way.

Author contributions

Conceptualization—AA and MMS. Writing, preparing the figures and tables—AA, CB, PDV, SGB, AAS and MMS. Review—AA, CB, PDV, SGB, AAS and MMS.

Ethics approval and consent to participate

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