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Original Research Paper

The dynamics of patients' attendance at outpatient clinics after acute coronary syndrome: The data of LISS-3 registry

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ABSTRACT

Objective: To evaluate the dynamics of patients' attendance at outpatient clinics after acute coronary syndrome (ACS).
Study design: Prospective observational study within the hospital registry.
Methods: All patients of the LISS-3 registry hospitalized with ACS from November 1, 2013, to July 31, 2015 were included (n = 429). Exclusion criteria were high probability of being unavailable for follow-up visits – living outside of Moscow and Moscow's suburbs, patients' inability or refusal to give informed consent (n = 32). All survived in hospital patients (n = 320) were divided into three groups depending on their attendance at outpatient clinics prior to ACS: attendants, partially compliant patients and nonattendants. Follow up was performed by phone interview (follow-up period: 14–35 months). Complete follow-up data were available for 88.44% patients (n = 283). 12.5% of patients died (n = 40). After ACS patients were also divided into three groups according to the same criteria as before ACS.
Results: Patients' attendance at outpatient clinics generally increased after ACS [$p < 0.05$]. Increase in attendance at outpatient clinics after ACS was associated with younger age, being married, and not having a history of diagnosed ischemic heart disease or previous myocardial infarction prior to ACS. Increased attendance at outpatient clinics after ACS was not associated with the final outcome of ACS (evolution of ACS into unstable angina or myocardial infarction).
Conclusions: Patients' attendance at outpatient clinics after ACS is associated with factors beyond the severity of the condition, particularly knolwedge and diagnosis. Efforts should be made to promote knowledge of patients conditions to ensure they attend treatment in accordance with guidelines.

What is already known about the topic

- Patients' adherence to treatment consists of their adherence to medication therapy and their attendance at outpatient clinics.
- A number of studies have analyzed incidence of nonadherence, causes and outcomes of poor medication adherence, and strategies to improve medication adherence.
- The problem of nonattendance at outpatient clinics is not so well studied.
- Previous studies have mostly analyzed factors associated with nonattendance.

What this paper adds

- Only half of all patients attend outpatient clinics in accordance with guidelines after acute coronary syndrome (ACS).
- Attendance at outpatient clinics after ACS was not determined by severity of ACS, but other factors.
- Time constraints, accessibility issues and belief that they would not recieve appropriate treatment were the main reasons for patients' nonattendance at outpatient clinics fter ACS.
- ACS resulted in increased attendance at outpatient clinics, particularly for patients who had not been previously diagnosed for CVD.

1. Introduction

The problem of early identification and management of cardiovascular disease (CVD) risk factors is still of current interest

Abbreviations: ACS, acute coronary syndrome; CVD, cardiovascular disease.

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all around the world. For example, EUROASPIRE IV study demonstrated that among CVD patients who had undergone coronary surgery or had had acute coronary syndrome (ACS) 16.0% smoked cigarettes, 59.9% had little or no physical activity, 37.6% were obese, 42.7% suffered from arterial hypertension, 80.5% had dyslipidemia and 26.8% reported having diabetes [1].

Despite the wide use of clinical guidelines in medical practice all over the world, some studies have demonstrated low quality of patients' primary and secondary prevention therapy [1–5].

Prehospital therapy is one of the components that influences outcomes of a disease. Its quality depends on different factors: identification of patients at high risk of cardiovascular events, physicians' adherence to the use of clinical guidelines in their practice, and patients' adherence to prescribed treatment [6], which consists of adherence to medication therapy and attendance at outpatients' clinics.

Many studies, including those performed within registries, have analyzed patients' adherence to medication therapy [7,8].

Some authors have addressed another issue of patients' adherence to treatment: their attendance at outpatient clinics [9,10]. Most published studies have analyzed patients' attendance at outpatient clinics based on the work of general practitioners' offices and family clinics that are widespread in Europe and America [11]. These studies have mostly assessed factors associated with nonattendance [9,10,12–16]. Attendance at outpatient clinics of patients with CVD has been analyzed on the basis of their attendance at cardiac rehabilitation programs after their discharge from hospitals where they received medical or surgical treatment [17,18]. The influence of nonattendance of patients with CVD at outpatient clinics on the quality of prehospital treatment and short-term and long-term outcomes and dynamics of attendance after ACS has been poorly investigated according to available sources [11].

The aim of the present study is to evaluate the dynamics of patients' attendance at outpatient clinics after ACS.

2. Material and methods

2.1. Study design

The study is a prospective observational study within the LISS-3 (Lyubertsy Infarct Survival Study) hospital registry. Lyubertsy is a suburb of Moscow, Russia, with a population of over 178,000.

We included all patients hospitalized with ACS in the Lyubertsy District Hospital from November 1, 2013, to July 31, 2015 (n = 429). Exclusion criteria included high probability of being unavailable for follow-up visits – living outside of Moscow and Moscow's suburbs, patients' inability or refusal to give informed consent (32/429).

During hospitalization 19.4% of patients died (77/397). All surviving patients (320/379), after providing written informed consent, were asked questions from a specifically designed checklist about regularity of attendance at outpatient clinics prior to ACS, data about the history of the present illness, and past medical history. The forms were filled by doctors in charge.

Patients were divided into three groups depending on their attendance at outpatient clinics prior to ACS (data received from the checklists were used): attendants – patients, who visited a physician or cardiologist at outpatient clinic once a year or more often; partially compliant patients, who visited their primary care physician less often than once a year or visited their doctor irregularly; and nonattendants – patients, who had never visited a primary care doctor prior to ACS.

Follow-up was performed for all patients simultaneously in October 2016, by phone interview with patients or their relatives (follow-up period: 14–35 months).

Complete follow-up data were available for 88.44% (283/320) of patients. 12.5% of patients died during the follow-up period (40/320).

During the phone interview, patients (243/283) reported their attendance rate at outpatient clinics. According to their attendance after ACS, patients were divided into three groups (data received during the phone interview were used): attendants – patients, who visited their cardiologist at outpatient clinic twice a year and more often, partially compliant patients who visited their doctor fewer than twice a year or visited outpatient clinics irregularly, and nonattendants – patients who did not visit a cardiologist after ACS.

Flow chart of the study is presented in Fig. 1.

2.2. Ethics

The study was approved by the local Ethical Committee of the Lyubertsy District Hospital and the local Ethical Committee of the National Research Centre for Preventive Medicine, Moscow.

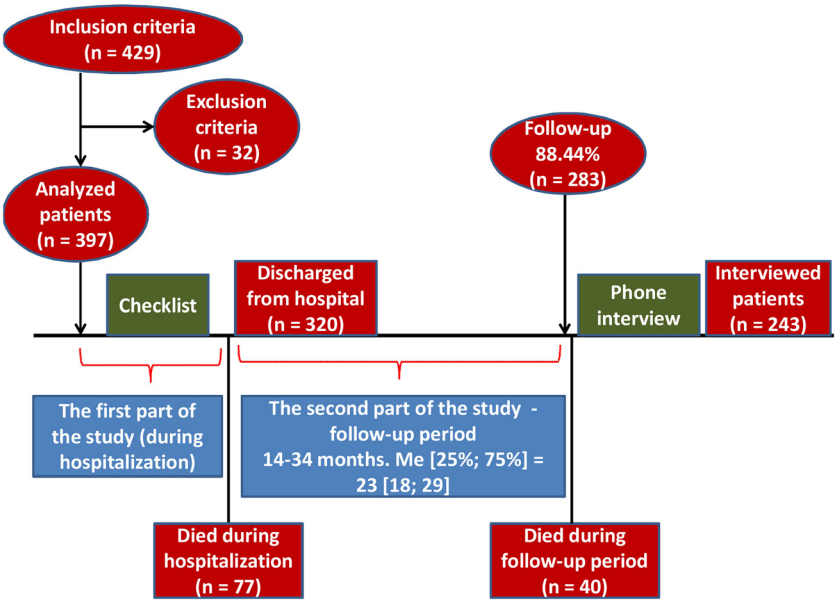

Fig. 1. Flow chart of the study.

2.3. Statistics

Patients' characteristics were obtained from the checklists. Data were analyzed using IBM SPSS Statistic version 20. Descriptive statistics, including median and interquartile range (IQR, 25th; 75th percentile) for continuous variables with non-normal distribution and percents for categorical variables were used to summarize participants' baseline sociodemographic and clinical characteristics. The McNemar test was used to determine differences between two related groups. The $\chi 2$ test was used for comparative analysis of categorical variables, and the Kruskal–Wallis test was used for qualitative variables with non-normal distribution. Logistic regression adjusted to age and gender was performed using increased attendance at outpatient clinics after ACS versus unchanged or decreased attendance at outpatient clinics after ACS as the outcome measure. p values <0.05 were considered significant.

3. Results

Before ACS, 43.4% of patients (139/320) visited outpatient clinics, 32.2% (103/320) partially complied with attendance guidelines, and 24.4% (78/320) did not attend at all.

Patients' attendance at outpatient clinics after ACS was as follows: 52.3% of patients (127/243) attended according to guidelines, 21.8% (53/243) partially complied, and 21.8% (53/243) did not attend. For 4.1% of patients (10/243), data on attendance at outpatient clinics were not available.

Table 1 shows that patients' attendance at outpatient clinics generally increased after ACS (72 patients increased their attendance at outpatient clinics, whereas 44 patients decreased their attendance) [$p < 0.05$].

The phone interview with patients showed the main causes for nonattendance at outpatient clinics after ACS (Table 2).

Patients' characteristics that determined the dynamics of their attendance at outpatient clinics after ACS are listed in Table 3.

Fig. 2 shows that increase in attendance at outpatient clinics after ACS was associated with younger age, being married, and not having a history of diagnosed ischemic heart disease (statistically significant) or previous myocardial infarction (tendency toward statistical significance) prior to ACS. It is notable that increased attendance at outpatient clinics after ACS was not associated with the final outcome of ACS (evolution of ACS into unstable angina or myocardial infarction).

4. Limitations

This study has several limitations. Registry is an observational study. It was not possible to obtain objective information about symptoms and health complaints that patients might have had prior to ACS. Specifically designed checklists that were used in this registry had been created with consideration of doctors' opportunity to question ACS patients, some of whom were hospitalized in a very poor condition. Checklists were filled by doctors during patients' stay at the hospital; this is why information that was not mentioned in checklists could not have been received retrospectively.

5. Discussion

Since the 1960s the problem of missed outpatient appointments has become a point of interest in various studies [19]. The special term nonattendance first appeared in publications in the late 1970s [20]. According to the literature, nonattendance can be associated with patient, hospital and general practitioner characteristics [10]. Factors related to patient proved to play the major role. They were considered more significant than factors related to hospital or doctor [11,21]. The most common factors associated with nonattendance at outpatient clinics according to different studies included family or work commitments (some patients had difficulties in getting time off work or arranging childcare); physical difficulty of attending clinics among geriatric patients; lack of clinical symptoms; low socioeconomic status; and financial, transport, and family problems [9–12,22]. Patients with chronic diseases of most kinds proved to be more compliant with attendance at outpatient clinics than those without [9,11,22]. The most common hospital factor influencing patients' attendance at outpatient clinics was the time between request for and date of an appointment [9,14,23]. General practitioner characteristics associated with nonattendance included being a high referrer with a tight working schedule and physician – patient gender differences [10,15].

Our study was conducted within the hospital registry of one major hospital. Being an observational uncontrolled study with data about prehospital attendance at outpatient clinics collected from patients during their hospital stay it lacked some important information such as presence or absence of symptoms prior to development of ACS. It goes without saying that registries are inferior to randomized controlled studies in the amount and quality of data. However, registries also have their advantages in that they are conducted in real clinical practice and impartially demonstrate the epidemiology of the analyzed problem. When doing this study we set a goal of disclosing a problem of patients' attendance at outpatient clinics prior to ACS.

Even though we had no information about patients' symptoms and complaints, we are confident that the majority of patients of this registry should have attended outpatient clinics prior to ACS. Patients with history of CVD should have attended outpatient clinics where they should have had the course of their disease monitored, special examinations performed and, if needed, their current treatment corrected. At the same time patients without history of CVD should have attended outpatient clinics to get examined for presence of CVD risk factors. These patients must have had CVD risk factors prior to ACS, even if they were unaware. As we have shown in our previous publication, not all patients had been aware of arterial hypertension and diabetes mellitus, and very few had been aware of dyslipidemia, leading to potential underdiagnosis of CVD [24]. Furthermore, severity of myocardial infarction presupposes the presence of clinical symptoms. Seeing that 68.7% of hospital patients had transmural myocardial

Table 1
Comparison of patients' attendance at outpatient clinics prior to ACS and after ACS (n = 233).

Patients' attendance at outpatient clinics		Patients' attendance at outpatient clinics after ACS		In total
		Partially compliant/nonattendants	Attendants	
Patients' attendance at outpatient clinics prior to ACS	Partially compliant/nonattendants	62	72	134
	Attendants	44	55	99
In total		106	127	233

*McNemar's test p = 0.012.

Table 2
Reasons for patients' nonattendance after ACS (data were received from patients during the phone interview) (n = 53).

Reasons for patients' nonattendance after ACS	n (%)
lack of time or lack of clinical symptoms	13 (24.5%)
long waiting time for appointments	6 (11.3%)
walking difficulty among geriatric patients	11 (20.8%)
not believing they would receive proper treatment at outpatient clinics	13 (24.5%)
preference for inpatient treatment to outpatient visits	3 (5.7%)
data not received	7 (13.2%)

Table 3
Patients' characteristics that determined the dynamics of their attendance at outpatient clinics after ACS.

Factors	Increased attendance (n = 72)	Unchanged attendance (n = 117)	Decreased attendance (n = 44)	p
Males	57 (79.2%)	70 (59.8%)	14 (31.8%)	0.0001[a]
Age, Median [25%; 75%]	58 [54; 68]	68 [59; 77]	77 [63; 82]	0.0001[b]
Higher educational level (data received for 227 patients of 233)	21 (29.2%)	34 (29.1%)	9 (20.5%)	0.500[a]
Married (data received for 225 patients of 233)	65 (90.3%)	82 (70.1%)	23 (52.3%)	0.0001[a]
Employed (data received for 230 patients of 233)	40 (55.6%)	39 (33.3%)	6 (13.6%)	0.0001[a]
Obesity (data received for 223 patients of 233)	30 (41.7%)	34 (29.1%)	22 (50.0%)	0.032[a]
Smoking	39 (54.2%)	38 (32.5%)	9 (20.5%)	0.0001[a]
Sedentary lifestyle (data received for 231 patients of 233)	28 (38.9%)	57 (48.7%)	35 (79.5%)	0.0001[a]
Family history of CVD (data received for 206 patients of 233)	6 (8.3%)	11 (9.4%)	10 (22.7%)	0.028[a]
Dyslipidemia	48 (66.7%)	74 (63.2%)	37 (84.1%)	0.038[a]
Diabetes mellitus	12 (16.7%)	26 (22.2%)	15 (34.1%)	0.093[a]
No diagnosed ischemic heart disease prior to ACS	58 (80.6%)	72 (61.5%)	22 (50.0%)	0.002[a]
No diagnosed myocardial infarction prior to ACS	68 (94.4%)	101 (86.3%)	34 (77.3%)	0.026[a]
Arterial hypertension	51 (70.8%)	87 (74.4%)	42 (95.5%)	0.005[a]
Atrial fibrillation	4 (5.6%)	9 (7.7%)	3 (6.8%)	0.853[a]
Stroke	1 (1.4%)	7 (6.0%)	4 (9.1%)	0.161[a]
Evolution of ACS into myocardial infarction	63 (87.5%)	93 (79.5%)	32 (72.7%)	0.133[a]

[a] ×2 test was used for comparative analysis of categorical variables.
[b] Kruskal–Wallis test was used for qualitative variables with non-normal distribution.

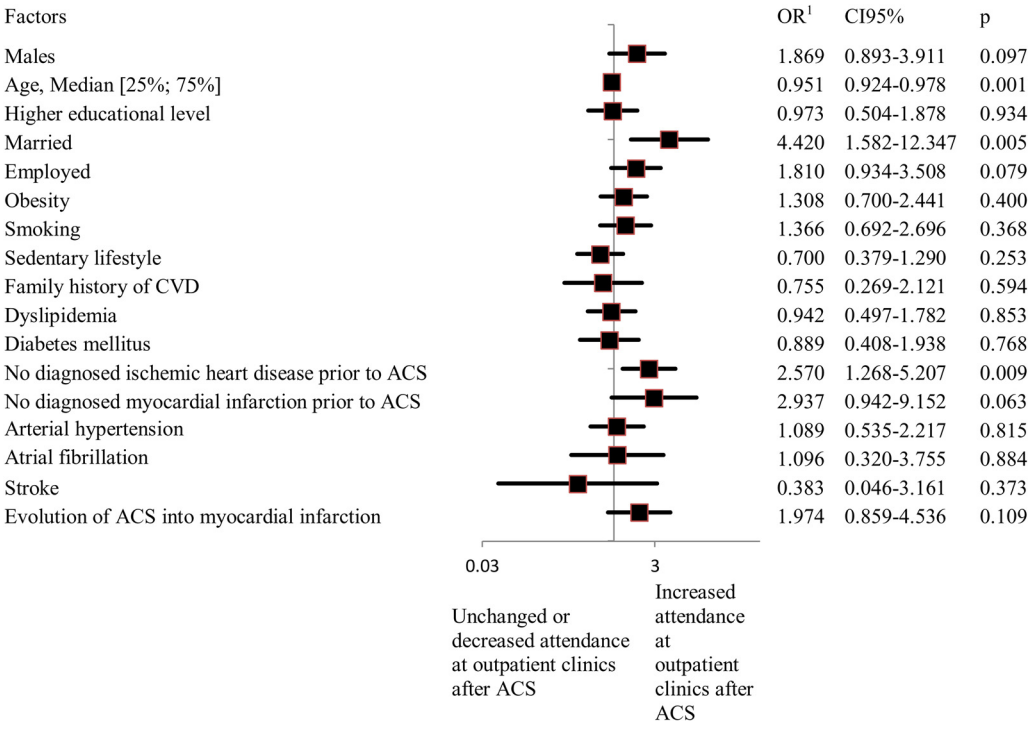

Fig. 2. Factors associated with increased attendance at outpatient clinics after ACS.

infarction as an outcome of ACS and that coronary angiography performed in most patients revealed hemodynamically significant atherosclerotic plaques [25], we can presume, that most patients had some symptoms, but paid little attention to them.

Also, as we demonstrated earlier, even though 56.4% of nonattendants had no diagnosed CVD prior to ACS, 39.7% of them had arterial hypertension, 9% had diabetes mellitus, 30.8% had obesity, 57.7% of them were smokers, 39% had a sedentary lifestyle and 11.1% had family history of CVD [26]. If these patients had been examined prior to ACS, other CVD risk factors (arterial hypertension, dyslipidemia, diabetes mellitus) might have been found. Elderly age by itself is an unchangeable CVD risk factor and can urge people to undergo medical examination. Age median of nonattendants was 57 years, which in Russian Federation is a retirement age for females and almost a retirement age for males. At this age people are at risk of having CVD and CVD risk factors and should be examined in outpatient clinics, and if needed prescription of primary or secondary prevention treatment of CVD undertaken. In the Russian Federation, according to the Order of the Ministry of Health of the Russian Federation ("On Approving on the Procedure of Dispensary Observation"), citizens with chronic diseases or those who have risk factors for their development are eligible for a free consultation and examination in outpatient clinics. This Dispensary Observation provides for every citizen's regular attendance at outpatient clinic. Patients without diagnosed CVD are eligible to attend hospital-based or outpatient clinic-based health centers where they can be examined for CVD risk factors. Thus, patient nonattendance of health facilities is largely finaa voluntary decision, with relatively few financial barriers. However, a previously conducted study showed that half of the surveyed patients with ACS had not attended outpatient clinics, even though they had known about the possibility to receive a free consultation in a health center [27].

In our study we found that increased attendance at outpatient clinics after ACS was registered in patients without a history of diagnosed ischemic heart disease and myocardial infarction prior to ACS. Thereby, we can assume that patients' knowledge of their disease is associated with increased attendance at outpatient clinics. It should be noted that increase in attendance at outpatient clinics after ACS was not associated with the final outcome of ACS (evolution of ACS into unstable angina or myocardial infarction). Thus, we can speculate that it was the fact of hospitalization due to acute coronary disease that influenced the increase in attendance. It means that some patients' intention to take care of their own health, visit their physician to find out about their diseases and risk factors, go through necessary medical examinations was triggered only by life-threatening case of ACS. Heart disease prevention is actively promoted all over the world especially among elderly patients. However, this registry showed that many people are still unaware of their health condition and CVD risk factors. Improvements in communication and dissemination of knowledge of patient's health factors *before* they lead to an acute event (and more importantly, in a manner that effectively increases the patient's awareness of their own disease), should be actively encouraged.

In our study we identified other reasons for patients' nonattendance (Table 2), some of which can be amenable to corrections. Some administrative issues that may have encouraged nonattendance have already been worked out in outpatient clinics in Russia: the appointments system has been simplified, and in some regions information about ACS patients' attendance at outpatient clinics is collected during their hospital stay and transferred to outpatient clinics so that nurses can call up patients with lower attendance rate and invite them to visit their physician after hospital discharge.

In our previous publication [26] we named clinical characteristics of patients with different attendance rate. In this study we presented clinical characteristics of patients with increased, unchanged and discharged attendance. Based on these data groups of patients with tendency to low attendance – those who had lower attendance rate prior to ACS and increased their attendance rate only after ACS (males, adults younger than 60 years of age, married patients, employed people, smokers, people without diagnosed cardiovascular disease) should be urged to visit their doctor at least once a year and undergo necessary minimum examinations in search of CVD risk factors. The fact that those without diagnosed CVD were amenable to increased attendance *after* ACS suggests that early intervention may be possible if they are made aware of the potential consequences of their condition. These findings also suggest that outpatient clinics should not be sought as simply a place for developing or seeking a diagnosis, but also a place where health and wellness are more actively monitored, to esnure that potential underdiagnosis of serious conditions such as CVD is not inadvertantly encouraged.

There are a number of strategies to improve patients' attendance at outpatients clinics. Some of these initiatives are similar to those used for improving adherence to medication therapy [7,28,29]. Some studies have shown efficiency of information strategies (full informing of patients, giving detailed information about a clinic and examination plan) [9,30] and behavioral strategies (using different reminders about scheduled appointments, including electronic, mail and telephone reminders, optimizing of appointment scheduling process, improving of communication between patient and physician) [31,32].

To increase patients' motivation to attend outpatient clinics group sessions (including 'healthy schools') where patients receive information about CVD risk factors, primary prevention measures including those controlled by patients themselves (lifestyle modifications, fighting bad habits), required frequency of attendance at outpatient clinics and instrumental and laboratory examinations may be an important mechanism to reduce future nonattendance. Information about health centers where patients without diagnosed CVD are eligible for a free consultation and about dispensary observation program for patients with diagnosed CVD should also be promoted, to esnure patients are aware of the services that are available and accessible to them. A notification system could be established between hospitals and outpatient clinics where CVD patients with low attendance rates could be revealed during hospital stay with the help of specialized questionnaires and information about them is transmitted to outpatient clinics after patients' hospital discharge. Later on, electronic reminders to schedule an appointment at outpatient clinics may be sent to patients, since it was demonstrated earlier that even some patients with diagnosed CVD did not attend outpatient clinics regularly [26].

It is necessary to bear in mind, that attendance at outpatient clinics should not be detached from other kinds of adherence to treatment. Regular attendance at outpatient clinics is not enough to improve quality of therapy and disease outcomes. Patients' adherence to doctors' recommendations and doctors' adherence to current clinical guidelines with improvement of quality of primary and secondary preventive treatment are also required as well as identification of CVD on early stages and CVD risk factors.

6. Conclusion

Our study shows that in general, patients' attendance at outpatient clinics increased after ACS. Increased attendance was associated with younger age, being married, and not having a history of diagnosed ischemic heart disease or previous myocardial infarction prior to ACS. Attendance was not associated with the

final outcome of ACS (evolution of ACS into unstable angina or myocardial infarction), indicating social, cutlural and other factors also need to be considered. Attendance at outpatient clinics cannot improve quality of therapy and disease outcomes all by itself. To solve this problem regular attendance at outpatient clinics should be combined with patients' adherence to doctors' recommendations, doctors' adherence to current clinical guidelines and identification of CVD on early stages and CVD risk factors.

Conflict of interest

All authors have no conflict of interest to report.

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