



Research Article

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Dynamic analysis of cardiovascular drugs data

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ABSTRACT

Cardiovascular disease is an important disease which is a serious hazard to human health, not only that, but the cause is still quite complicated. Therefore, it is very important to carry out research work of cardiovascular drugs in the medical profession. In this article, the money amount sequence method and DDD number sequence method were used to statistically analyze the data of cardiovascular drugs which were purchased by patients in a hospital in Shanghai in 2010-2013 year. The data of cardiovascular drugs second-class hospitals and upper-class hospitals in Shanghai included the drug varieties, prescription medication, the amount of money, which were statistically analyzed in order to provide recommendations for future cardiovascular medication guide. Through this research, we have come to the result that the money of cardiovascular drugs accounts greater of the amount of all of the drugs in the second-class hospitals than that in the upper-class hospitals, and cardiovascular medication amounts, prescriptions, etc of the second-class hospitals and upper-class hospitals had increased than before. Calcium antagonists and angiotensin ii receptor antagonist drugs led occupation, as well as a small amount of varieties of drugs had gone into the top 10 amounts .As for cardiovascular drugs, foreign markets occupy a major market. That is to say that between different levels of hospitals there is some difference in cardiovascular drug use, but the drugs with good effects are already the first choice.

Keywords: Cardiovascular; drugs medication; data; dynamic analysis

INTRODUCTION

As the people's living standards continuously improve, the phenomenon of our aging society is growing and this situation led directly that the incidence of cardiovascular rise significantly than before. Since the reform and opening up, cardiovascular disease has always been an illness difficult to cure, which severely impact on life expectancy and quality of life and human health in the elderly. But recently, health care reform widely spread in our country, some of the basic drug system continues to develop. So in this case, it is already an important common concern of the medicine field ,especially of drug regulatory authorities and the whole society ,to do a comprehensive understanding of difference of medication existing between the different levels of hospitals and trends in the future . Based on this, in this article, the author mainly compared the cardiovascular drug use in second-class hospitals and upper-class hospitals in Shanghai in 2011-2013 year, and thereby got recommendation with reference value.

EXPERIMENTAL SECTION

1.1 Materials

Since 2011, more than 20 hospitals have entered the analysis system of hospital prescription in Shanghai Institute of Pharmaceutical Industry, among which 12 are the second-class hospitals, and 14 are the upper-class hospitals. In this article, all data is statistics of cardiovascular drug prescribing in some medicine research center of Shanghai during 2011-2013 year.

1.2 Method

Make statistics in accordance with patients within a week of each month, as well as the records about the use of prescription drugs in the department's, and spending money, etc. Prescription data for sampling was carried out by hospital level, using money amount sequence method. Calculate the annual average growth rate of drugs = [(Closing Year Data / Starting year data) ¹ / (ending year- beginning year) -1] @ 100% ,and analyze the cardiovascular drug use.

RESULTS AND ANALYSIS

2.1 Overall use of cardiovascular drugs

The money amount of cardiovascular drugs in sample prescription and prescriptions amount in 2011-2013 year was conducted a comprehensive statistical and average annual growth rate was calculated, and the results were shown in Table 1 and Table 2.

Table 1 The money amount of cardiovascular drugs and prescriptions amount and annual growth rate of average expense in second-class hospitals

options	2011year	2012 year	2013 year	annual growth rate (%)
money amount (Ten thousand yuan)	6225.7	7347.07	9006.51	20.28
prescriptions amount (Ten thousand pieces)	74.1	78.88	88.05	9.01
average expense (yuan)	84.2	93.14	102.5	10.34

Table 2 The money amount of cardiovascular drugs and prescriptions amount annual growth rate of average expense in upper-class hospitals

options	2011year	2012 year	2013 year	annual growth rate (%)
money amount (Ten thousand yuan)	12846.7	15150.3	19244.5	22.39
prescriptions amount (Ten thousand pieces)	110.59	119.55	134.32	10.21
average expense (yuan)	116.17	126.73	143.27	11.05

In the three years between 2011-2013, 14.81 percent of the total money amount was that of the cardiovascular drugs in sample prescription of second-class hospitals, while 11.59 percent was that of upper-class hospitals, ie that of second-class hospitals was slightly higher than that of upper-class hospitals. According to Table 1 and Table 2, it could be found that during the three years money and prescriptions, as well as the average expense of cardiovascular drugs in both upper-class hospitals and second-class hospitals had a certain level of growth.

Table 3The money amount sequence and annual average growth rate of various types of cardiovascular drugs in second-class hospitals

Types of drugs	2011year		2012 year		2013 year		annual average growth rate (%)
	Money amount	sequence	Money amount	sequence	Money amount	sequence	
Other Cardiovascular System Drugs	1748.8	1	1847.8	1	1858.8	1	2.73
Calcium antagonists	1108.77	2	1109.77	2	1125.77	2	20.8
Angiotensin	658.10	3	675.10	3	688.10	3	49.3
Antianginals	604.28	4	612.28	4	615.28	4	28.14
Antihyperlipidemics	493.1	5	497.1	5	500.1	5	38.69
Other vasodilators	356.58	6	358.58	6	366.58	6	28.8
Angiotensin-converting enzyme inhibitors	450.8	7	451.8	7	453.8	7	3.16
B-blockers	205.1	8	206.1	8	212.1	8	25.96
Peripheral vasodilator	143.5	9	146.5	9	148.5	9	11.46
Non-cardiac glycosides cardiac stimulant	148.1	10	149.1	10	153.1	10	5.35
Systemic vascular protective agents	61.43	11	64.43	11	68.43	11	34.82
diuretic	59.5	12	60.5	12	68.5	12	25.54
hypotensive drug	111.75	13	115.75	13	118.75	13	8.9
antiarrhythmic drugs	65.35	14	68.35	14	75.35	14	13.5
antishock	8.71	15	9.71	15	10.71	15	12.4
pressor agent	3.41	16	4.41	16	5.21	16	15.7
cardiac glycoside	1.51	17	1.71	17	1.91	17	17.34
Total	6225.87		7348.1		9007.5		20.3

2.2 Statistics analysis of money amount of various types of cardiovascular drugs

Count the amount of money amount of various types of cardiovascular drugs in sample prescription in upper-class hospitals and second-class hospitals in Shanghai area, and then rank it according to the previous system that we had

talked about by the money amount of medication, and calculate the growth rate of medication of various types of cardiovascular drugs, the results were shown in Table 3 and Table 4.

Table 4 The money amount sequence and annual average growth rate of two various types of cardiovascular drugs in upper-class hospitals

Types of drugs	2011 year		2012 year		2013 year		annual average growth rate (%)
	Money amount	sequence	Money amount	sequence	Money amount	sequence	
Other Cardiovascular System Drugs	1748.8	1	1847.8	1	1858.8	1	2.73
Ca-antagonist	1108.77	2	1109.77	2	1125.77	2	20.8
ANG	658.10	3	675.10	3	688.10	3	49.3
antianginal	604.28	4	612.28	4	615.28	4	28.14
descendens blood fat drugs	493.1	5	497.1	5	500.1	5	38.69
Other angiotenic	356.58	6	358.58	6	366.58	6	28.8
ACEI	450.8	7	451.8	7	453.8	7	3.16
B-blockers	205.1	8	206.1	8	212.1	8	25.96
Peripheral vasodilator	143.5	9	146.5	9	148.5	9	11.46
Non-cardiac glycosides cardiac stimulant	148.1	10	149.1	10	153.1	10	5.35
Systemic vascular protective agents	61.43	11	64.43	11	68.43	11	34.82
diuretic	59.5	12	60.5	12	68.5	12	25.54
hypotensive drug	111.75	13	115.75	13	118.75	13	8.9
antiarrhythmic drugs	65.35	14	68.35	14	75.35	14	13.5
antishock	8.71	15	9.71	15	10.71	15	12.4
pressor agent	3.41	16	4.41	16	5.21	16	15.7
Cardiac glycosides	1.51	17	1.71	17	1.91	17	17.34
total	6225.87		7348.1		9007.5		20.3

According to the above Table 3 and Table 4, in the past three years, money amount sequence of various types of cardiovascular drugs in the upper-class and second-class hospitals is basically stable. Calcium channel blockers (CCB) and angiotensin receptor blockers (ARB) are both in the forefront of the money amount in the upper-class and second-class hospitals. ARB and angiotensin converting enzyme inhibitors (ACEI) act on the renin-angiotensin system (RAS), not only can lower blood pressure, but can also reduce heart failure, as well as effectively protect the target organ. But because ARB does not have the role of promoting the generation of bradykinin, so it will not appear adverse reactions of cough as that of ACEI, with an average annual growth rate stable at the forefront, also in the first place of second-class hospitals, and money amount of ACEI had no large amount of growth, indicating that ARB began to be replaced by ACEI. In upper-class hospitals, the average annual growth rate of lipid-lowering drugs is the first, and the average annual growth rate of antihypertensive drugs is the lowest in the upper-class and second-class hospitals, or even negative.

2.3 Change of the amount of money of the main varieties of cardiovascular drugs

As for money amount sequence and annual average growth rate of the main types of cardiovascular drugs in 2011-2013, see Table 5 and 6.

Table 5 The money amount sequence and annual average growth rate of the main types of cardiovascular drugs in second-class hospitals

Types of drugs	2011 year		2012 year		2013 year		annual average growth rate (%)
	money amount	sequence	money amount	sequence	money amount	sequence	
amlodipine	477.5	1	481.5	1	487.5	1	11.8
Valsartan	214.98	2	215.98	2	218.98	2	56.04
alprostadil	259.98	3	262.98	3	266.98	3	27.7
nifedipine	230.46	4	235.46	4	240.46	4	27.09
atorvastatin	98.67	5	100.67	5	108.67	5	86.97
Losartan	289.48	6	291.48	6	293.48	6	4.35
Isosorbidedimonitrate	260.52	7	262.52	7	264.52	7	7.02
felodipine	214.2	8	215.2	8	218.2	8	16.94
Simvastatin	157.4	9	158.4	9	162.4	9	29.09
Salvianolate	73.3	10	75.3	10	77.3	10	88.06

It can be found according to the above tables 5 and 6 that between these three years, whether in second-class or upper-class hospitals, the mainly used cardiovascular drugs did not change much, basically medication of CCB and ARB class is the mostly used. In second-class and upper-class hospitals, valsartan of ARB medication drugs is much forward in money amount sequence and grew faster. Comparing with valsartan, losartan significantly grew more slowly, even ranked in the last row in second-class hospitals, which indicates that it is possible that ARB varieties will further be replaced. Annual growth rate of Salvianolate was the first in second-class or upper-class hospitals, which indicates that traditional Chinese medicine injections is extremely important in the treatment of cardiovascular disease. Statins mainly suppress cholesterol biosynthesis by inhibiting HMG-CoA reductase, and

lipid-lowering effect is obvious. Statins also improves coronary endothelial function, stabilize atherosclerotic plaque and other non-lipid-lowering effect, and the tolerability and compliance is good, so it application has gradually become the most widely used class of lipid regulating drugs in clinical. As its representative drugs, atorvastatin has the features of lowering the lipid with a small dose, high security, with also a high average annual growth rate.

Table 6 The money amount sequence and annual average growth rate of the main types of cardiovascular drugs in upper-class hospitals

Types of drugs	2011 year		2012 year		2013 year		annual average growth rate (%)
	money amount	sequence	money amount	sequence	money amount	sequence	
Valsartan	477.5	1	481.5	1	487.5	1	11.8
atorvastatin	214.98	2	215.98	2	218.98	2	56.04
amlodipine	259.98	3	262.98	3	266.98	3	27.7
alprostadi	230.46	4	235.46	4	240.46	4	27.09
Losartan	98.67	5	100.67	5	108.67	5	86.97
nifedipine	289.48	6	291.48	6	293.48	6	4.35
Isosorbide mononitrate	260.52	7	262.52	7	264.52	7	7.02
Coenzyme complex	214.2	8	215.2	8	218.2	8	16.94
felodipine	157.4	9	158.4	9	162.4	9	29.09
Salviaolate	73.3	10	75.3	10	77.3	10	88.06

CONCLUSION

Based on the above analysis, it is found that in 2011-2013, the Shanghai Second, all the indexes of in second-class and upper-class hospitals have different degrees of growth, which is enough to show that cardiovascular drugs plays an important role in hospital medication. And because upper-class hospitals can mainly treat incurable and severe diseases relying on its own strengths, however the main function of second-class hospitals are treating chronic and common diseases, so the money amounts of cardiovascular drugs in second-class hospitals is much higher than that in upper-class hospitals. The trend of high growing rate of Salviaolate has indicated the status of TCM injections in the treatment of cardiovascular disease, but its rationality needs also to be further verified. Cardiovascular drugs have been the concern of many manufacturers by its clinical effect.

For now, many of the drug varieties are produced by foreign-funded enterprises, and the price is higher than the domestic drugs. China has carried out a comprehensive health care reform, which will enable the hospital medication to be apparently increasingly rationalized, and the price to be more standardized. Therefore, for the domestic pharmaceutical companies, it is most important to pay attention to the research and innovation of drug, and to produce better new cost-effective drugs. The prescription is the last part to give the drug directly to the patient for application, which is the ultimate information carrier manifesting the pharmaceutical use. The analysis of medication of these drugs can help us understand the actual characteristics of cardiovascular drugs in different levels of hospitals, so as to make cardiovascular drugs further more comprehensive and standardized. In a word, to improve the standard of rational use of cardiovascular drugs, only we should maximize the ability of all aspects, then we can make cardiovascular medication safer and more reasonable.

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