Analysis of antimicrobial use and cost-benefit rationality in medical emergency department

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Abstract: Rational use of antimicrobial agents can reduce the burden of patients, reduce adverse drug reactions and effectively cure bacterial infections. In this paper the analysis is done on the antimicrobial use and cost-benefit rationality in medical emergency department. Based on the analysis of the use of antibiotics in hospital emergency department, Antimicrobial prescription accounting for 44.26% of the total prescription, involving cephalosporins, fluoroquinolones, macrolides, cephalosporins. According to the stakeholder theory, the use of antimicrobial agents involves multiple interests, too much emphasis on any party also affect the rational use of antimicrobial drugs. Pharmacy management departments need to develop a reasonable and scientific list of antimicrobial drugs, standard training people to correctly use the knowledge of antimicrobial drugs

Keywords: Antibacterial drugs, emergency department, DDDs, cost-benefit.

INTRODUCTION

Since penicillin was developed, the human use of antibiotics is effective for the prevention and cure of bacterial infectious diseases, reduce the mortality of severe bacterial infections, but also lead to antibacterial drug development and wide application of the antibacterial drugs become the climax of the hospital most varieties, the most widely used class of drugs (Cahill *et al.*, 2015; Altorki *et al.*, 2016). The high cost of antibacterial drugs is the main problem in our hospital patients, and pharmacists and pharmaceutical companies are facing, restricts the further improvement of medical conditions in china (Chen *et al.*, 2012). Reasonable application of antibacterial drugs can reduce the medical burden of patients, reduce adverse drug reactions and effective cure of bacterial infectious diseases in addition, antibacterial drugs not only for increasing its resistance and increasing attention (Dindo *et al.*,2014; Ghoneum *et al.*,2015), and the drug cost growth also have attracted more and more attention, visible in drug management, rational use of antibacterial drugs the management is the priority among priorities of rational drug use, need through the index system and standard of evaluation and management.

The theory of interest is put forward in order to make the social expectation and enterprise behavior agree, of course, the most direct way is through government regulation or social control (Hu, 2013; Liu *et al.*, 2013; Mellotte *et al.*, 2015). However, there is a limitation in this way, that is to say, the index system of the evaluation of the social effect of the enterprise is not perfect, which makes the feasibility and effectiveness of the control is very limited (Qin *et al.*, 2015). Hospital management from the application of stakeholder theory to the enterprise transition government to implement a social commonweal career, from the perspective of stakeholder theory to the rational use of antibiotics in the hospital, and the formation of the index system has high feasibility, in order to improve the shortage of stakeholder theory. Rational use of antimicrobial drugs is not only the responsibility of the society and the government, but also the responsibility of the hospital of the socialist public health institutions that carry out disease prevention and cure and protect people's health (Shim *et al.*, 2010). In the face of the whole human society to ensure the health needs of health service for community residents, must bear the health of the people, safeguard national interest obligation, which is an important manifestation of the public hospitals in the medical and health system reform, it is an important part of hospital development strategy (Xuan, 2015; Liu *et al.*, 2016). Constantly improve the quantitative index system, can be used in the course of the replacement and use of antibiotics, to make regular evaluation and feedback, in order to grasp the use of antimicrobial drugs in the hospital to find out the weak points. To guide the clinical improvement, rational drug use will eventually experience to the category of pharmacy administration. It can not only help to control the construction of hospital drug safety system, but also improve the medical security of the whole hospital, improve the quality of medical service, and improve the hospital service flow.

MATERIALS AND METHODS

Rational drug use

WHO in 1985 in rational use of experts at a meeting of Nairobi, the definition of rational drug use: Drug patients is in full compliance with the treatment needs of patients,

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the individual needs of clinical dosage for patients, and ensure that patients receive adequate drug treatment, as well as for the patients and the community the most low price. Since 1990s, the international pharmaceutical industry reached a consensus on the definition of rational use of medicines, more scientific and complete with system knowledge and theory of contemporary medicine and disease, to provide safe, effective, economic and appropriate drugs. The reasonable use of medical standards, namely: the correct use of drugs; drug indication clear; curative effect, safety, use, price, suitable for patients; dose, usage, course of treatment without contraindications properly; adverse reactions; deployment errors; patient compliance is good.

Antimicrobial use intensity

Defined Daily Doses, DDD) was the main indication for antimicrobial agents with an average daily maintenance dose of 100mg/day (DDD) per day for adult patients with antimicrobial agents consumed per day. DDD as a unit of measurement independent of drug prices and formulations. In accordance with the recommended dose of WHO recommended daily dose protocol, the same generic drug dosage forms of different DDD values are also different. The cumulative DDD or mean DDD could be calculated in a single case or in all cases, and cumulative DDD could be calculated using different types of drugs. DDD large, reflecting the tendency of the choice of drugs, on the contrary, gradually use the drug. Because there are differences in the dosage of different antimicrobial agents, it is necessary to establish a comparison between different drugs. DDDs is such an indicator.

Method

From the pharmacy store computer management software, the drug prescription data of emergency department were searched, including the name, dosage form, specification, unit price, consumption quantity, consumption amount, etc.. Combined with the application of antibacterial drug targets, in-depth analysis of them in the hospital for rational use of antimicrobial drugs management so as to analyze the pros and cons of each index and the rational use of antimicrobial drugs between internal relations, regarded as the important basis of inspection and revision of hospital rational use of the structure and content of index system of the antimicrobial drugs.

RESULTS

Prescription statistics and review

2945 prescriptions for the use of antimicrobial drugs in a total of 1328 prescriptions, prescription ratio of 44.26%, significantly higher than the requirements of the Ministry of health emergency antimicrobial prescription proportion is not higher than the standard of 40%. Through the use of antimicrobial agents 1328 special comments on the prescription, a total of 197 unreasonable prescriptions, accounting for about 30% of the antibacterial drugs prescribed by the review of the prescription of antibiotics for the use of antibiotics, the total number of prescriptions for the use of antibacterial drugs, the total number of prescriptions for antibacterial drugs by 14.83%. The main problems of irrational prescriptions were the inappropriate use of the combined medication, no indication of medication, improper administration frequency, accounting for 28.93%, 21.31% and 17.76% respectively.

Use of antimicrobial agents

Investigation of antimicrobial prescription 1328, accounting for 44.26% of the total prescription, with a single drug-based, of which 74.13% is a single drug, involving drugs are cephalosporins, fluoroquinolones, macrolides, Prime category in the first place, accounting for 32.07%.

The frequency of oral antimicrobial use

The total amount of oral antimicrobial agents in the first year of emergency patients was sorted by DDDs and the amount. The top 10 were listed in Table 4 and Table 5.

DISCUSSION

Antimicrobial drug management measures

There are many reasons for the high use rate of antimicrobial agents, mainly in the following cases: First, the clinicians on the rational use of antimicrobial drugs is not strong, some no obvious indications of symptoms, such as fever to be investigated, mild skin trauma, The virus caused by upper respiratory tract infection and so on the use of antimicrobial drugs; Second, outpatient to do bacterial culture and drug susceptibility testing less, mainly by empirical medication, a considerable number of doctors fear the patient infection and excessive prevention of medication, such as habitually Antibiotics are used in patients with viral diseases. Unexplained fever and the abuse of antimicrobial drugs, will cover up the symptoms, adversely affected by the disease; mild skin trauma by sterile treatment that can achieve the purpose of controlling infection, but also to give antibiotics. Some obvious viral infections such as hand, foot and mouth disease, chicken pox, etc. are given antibiotic treatment. The application of these antimicrobial agents unreasonable, not only will affect the treatment effect, increase the economic burden of patients, but also cause serious adverse reactions, leading to the emergence of drug-resistant strains

Hospital social responsibility

Social responsibility theory, the earliest originated in corporate social responsibility. CSR's main core content is: the further development of enterprises requires enterprises to go beyond the traditional concept of profit as the only goal, emphasizing the enterprise in the production process of the value of people's attention, emphasizing the

Table 1: Types of unreasonable prescription of antibiotics

category	Prescription	Proportion
Inappropriate combination therapy	57	28.93%
Improper administration frequency	42	21.31%
No indication medication	35	17.76%
Dosage is not suitable	24	12.18%
Selection of drugs is not appropriate	27	13.70%
Other	12	6.1%
Total	197	100.00

Table 2: Combined use of antibiotics

Medication method	Antimicrobial prescription	Proportion of antimicrobial agents	Percentage of total prescription (%)
Single medication	984	74.13%	33.41%
Two drug combination	235	17.69%	7.97%
Triple and triple	37	2.78%	1.25%
General prescription	1328	44.26%	

Table 3: Various types of antimicrobial use

category	antimicrobial agents times	Proportion	Sorting
Cephalosporins	426	32.07	1
Fluoroquinolones	275	20.70	2
Macrolides	184	13.85	3
Cetamycin class	173	13.02	4
Nitroimidazoles	95	7.15	5
Lincomycin class	89	6.70	6
Penicillins	46	3.46	7
other	38	2.86	8
total			

Table 4: The frequency of antimicrobial use

Drug Name	Recommended DDD (g)	DDDs	Sorting
Cefaclor sustained release tablets	0.75	43 709	1
Azithromycin dispersible tablets	0.5	41 650	2
Clarithromycin capsules	0.5	39 274	3
Cephalexin sustained release tablets	1.0	36 142	4
Cephalexin sustained release tablets	0.125	25 190	5
Levofloxacin Hydrochloride Capsules	0.4	24 797	6
Amoxicillin capsule	1.5	22 185	7
Amoxicillin clavulanate dispersible tablets	0.914	20 432	8
Cefixime particles	0.1	19 645	9
Metronidazole tablets	1.2	18 450	10

consumer, the environment, the contribution of society, Its responsibility contains both legal obligations and moral obligations. Therefore, the main body of corporate social responsibility in the course of business operations in addition to taking into account their own financial and business development, but also spontaneously to its public, social and natural environment, the impact of consideration. The hospital is the main unit of the public sector, which protects the people from health and health. Therefore, the active implementation of social responsibility is the mission of the hospital and the rational use of antimicrobial drugs that the hospital is the ultimate realization of respect for life, care for patients an effective way. Social responsibility emphasizes the corresponding responsibility for the stakeholder, taking into account its impact on society and the natural environment. And the use of antibiotics caused by unreasonable use of bacterial resistance as one of the seven major public health problems in the world, to promote the use of anti-bacterial drugs continue to strengthen the supervision of the people common sense of common people, the hospital can not maximize profits As

Table 5: Medication of drug consumption

Drug Name	Total sales amount	Sorting
Cefaclor sustained release tablets	405341.5	1
Cefdinir dispersible tablets	341292.1	2
Azithromycin dispersible tablets	287354.7	3
Clarithromycin capsules	226321.6	4
Clindamycin hydrochloride palmitate granules	203517.4	5
Levofloxacin Hydrochloride Capsules	192143.5	6
Cefixime particles	174682.3	7
Amoxicillin clavulanate dispersible tablets	143241.2	8
Cefixime particles	135349.9	9
Metronidazole tablets	115987.7	10

the goal, social responsibility in an external pressure on the way to the hospital, and gradually make the hospital willing to take the initiative to take social responsibility.

The rational use of antimicrobial agents

Stakeholder refers to a group or individual that has an interest in the production and operation of the enterprise. The use of antimicrobial drugs involves multiple interests. The evaluation index can enrich the empirical research of interest-related theory. The theory of interest-related theories is similar to that of other theories and has its theoretical shortcomings. It is still a relatively perfect theory. As people pay more attention to the social effects of stakeholder behavior in the enterprise, people are increasingly required to take into account the various stakeholders in the governance process. In the perspective of stakeholder theory, the use of antimicrobial agents in the clinical use involves the vital interests of various stakeholder groups or individuals, such as patients, physicians, hospitals, and drug-related circulation enterprises, where the groups or individuals of the stakeholders Can be used in the use of antimicrobial drugs to get their best interests, and different stakeholders due to the role of different, the impact of the use of antimicrobial drugs are also different, too much emphasis on any side also affect the use of antimicrobial drugs rationality. In the course of the use of antimicrobial drugs, the interests of all parties will be achieved through the prescription of the physician to achieve, so the prescription prescription for the interests of the core part. The prescription of the physician as an important component of the evaluation index of antimicrobial drugs will better analyze and restrict the linkages and contradictions between the various stakeholder groups involved in the clinical use of antimicrobial agents.

CONCLUSION

In recent years, the relevant departments of foreign research on drug economics more and more attention to their correct use can reduce the economic burden of patients and save social health resources, can make full use of limited drug resources, more reasonable allocation of medical expenses and the development of the most Optimize the treatment program, so that more patients get better and economical treatment, improve social and economic benefits. The following from the perspective of drug economics to analyze how to more rational use of antimicrobial drugs. The need for government-led, the relevant supervision of the hospital pharmacy management departments need to develop a reasonable and scientific list of antimicrobial drugs, some effective, low cost of antimicrobial drugs into the hospital antimicrobial drug list which will be expensive, medical effects in general, adverse reactions Many drugs are removed from the hospital medication directory. The scope of treatment of antimicrobial drugs, the introduction of drug economics concept, the majority of patients in the protection of the premise of the effect, so that less to pay the cost of medicine, the same disease listed several treatment options for patients to choose. Standardize the training of people to use the knowledge of antimicrobial drugs. For unreasonable prescription should be timely and clinician communication, from top to bottom, interlocking, the formation of antimicrobial rational use of the treatment chain, in order to truly long-term safe and effective use of antimicrobial drugs.

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