

Analysis of the Impact of National Medical Insurance Negotiation Policy on the Use of Anticancer Drugs in a Hospital

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| Received: 26.08.2023 | Accepted: 02.10.2023 | Published: 05.10.2023

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Abstract

Original Research Article

To analyze the impact of national medical insurance negotiation policy on the use of anti-cancer drugs in a certain hospital. The usage information of anti-tumor drugs in the hospital from 2018 to 2019 was selected, and a comparative analysis of the usage situation of anti-tumor drugs was conducted. It found that the national medical insurance negotiation policy effectively promoted the use of anti-tumor drugs, reduced drug prices, and improved the accessibility of anti-tumor drugs.

Keywords: Antitumor drugs, National medical insurance negotiation, Drug price regulation, Medical insurance, Pharmaceutical management.

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INTRODUCTION

Malignant tumors have become a major disease that seriously affects human health. The high cost of anti-cancer drugs and the heavy medical burden on cancer patients are significant issues. In China, measures such as national negotiations and centralized procurement have been implemented to improve drug accessibility, reduce the economic burden of the disease, and ensure medication safety, effectively benefiting cancer patients. Through national negotiations, certain clinically necessary, effective, and widely used anti-cancer drugs have been included in the national medical insurance catalog. Insurance policies, including basic medical insurance, serious illness insurance, and medical assistance, have been tilted towards cancer patients, significantly increasing their reimbursement levels and greatly reducing the medical expenses burden for cancer patients [1].

On December 12, 2018, the Health Commission of Guangxi Zhuang Autonomous Region issued a document titled "Notice on the Allocation and Use of 17 National Medical Insurance Negotiation Anticancer Drugs" [The Health Commission of Guangxi Zhuang Autonomous Region (2018) No.59], requiring hospitals to implement the allocation of negotiated drugs within the specified time. The national negotiation policy has been implemented for many years. By the end of 2020, more than 220 drugs been included in the medical

insurance catalog, and the achievements have remarkable. However, there are few reports on variety and use of anticancer drugs in hospitals before and after negotiations [2]. In order to understand the impact of the national negotiation policy on the catalog of anticancer drugs in a certain hospital, this study aims to compare and analyze the utilization frequency (DDD), usage amount, ranking ratio, and limited daily cost of 35 new anticancer drugs that were negotiated through national medical insurance in 2018 and 2019 and were used in the hospital, before and after the issuance of document No.59, in order to explore the impact of the national medical insurance negotiation policy on the use of negotiated anticancer drugs in the hospital.

1 DATA AND METHODS

1.1 General Information

Retrieve information and usage data of the hospital's negotiated anti-cancer drugs in 2018 and 2019 from the Hospital Information System (HIS). The year 2018, before the issuance of Document No. 59, will serve as the control group, and the year 2019, after the implementation of Document No. 59, will serve as the experimental group. The usage of negotiated anti-cancer drugs in the hospital during these two periods, including the usage of Trastuzumab, Bevacizumab, and Rituximab, will be analyzed.

1.2 RESEARCH METHODS AND OBSERVATION INDICATORS

1.2.1 Defined Daily Doses (DDDs)

DDDs = Total sales volume of a drug (in mg)/ Defined Daily Dose (DDD) value of the drug. DDD refers to the average daily dose of a drug for its main therapeutic purpose. A higher DDDs value indicates a higher frequency of drug use.

1.2.2 Drug Utilization Cost

Drug Utilization Cost = Quantity of drug used \times Unit price. Statistical analysis is conducted on the cost, composition ratio, and change rate of drug utilization, comparing the changes after the drug is included in the national drug list. The composition ratio refers to the proportion of the cost of a certain drug to the total cost of anticancer drugs in a given year, while the change rate refers to the change in drug utilization cost before and after inclusion in medical insurance.

1.2.3 Ratio of Rankings

The ratio of rankings (B/A), also known as medication synchronicity, refers to whether the amount of drug use is synchronized with the number of users. B/A=Ranking of drug utilization cost (B)/Ranking of DDDs (A). When B/A=1, it indicates good synchronicity

between drug utilization cost and number of users, and the drug utilization cost is reasonable. When B/A < 1, it indicates that the drug utilization cost is expensive but the utilization rate is low. When B/A > 1, it indicates that the drug utilization cost is low but the utilization rate is high.

1.2.4 Defined Daily Cost (Dddc)

Defined Daily Cost (Dddc) represents the average daily cost of patients using a drug and represents the overall price level of the drug. Dddc = Drug utilization cost / DDDs. A higher Dddc indicates a more expensive drug, which will result in a heavier financial burden for patients [3].

2 RESULTS

2.1 DDDs and Ranking of Anticancer Drugs

In 2018, the hospital mainly used 6 negotiated anticancer drugs, among which Trastuzumab, Bortezomib, and Pemetrex had the top three DDDs, and the three drugs accounted for 87.06% of the composition. The number of anticancer drug varieties used in 2019 increased significantly, and the DDDs of new anticancer drugs showed a growth trend compared to 2018, as shown in Table 1.

Table 1: DDDs and Rankings of Antineoplastic Drugs Before and After the Implementation of the Drug Execution Documents Notification in a Certain Hospital

Drug Name	Control Group			Experimental Group			Change Rate/%
	DDDs	Ranking	Composition/%	DDDs	Ranking	Composition/%	
Bevacizumab	16.00	6	0.57	224.00	8	1.22	1300.00
Pertuzumab	924.00	1	32.96	12254.00	1	66.50	1226.19
Fluvisuquin	-	-	-	542.17	4	2.94	-
Rituximab	257.12	4	9.17	433.99	6	2.36	68.79
Sunitinib	-	-	-	113.95	11	0.62	-
Lenalidomide	89.33	5	3.19	97.33	12	0.53	8.96
Bortezomib	901.25	2	32.15	2617.50	2	14.21	190.43
Apalutamide	-	-	-	41.18	13	0.22	-
Abiraterone	-	-	150.00	10	0.81	-	-
Astragalus Polysaccharide	-	-	-	412.00	7	2.24	-
Enzalutamide	-	-	-	163.50	9	0.89	-
Ibrutinib	-	-	-	28.50	14	0.15	-
Pembrolizumab	615.35	3	21.95	868.73	3	4.71	41.18
Azacididine	-	-	-	479.62	5	2.60	-

"- "indicates that there is no purchasing record for the drug.

2.2 Amount and Ranking of Antitumor Drug Usage

In 2018 and 2019, three antitumor drugs, namely Trastuzumab, Rituximab, and Bortezomib, ranked among the top three in terms of usage amount. In

2019, except for Lenalidomide, the usage amount of other antitumor drugs increased significantly, as shown in Table 2.

Table 2: Amount and Ranking of Antitumor Drug Usage Before and After the Implementation of the Hospital's Antitumor Drug Execution Notice

Drug Name	Control Group			Experimental Group			Change Rate/%
	Sales Total/10,000 RMB	Ranking	Composition /%	Sales Total/10,000 RMB	Ranking	Composition /%	
Bevacizumab	0.80	6	0.45	11.14	6	1.54	1294.42
Trastuzumab	30.83	3	17.51	404.95	1	55.85	1213.42
Fluvisquine	-	-	-	4.15	11	0.57	-
Rituximab	70.66	1	40.12	77.82	3	10.73	10.13
Sorafenib	-	-	-	7.24	9	1.00	-
Lanreotide	6.91	5	3.92	2.72	12	0.38	-60.59
Bortezomib	59.59	2	33.84	162.58	2	22.42	172.83
Apalutamide	-	-	-	1.84	14	0.25	-
Abirone	-	-	-	8.13	8	1.12	-
Astragalus Polysaccharide	-	-	-	11.45	5	1.58	-
Enzalut	-	-	-	5.87	10	0.81	-
Ibrutinib	-	-	-	2.15	13	0.30	-
Pemetrexed	7.32	4	4.16	8.87	7	1.22	21.26
Azacitidine	-	-	-	16.14	4	2.23	-

"-" indicates that there is no purchasing record for the drug.

2.3 DDDc and B/A Value of Antitumor Drugs

Compared to 2018, the DDDc of antitumor drugs have all decreased, with Lenalidomide having the largest decrease of 63.83%. Drugs with high DDDc values, such as Rituximab and Imatinib, have a B/A

value of than 1, indicating a high usage amount but low clinical utilization. On the other hand, drugs like Fluvisuquone and Pemetrexed have a B/A value greater than 1, indicating a low usage amount but high clinical utilization, as shown in Table 3.

Table 3: DDDc and B/A Value Before and After the Implementation of the Hospital's Antitumor Drug Execution Notice

Drug Name	Control Group			Experimental Group		
	DDDc	Ranking	B/A Value	DDDc	Ranking	B/A Value
Bevacizumab	499.50	4	1	497.51	6	0.75
Trastuzumab	333.67	5	3	330.46	10	1
Fluvisquine	-	-	-	76.56	14	2.75
Rituximab	2748.16	1	0.25	1793.03	1	0.5
Sorafenib	-	-	-	635.71	3	0.81
Lanreotide	773.01	2	1	279.58	11	1
Bortezomib	661.19	3	1	621.12	4	1
Apalutamide	-	-	-	447.45	7	1.07
Abirone	-	-	-	542.28	5	0.8
Astragalus Polysaccharide	-	-	-	278.00	12	0.71
Enzalut	-	-	-	359.02	8	1.11
Ibrutinib	-	-	-	756.00	2	0.92
Pemetrexed	118.93	6	1.33	102.16	13	2.33
Azacitidine	-	-	-	336.55	9	0.8

"-" indicates that there is no purchasing record for the drug.

3. DISCUSSION

Since 2015, the medical system has implemented various reform measures such as canceling "drug markups" and implementing "volume-based procurement". After the release of the 7th National Document, the concept of "integrated procurement and pricing based on volume" was proposed, requiring the implementation of "volume-based procurement" [4]. In 2018, the "4+7" volume-based procurement was piloted,

and at the end of the year, the Health Commission of Guangxi Zhuang Autonomous Region issued a document requiring hospitals to implement national negotiation drug allocation within a specified time.

After strictly implementing the "Notice on the Allocation and Use of 17 National Medical Insurance Negotiation Anticancer Drugs" [The Health Commission of Guangxi Zhuang Autonomous Region (2018) No.59],

the number of antitumor drug varieties used in the hospital has significantly increased from the original 6 negotiated drugs to 14. The DDDs of antitumor drugs have all significantly increased, indicating an increase in clinical utilization. Before and after the policy implementation, the top three DDDs were Trastuzumab, Bortezomib, and Pemetrexed. This indicates that these three drugs are the most commonly used national negotiated antitumor drugs in the hospital. After the policy implementation, DDDs of Trastuzumab and Bevacizumab increased by more than 10 times, and the DDDs of Bortezomib increased by nearly 2 times. With the increasing number of breast cancer patients in China, Trastuzab, which selectively targets the HER-2 receptor, has shown significant effects in treating breast cancer with fewer side effects compared to chemotherapy. It significantly improves the survival time and quality of life of breast cancer patients, making it the first choice for targeted antitumor drugs in the treatment of breast cancer [5]. Before and after the policy implementation, the top three drugs in terms of usage amount were Rituximab, Trastuzumab, and Bortezomib. Among these three drugs, Rituximab had the highest DDDc, while Trastuzumab had the lowest DDDc, indicating that Trastuzumab has the lowest economic burden on patients, while Rituximab has the highest. After the policy implementation, the prices of drugs showed a downward trend year by year, indicating the "benefit to the people" behind the national negotiation policy. Analyzing the B/A values, before and after the policy implementation, the B/A value of Rituximab was lowest, indicating poor synchronization of drug prices. The issue of high prices for Rituximab still needs to be addressed.

4. CONCLUSION AND PERSPECTIVES

In conclusion, the number of patients using national negotiated antitumor drugs in the hospital has been increasing from 2018 to 2019, and the usage amount has been gradually increasing, which is in line with the trend of national medical insurance policy development. The effective implementation of national negotiation policies has to some extent reduced drug prices, reduced patient expenses, improved the accessibility of antumor drugs. However, although the prices of related anticancer drugs have decreased after

the policy implementation, the total usage amount and total drug expenditure have increased, which needs attention in terms of the pressure on the national medical insurance system [6- 7]. This study also has certain limitations, mainly in terms of the selected scope of 35 newly negotiated antitumor drugs from 2018 to 2019, which may have an impact on the objectivity of the conclusions. Therefore, in the future, the inclusion of national negotiated antitumor drugs should be expanded to enhance the authority of the conclusions of this article and better guide the implementation of specific clinical work.

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