Pharmacoeconomic analysis of antineoplastics at the Oncology Institute of Vojvodina from 2005 to 2008

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SUMMARY

Contemporary cancer chemotherapy need to be active against malignant cell (selectivity), to be based on the molecular biology of the cancer cell, to enhance immune response to cancer, and to stop development of resistance to drug. Research in this field is expensive, as well as the cost of newly discovered drugs. Targeted therapies are registered in the Republic of Serbia and their applications are controlled by the state authority. At the Oncology Institute of Vojvodina smaller number of patients was treated with targeted therapy than with classical chemotherapy. However, our costs for treating patients with monoclonal therapies are at the level of those worldwide.

Key words: *Economics, Pharmaceutical; Medical Oncology; Drug Delivery Systems*

The current chemotherapy is not selective in destroying malignant cells. It has no influence to basic molecular changes in cancer cells, has no power to eliminate all malignant cells, and thus makes possible for malignant cells to develop resistance to anticancer drugs (1).

Table 1. Total number of cytostatics, the number, and percentage of cytostatics in category A, B, and C at the Oncology Institute of Vojvodina from 2005 to 2008

Year 2008

Category	Nº of drugs	% of total number of drugs	% of total expense
A	6	13	70
B	8	18	20
C	31	69	10

Total number 45

Year 2007

Category	Nº of drugs	% of total number of drugs	% of total expense
A	5	13	70
B	5	13	20
C	29	74	10

Total number 39

Year 2006

Category	Nº of drugs	% of total number of drugs	% of total expense
A	5	14	70
B	6	16	20
C	26	70	10

Total number 37

Year 2005

Category	Nº of drugs	% of total number of drugs	% of total expense
A	7	19	70
B	8	22	20
C	22	59	10

Total number 37

In the future, chemotherapy should be based on the cancer cell biology. Inactivation of the components of the signaling pathway inhibited by cyclins, cyclin-depending kinases or tyrosine kinases and by the impact of antisense oligonucleotides, restoration of tumor suppressor genes function, inhibition of tumor growth, invasion and metastasization by inhibitors of angiogenesis or matrix metalloproteinase, enhancement of host immune response, and reverse drug resistance could be future approaches in treating malignant disease (1).

National Cancer Institute has classified the targeted therapy in categories: small molecule drugs, monoclonal antibodies, apoptosis-inducing drugs, angiogenesis inhibitors, cancer vaccines, and gene therapy (2).

In the Republic of Serbia the following targeted drugs are registered: small molecule – imatinib, gefitinib, erlotinib, nilotinib, temsirolimus; monoclonal antibodies – alemtuzumab, bevacizumab, cetuximab, rituximab, trastuzumab; apoptosis inducing drugs – bortezomib; angiogenesis inhibitors – sorafenib, sunitinib; and cancer vaccines – (hepatitis B and human papillomavirus vaccines) (3).

From 2005 to 2008, the number of antineoplastic drugs ranged from 37 to 45 at the Oncology Institute of Vojvodina in Sremska Kamenica. Seventy percent of the budget for antineoplastics was spent for only 5 to 7 drugs (category A, Table 1).

From 2005 to 2008, only two monoclonal antibodies (rituximab and trastuzumab) were available in category A (Table 2).

Table 2. Antineoplastic drugs with 70% of total costs for treatment of patients with malignant disease from 2005 to 2008

2005	2006	2007	2008
Paclitaxel	Paclitaxel	Trastuzumab	Trastuzumab
Oxaliplatin	Trastuzumab	Paclitaxel	Docetaxel
Docetaxel	Docetaxel	Capecitabine	Rituximab
Doxorubicin	Rituximab	Oxaliplatin	Capecitabine
Rituximab	Oxaliplatin	Rituximab	Paclitaxel
Trastuzumab			Irinotecan
Fluorouracil			

From 2005 to 2008, the number of dispensed vials of monoclonal antibodies to the wards of our Institute increased every year. The reasons were new registered drugs and new indication for their use (Table 3).

Table 3. Number of vials of monoclonal antibodies dispensed to wards of the Institute from 2005 to 2008

			Number of vials			
INN	Dose	Package	2005	2006	2007	2008
Rituximab	500mg	Vial	35	129	216	278
Rituximab	100mg	Vial	64	320	436	472
Trastuzumab	440mg	Vial	24	115	486	729
Bevacizumab	400mg	Vial	0	0	76	52
Bevacizumab	100mg	Vial	0	0	95	12
Cetuximab	100mg	Vial	0	0	0	261

Annual reports of two companies Roche and Merck, which produce monoclonal antibodies, send us a message that the sale of monoclonal antibodies is in constant increase and this trend will continue in future (Figure 1).

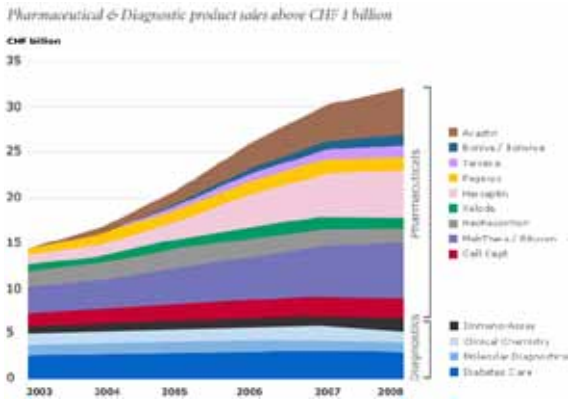

Figure 1. Roche pharmaceutical and diagnostic sales from 2003 to 2008 (4)

In 2007, the sale in Merck's oncology unit amounted to 479 million €. The sale of Merck's major cytostatic cetuximab increased for 40% (470 million €). In 2008, the sale of cytostatics was 574 million € and the sale of cetuximab amounted to 565 million €. Researches of market within the field of oncology anticipate the increasing sale from 35 billon $ in 2006 to 80 billion $ in 2008. The aim is to spread the indication for use of cetuximab to treatment of non-small cell lung cancer and the other sites of tumor (5,6).

CONCLUSION

Because of current chemotherapy shortages, there are new approaches to the therapy of malignant diseases. The budget for development of a new drug in oncology is measured in millions of Euros so we can expect that the price of such a newly developed drug is also very high. Monoclonal antibodies for the treatment of malignant diseases with strictly defined indication are used at the Oncology Institute of Vojvodina. However, the number of vials dispensed to the wards and the number of patients treated with monoclonal antibodies is lower than with older generation of antineoplastics. The prices of new drugs are higher than for the older ones and that is why the budget for treating illness with new therapies is also very high.

Conflict of interest

We declare no conflicts of interest.

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