

The Blinded Economic Impact of Chemotherapy: How Adverse Effects Affect Costs during Bladder Oncology Treatments

Rigo DF¹, Penetti R¹
1. Adium, São Paulo, Brazil

EE446

Introduction

Bladder cancer treatment with chemotherapy is often associated with significant adverse effects (AEs), leading to substantial additional costs that many times are not considered by the Health Insurance which are the payers of the treatments and management of this patient. Understanding the economic burden of adverse events is essential to optimizing the allocation of healthcare resources and improving patient outcomes. This better allocation involves stratifying patients by risk of AEs and expanding the available therapeutic arsenal.

Methods

A literature review was conducted to identify the most frequent AEs (prevalence $\geq 30\%$) in patients receiving chemotherapy for bladder cancer. A micro-costing analysis was performed for the management of each AE using unit costs from the Brazilian private healthcare sector. Standard treatment protocols from national cancer guidelines were used as reference for AE management strategies. The adverse effects chosen for costing were those that will be the responsibility of the health plan, and therefore AEs with recommended care at the patient's home and those related to low cost that would not influence the analysis were excluded.

Results

From the literature review, the most common AEs in patients with bladder cancer, being treated with platinum-based chemotherapy were anemia(57%), neutropenia (42%) and nausea (39%).

Treatment-related adverse events.				
	chemotherapy (N=433)			
	Any Level	%	Level>3	%
Any adverse event	414	96%	301	70%
Peripheral sensory neuropathy	43	10%	0	0%
Pruritus	21	5%	0	0%
Alopecia	34	8%	1	0%
Maculopapular rash	14	3%	0	0%
Fatigue	156	36%	18	4%
Diarrhea	48	11%	3	1%
Reduced appetite	98	23%	6	1%
Nausea	168	39%	12	3%
Anemia	245	57%	136	31%
Hyperglycemia	3	1%	0	0%
Neutropenia	180	42%	130	30%
Decreased neutrophil count	54	13%	39	9%
Decrease in platelets	63	15%	28	7%

For the treatment of each AE, the standard treatment indicated by Brazilian Society of Clinical Oncology (SBOC), in the document they recommend the use of erythropoietin injectable solution for the treatment of anemia. For nausea, the recommended treatment is the application of ondansetron in injectable solution before each chemotherapy session and for the following 5 days, totaling six applications per cycle. In the case of neutropenia, as it is a more serious infection with greater effects and sequelae, treatment is carried out with ceftazidime pentahydrate, with a single application per cycle and a dose dependent on the patient's weight.

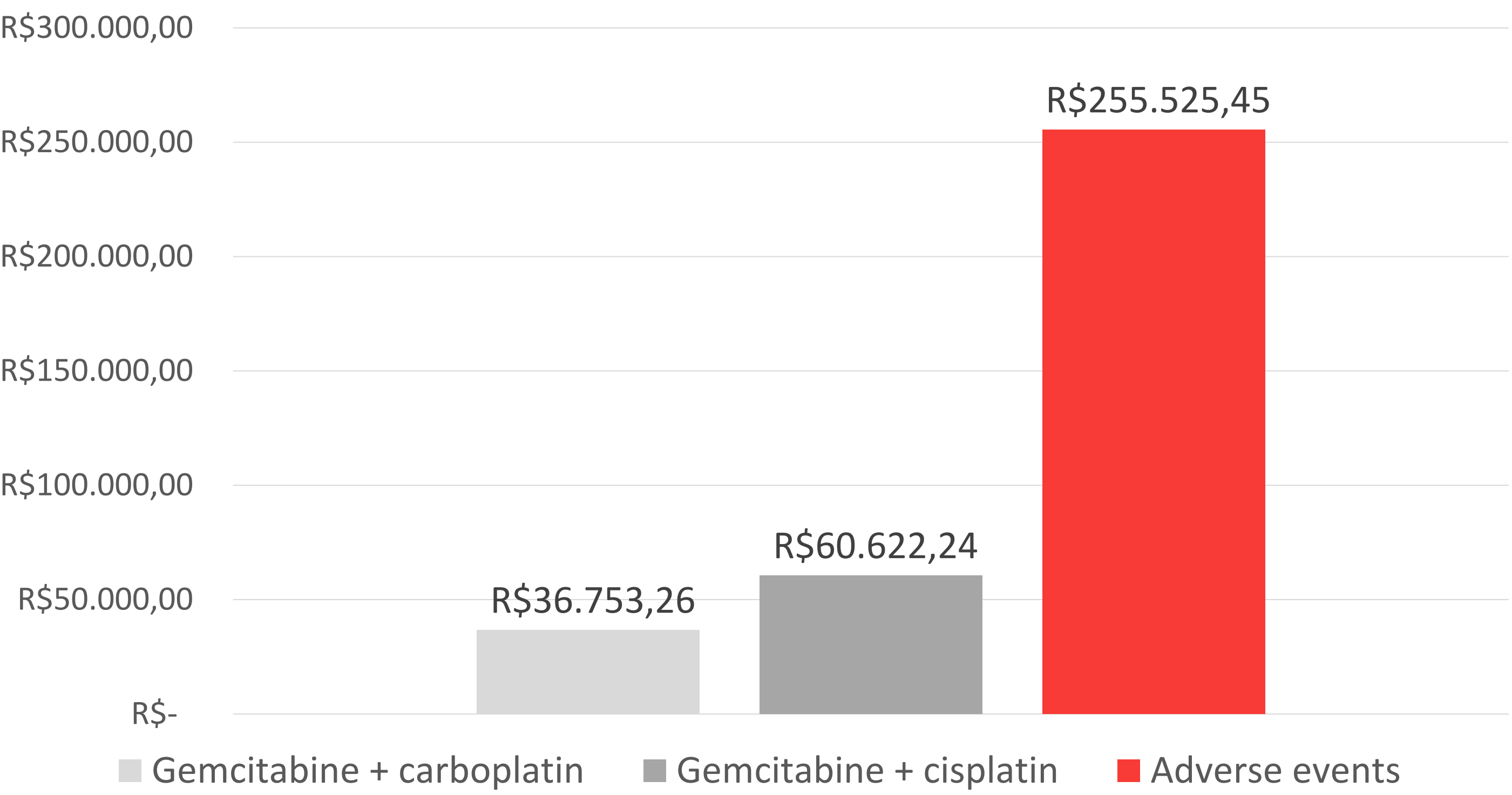
Objectives

To estimate the additional costs associated with the management of the most frequent adverse effects during chemotherapy for the treatment of bladder cancer, based on data taken from pivotal studies relating the use of chemotherapy with immuno-oncology and basing the calculations on real data from the Brazilian private health system.

So, it was calculated that for one treatment of each patient who presented these AEs in a regimen of 6 cycles of platinum-based chemotherapy we would have the following costs: anemia R\$325.45, neutropenia approximately R\$247 thousand and nausea R\$8.2 thousand.

Adverse Event	Prevalence (%)	Treatment	Estimated Cost (R\$)	
Anemia	57%	Erythropoietin	R\$	325,45
Neutropenia	42%	Ondansetron	R\$	247.000,00
Nausea/Vomiting	39%	Ceftazidime	R\$	8.200,00

With the cost data in hand, a comparison was made between the costs of adverse effects and the cost of the therapy that causes such effects.



Adverse Events Cost Overshadows Chemotherapy Expenses in Bladder Cancer (6-Cycle Treatment)

Conclusions

- Bladder cancer treatment with platinum-based chemotherapy can lead to costs up to eight times higher than the price of the drugs themselves when the hidden burden of managing adverse events (AEs) is considered.
- Patients with more advanced disease stages tend to generate higher healthcare costs, highlighting the need to prioritize treatments with greater efficacy to optimize resource allocation.
- Reducing the clinical and economic impact of AEs is essential to improve resource distribution and enhance patient quality of life.
- Implementing a smart treatment sequencing strategy, including the use of innovative technologies such as immuno-oncology in earlier stages, may help minimize the total annual cost impact—particularly the often-overlooked costs associated with AEs in metastatic bladder cancer.

References

Bozzini C, Busti F, Marchi G, Vianello A, Cerchione C, Martinelli G, Girelli D. Anemia in patients receiving anticancer treatments: focus on novel therapeutic approaches. *Frontiers in Oncology*. 2024;14:1380358. doi:10.3389/fonc.2024.1380358.

Pulido JZ, Aleixo SB. Antieméticos em Oncologia. *Revista Brasileira de Oncologia Clínica*. 2004;1(3):35-40.

Chron Epigen Indústria e Comércio Ltda. Eritropoietina Alfa (Alfaepoetina) - Bula Profissional. 2024.

União Química Farmacêutica Nacional. Cloridrato de Ondansetrona - Bula Profissional. 2024.

Hurvitz S, Guerin A, Brammer M, et al. Investigation of Adverse-Event-Related Costs for Patients With Metastatic Breast Cancer in a Real-World Setting. *The Oncologist*. 2014;19(9):901-908. doi:10.1634/theoncologist.2014-0059.

Powles T, Valderrama BP, Gupta S, et al. Enfortumab Vedotin and Pembrolizumab in Untreated Advanced Urothelial Cancer. *New England Journal of Medicine*. 2024;390(10):875-888.

Borg S, Glenngård AH, Österborg A, Persson U. The cost-effectiveness of treatment with erythropoietin compared to red blood cell transfusions for patients with chemotherapy-induced anaemia: A Markov model. *Acta Oncologica*. 2008;47(6):1009-1017. doi:10.1080/02841860701744498

INCA. Estimativa 2023: Incidência de Câncer no Brasil. Instituto Nacional de Câncer, 2023.

IBGE. Projeções da População, 2024.

Balar AV, Kulkarni GS, Uchio EM, et al. Pembrolizumab monotherapy for the treatment of high-risk non-muscle-invasive bladder cancer unresponsive to BCG (KEYNOTE-057): an open-label, single-arm, multicentre, phase 2 study. *The Lancet Oncology*. 2021;22(7):919-930. doi:10.1016/S1470-2045(21)00237-3.

Blau Farmacêutica S.A. (2022). Ceftazidon® (ceftazidima pentaidratada) 1000mg Pó Injetável - Bula Profissional da Saúde. [Package Insert].

Contact

Rigo Deborah: deborah.rigo@adium.com.br

Penetti Renata: Renata.Penetti@adium.com.br