PCN165

German cost analysis of triplet regimens for relapsed or refractory multiple myeloma patients

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Background

- Multiple myeloma (MM) is an incurable, heterogeneous blood cancer with serious disease-related complications
- Recently, several new agents have been approved for the treatment of MM patients who received at least 1 prior line of therapy
- These new agents have demonstrated to be efficacious in extending progression-free survival (PFS) and time to progression [1,2,3,4]
- The majority of these new drugs is only administered parenterally, excepting Ixazomib-based combination which is the only orally bioavailable regimen
- Oral and intravenous administration of anticancer drugs may place different financial burden on the healthcare system
- For example, in Germany, the physician fees for administration of intravenous therapies are twice as high as for oral therapies

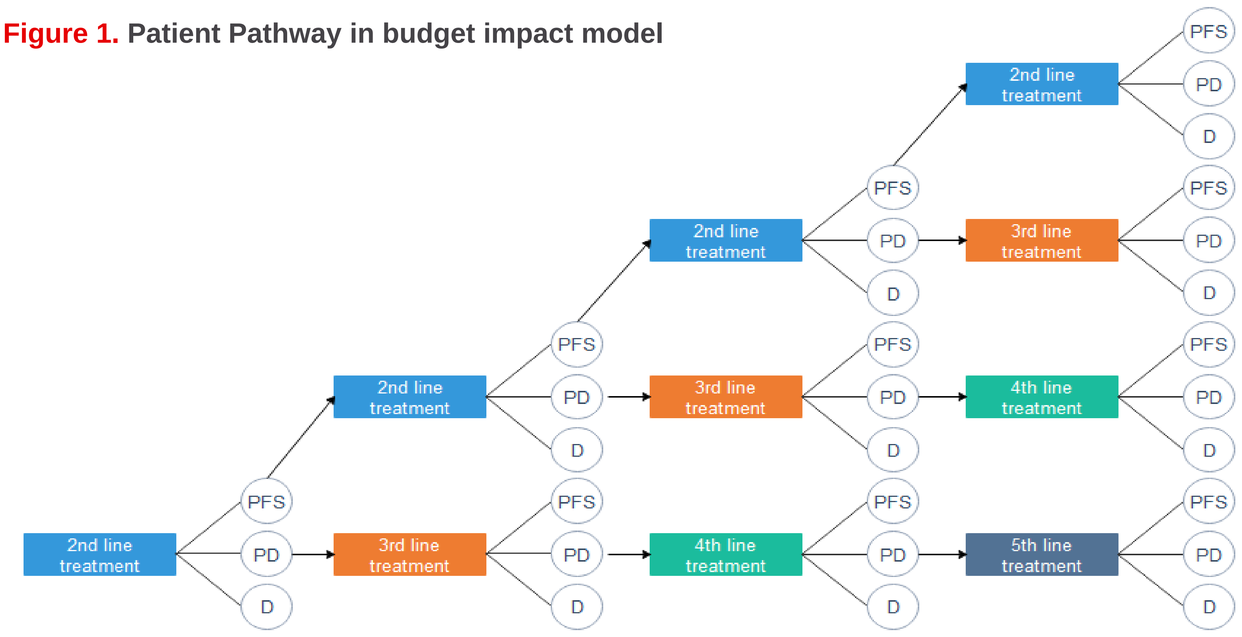
Objectives

- To conduct a budget impact analysis (BIA) over 1-year time horizon of triplet therapies for relapsed/refractory multiple myeloma (rrMM) patients from the perspective of German statutory health insurance

Study design

- A 3-state partitioned survival model was developed to evaluate the budget impact of the following regimens from 2nd to 5th treatment line (**Figure 1**):
  – carfilzomib plus lenalidomide plus dexamethasone (KRd),
  – elotuzumab plus lenalidomide plus dexamethasone (ERd),
  – daratumumab plus lenalidomide plus dexamethasone (DRd), and
  – ixazomib plus lenalidomide plus dexamethasone (IRd)
- Once 2nd line patients experienced a disease progression, three additional lenalidomide-free therapies were prescribed in third treatment line, only.
- In 4th and 5th line, all therapies were considered, excepted those previously received
- PFS and overall survival (OS) data from published Kaplan-Meier curves were extracted and extrapolated over life-time horizon to estimate the treatment duration
- The analysis included direct medical costs and direct non-medical costs, such as transportation costs.

Figure 1. Patient Pathway in budget impact model



Modelling scenarios

Reference and equivalence scenario

- **Reference scenario**: corresponds to the status-quo market share observed in the German market in the 1st quarter 2019. For the following years observed market trends were assumed to continue (**Table 1**).
- **Equivalence Scenario:** equal market share (25% each) of all triplets over 1-year and 3-year time horizon.

Table 1. Reference Scenario

	2019 (year 1)	2020 (year 2)	2021 (year 3)
KRd	46%	35%	19%
ERd	13%	10%	7%
DRd	32%	45%	63%
IRd	9%	10%	11%

1-year specific scenarios:

- **KRd/ ERd/ DRd/ IRd -scenario**: Market share of respective drug was assumed at 100% and 0% for all other triplets

Sensitivity analyses

- Deterministic sensitivity analyses were conducted to identify the most influential model inputs
- BIA was conducted over 3-year time horizon

Target Population

- Prevalent target population in 2019 comprised 10,262 rrMM patients
- Incident populations were estimated at 2,337 and 2,417 patients for 2020 and 2021

Results

- In all scenarios drug acquisition costs accounted for about 90% of the total costs. (**Table 2**).
- Across all scenarios, use of oral therapy alone (IRd-scenario) generated the lowest total costs (**Table 2**).
- Savings achieved by using oral therapy alone were driven by drug costs followed by preparation costs for parenteral solutions, and transportation costs.

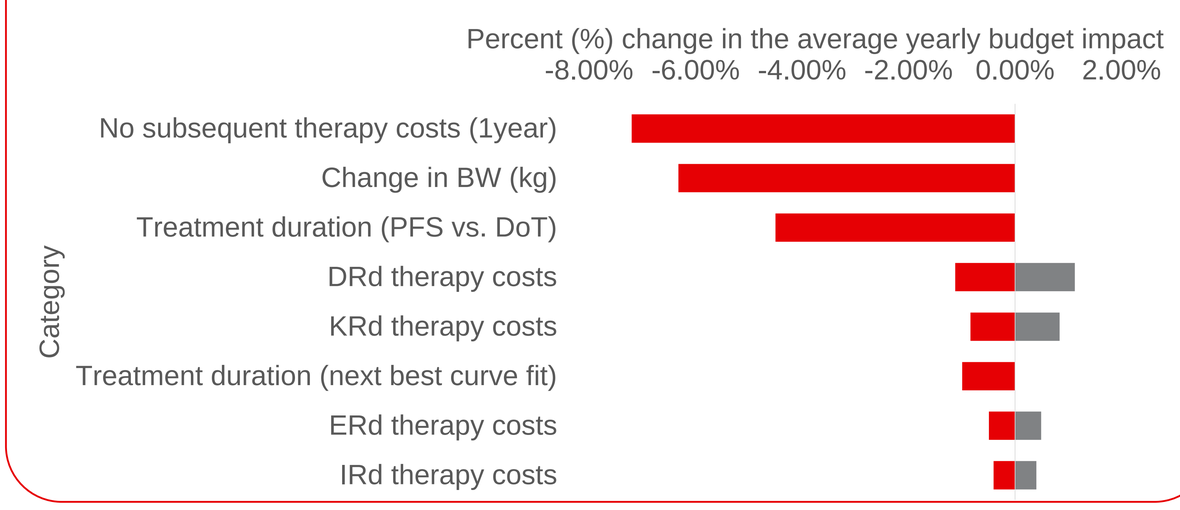
Table 2. Budget impact results by cost category over 1-year in million €

Scenario	Drug costs	Administration costs and other 1-time costs	Comedication costs and preparation costs for parental solution	Adverse event costs	Transport costs	Subsequent line costs	*Total costs*	*Δ**
Reference	1,243	8	29	0.6	8	104	1,393	-
Equivalence	1,196	8	23	0.6	6	95	1,317	5.5%
IRd	961	5	0	0.5	0	99	1,060	23.9%
KRd	1,025	8	35	0.4	13	116	1,197	14.1%
DRd	1,720	10	29	0.8	5	59	1,824	30.9%
ERd	1,042	9	26	0.5	5	174	1,257	9.8%

* Difference between different scenarios and the Reference scenario

- Exclusion of the subsequent treatment lines had the biggest impact on the results while variation in drug acquisition costs by 5% as well as the use of next best fit curve only slightly affected the total costs (**Figure 2**)
- BIA over 3-year time horizon: Across all scenarios, the Equivalence-scenario generated the lowest costs followed by the scenario with the use of oral therapy alone (IRd-scenario)

Figure 2. Tornado Diagram showing the results of sensitivity analyses



Limitations

- Treatment efficacy for each drug in each therapy line is assumed to be not correlated with the previous therapy line
- No indirect comparison of data from clinical trials was performed.
- By focusing on the selected starting triplet therapies, the study might ignore further treatment options
- Real world treatment duration may differ from observation in clinical trials

Conclusions

- **Results demonstrate that oral-based therapy regimens for treatment of rrMM offer cost advantages over intravenous-based therapy regimens**
- **Saving effects for oral-based therapy (IRd-scenario) are observed for all direct costs and direct non-medical costs except subsequent therapy line costs**
- **Across all scenarios and time horizons, drug acquisition costs were the largest cost driver followed by subsequent lines costs, comedications costs and preparation costs for parenteral solutions**

References

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Acknowledgments

This study was sponsored by Takeda Pharma Vertrieb GmbH & Co. KG and the poster was prepared by Takeda Pharma Vertrieb GmbH & Co. KG and WifOR Institute.