Cost-effectiveness of avelumab as first-line maintenance treatment for locally advanced or metastatic urothelial carcinoma in Finland

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SCOPE

- **This study aimed to assess the cost-effectiveness of avelumab + best supportive care (BSC) vs BSC alone as a first-line maintenance treatment in adult patients with locally advanced or metastatic urothelial carcinoma that has not progressed with platinum-based chemotherapy in the Finnish healthcare setting**

CONCLUSIONS

- **Avelumab provides a significant clinical improvement in a patient group affected by a severe form of cancer that usually has a relatively poor prognosis**
- **Avelumab + BSC achieved an additional 1.00 life-year (LY) and 0.63 quality-adjusted LY (QALY) compared with BSC alone**
- **The Finnish Medicines Agency (Fimea) found relatively little uncertainty in the model[1]**
  - **Remaining uncertainty was well-assessed by sensitivity and scenario analyses**
- **First-line maintenance treatment of locally advanced or metastatic urothelial carcinoma with avelumab can be a cost-effective treatment option in Finland**
- **This finding was corroborated by Fimea, which concluded that the results of the cost-effectiveness analysis are of the correct order of magnitude[1]**

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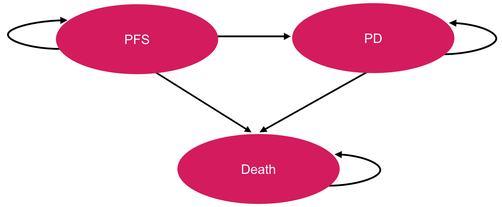
BACKGROUND

- Avelumab is a human IgG1 antibody that targets programmed death ligand 1 (PD-L1)[2]
- Avelumab is approved in Finland as monotherapy for first-line maintenance treatment in adult patients with locally advanced or metastatic urothelial carcinoma that has not progressed with platinum-based chemotherapy[1,3]
- As of 2019, 11,636 patients had bladder or urinary tract cancer in Finland[4]
- This study aimed to assess the cost-effectiveness of avelumab plus BSC vs BSC alone in the Finnish healthcare setting

METHODS

- Using a Finnish healthcare perspective, a cost-utility analysis was conducted by building a 3-state partitioned survival model: progression-free survival (PFS), progressed disease (PD), and death (**Figure 1**)
- Efficacy, safety, and utility parameters were derived from the phase 3 JAVELIN Bladder 100 study, with a cutoff date of 21 October 2019[2]
- Cost and healthcare resource use data were obtained using Finnish clinical expert input and cost literature[5-6]
- Clinical study results were extrapolated with parametric survival curves using a base-case time horizon of 25 years and a cycle length of 7 days
  - Spline-based models for PFS were used
- Both costs (euros, 2020) and effects were discounted at a 3% annual discount rate
- Scenario analyses and a probabilistic sensitivity analysis were conducted to assess the effect and magnitude of uncertainty
- Outcomes are reported in terms of LYs and QALYs gained

Figure 1. 3-state partitioned survival model structure

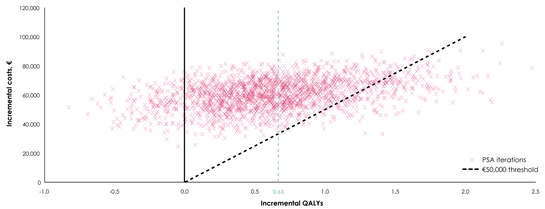


PD, progressed disease; **PFS**, progression-free survival.

RESULTS

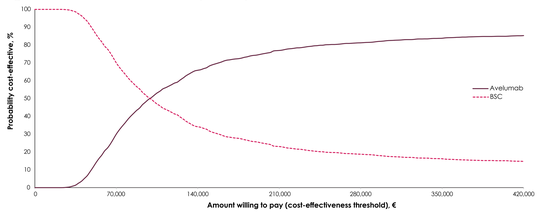
- In the base-case analysis, avelumab + BSC achieved an additional 1.00 LY (3.94 vs 2.95) and 0.63 QALY (2.44 vs 1.82) compared with BSC alone (**Figure 2**)
- The incremental cost-effectiveness ratio (ICER) was <3 times the GDP per capita per QALY gained (**Figure 3**)
- The probabilistic sensitivity analysis shows that, while some uncertainty remains, most iterations present a positive health benefit for avelumab (**Figure 2**)
- The 1-way sensitivity analysis (**Figure 4**) shows that the variables that influence cost-effectiveness most are:
  - relative dose intensity of avelumab
  - subsequent treatment decisions after first-line maintenance (**Table 1**)

Figure 2. Probabilistic sensitivity analysis



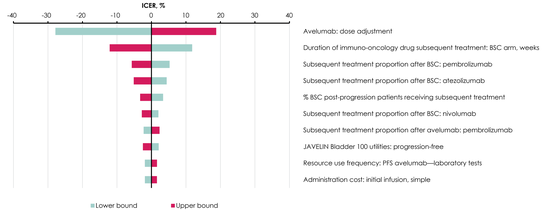
2000 iterations. List price analysis.
PSA, probabilistic sensitivity analysis; **QALY**, quality-adjusted life-year.

Figure 3. Cost-effectiveness acceptability curves



List price analysis.
BSC, best supportive care.

Figure 4. One-way sensitivity analysis



BSC, best supportive care; **ICER**, incremental cost-effectiveness ratio; **PFS**, progression-free survival.

Table 1. Scenario analysis results

	Avelumab + BSC			BSC			Incremental			
Scenario	**Total costs**	**Total LYG**	**Total QALYs**	**Total costs**	**Total LYG**	**Total QALYs**	**Incremental costs**	**Incremental LYG**	**Incremental QLAYs**	**ICER**
Time horizon: 5 years	-7	-38	-31	-9	-33	-26	-5	-54	-46	78
Time horizon: 10 years	-3	-19	-13	-3	-16	-11	-2	-28	-21	24
Time horizon: 20 years	0	-3	-2	0	-3	-1	-1	-5	-3	2
Discount rate: 0%	5	0	16	6	0	13	5	0	22	-14
OS: log normal	-2	-17	-13	-4	-21	-16	0	-5	-4	3
OS: log-log	-3	-18	-14	-4	-19	-16	-1	-14	-11	11
PFS: exponential	0	0	-3	2	0	-1	-2	0	-9	8
PFS: generalized gamma distribution	0	0	0	1	0	-1	-1	0	2	-3
PFS definition: investigator assessed	0	0	0	2	0	-1	-2	0	3	-5
TTD: log normal, treatment stop at 2 years	0	0	0	0	0	0	0	0	0	0
TTD: log normal, no treatment stop	21	0	0	0	0	0	42	0	0	42
Utilities: TA519[7]	0	0	-7	0	0	-7	0	0	-4	4
Utilities: no age adjustment	0	0	3	0	0	2	0	0	4	-4
Costs: no wastage applied	0	0	0	-6	0	0	5	0	0	5
RDI: low end of clinicians' estimate	-31	0	0	0	0	0	-61	0	0	-61
RDI: clinicians' conservative estimate	-7	0	0	0	0	0	-13	0	0	-13
RDI: no RDI	10	0	0	0	0	0	19	0	0	19
Population: Finnish average	0	-3	-2	0	-2	-2	0	-4	-3	3
Clinical practice assumptions	-19	-3	-2	-35	-2	-2	-3	-4	-3	0

Results presented as percentage change from base-case analysis.
BSC, best supportive care; **ICER**, incremental cost-effectiveness ratio; **LYG**, life-years gained; **OS**, overall survival; **PFS**, progression-free survival; **QALY**, quality-adjusted life-year; **RDI**, relative dose intensity; **TA**, technology assessment; **TTD**, time to treatment discontinuation.

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DISCLOSURES E. Karttunen and **S. Jääskeläinen** are employees of Merck OY, Espoo, Finland, an affiliate of Merck KGaA, Darmstadt, Germany. At the time of the study, **P. Hervonen** was an employee of Helsinki University Hospital, Helsinki, Finland. He reports advisory roles at BMS, Merck & Co., Kenilworth, NJ, Pfizer, and Roche and clinical study participation in trials funded by Merck & Co., Kenilworth, NJ. **J. Chang** is an employee of Pfizer, New York, USA. **M. Kearney** is an employee of the healthcare business of Merck KGaA, Darmstadt, Germany. **ACKNOWLEDGMENTS** This study was funded by the healthcare business of Merck KGaA, Darmstadt, Germany (CrossRef Funder ID: 10.13039/100009945) as part of an alliance between the healthcare business of Merck KGaA, Darmstadt, Germany and Pfizer. Editorial support was provided by ClinicalThinking and was funded by the healthcare business of Merck KGaA, Darmstadt, Germany and Pfizer.

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