Budget Impact Analysis of Pembrolizumab in the Treatment of Advanced Melanoma in China

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BACKGROUND AND OBJECTIVES

◆ Advanced (unresectable or metastatic) melanoma is a dire disease resulting in very short life expectancy and poor quality of life in China. For patients who failed the first-line treatment, very limited treatment options are available. Pembrolizumab delays cancer disease progression and potentially prolongs overall survival and improves patients' quality of life (Robert C, 2014).

◆ This study was to determine the budgetary impact of introducing Pembrolizumab into medical insurance in the treatment of patients with previously treated advanced melanoma in China.

METHODS

◆ **Model Structure**

A 3-year budgetary impact model was developed to assess the expense of treatment for unresectable or metastatic melanoma patients who failed the first-line treatment in China.

As illustrated in Figure 1, two scenarios were established to calculate the incremental expenditure. (Pembrolizumab not Introduced into the Medical Insurance and Pembrolizumab Introduced into the Medical Insurance)

The total costs of the two scenarios were calculated by multiplying the target population, market share, and costs of drugs and medical resources.

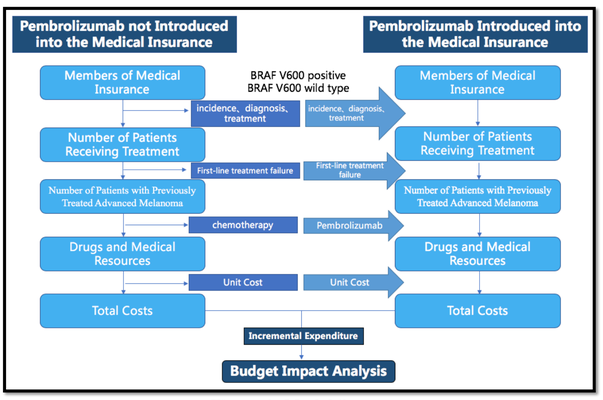

Figure 1. Model Structure

Budget impact was calculated separately by reason of the different reimbursement policies between Urban Employee Basic Medical Insurance (UEBMI) and Urban and Rural Resident Basic Medical Insurance (URRBMI).

The second-line treatment of melanoma is very limited in China. Chemotherapy is the main treatment until the appearance of immunotherapy. In the chemotherapy regimens, the most commonly used is carboplatin and paclitaxel regimen (Guo J, 2016). Therefore, in order to simplify the model, all the chemotherapy regimens are indicated by carboplatin + paclitaxel.

◆ **Perspective:** Payer

◆ **Model Input**

• *Target population*

Target population was forecasted using data from healthcare database, expert opinion and literature review.

The number of patients receiving treatment was calculated by multiplying the members of medical insurance, incidence rate (Liu J, 2018), diagnostic rate and rate of receiving therapy.

For patients with early melanoma (stage I-IIIab), 95% can be cured by surgery, but 40% of patients had melanoma recurrence in the second year. 90% of them required medication after relapse, and 70% of first-line treatment failures were transferred to second-line treatment. For patients with unresectable or metastatic melanoma (stage IIIc and IV), 80% of them required medication, and 50% of first-line treatment failures were transferred to second-line treatment.

Patients who received the second-line treatment were the target population for this study. As a result, the target population consists of two parts, one from the newly diagnosed patients with stage IIIc and IV, and the other from patients who had surgery but relapsed in the previous year.

• *Market Share*

Market Share of Pembrolizumab and carboplatin + paclitaxel were collected from the IQVIA database.

• *Cost*

Total direct medical costs which included drug acquisition, drug administration, laboratory examination, imaging examination and adverse event management were estimated.

Pembrolizumab cost in China is ¥17918 per 100 mg vial and is administered at a dose of 2 mg/kg every 3 weeks. 50% patients received two 100 mg vial and 50% patients received one 100mg vial of pembrolizumab. It was assumed that the price will be 55% of the original price after Pembrolizumab introduced into the medical insurance.

According to median tendering price per mg from 8 provinces/cities, cost for carboplatin and paclitaxel per mg was ¥1.12 and ¥ 24.90. Both carboplatin and paclitaxel are administered Q3W for a total of 6 doses (Flaherty KT, 2013) (Hu Y, 1999). The cost for administering pembrolizumab and chemotherapy was ¥56.25 and ¥178.25 each cycle respectively.

Patients incur regular costs for routine oncology office visits, lab tests, and scans. The data for the resource use frequency and costs were provided by the physicians interview.

Events and incidence of Grade 3-5 SAEs (Flaherty KT, 2013) were identified from published clinical trials, and unit cost of different SAE management was calculated and consolidated from literature review, database analysis and physician interview. SAE management cost was administered as one-off cost at the beginning of model cycles.

◆ **Parameter Uncertainty Analysis**

One-way sensitivity analysis was performed to test the robustness of results.

RESULTS

◆ **Base-Case Results**

As illustrated in Figure 2, with Pembrolizumab introduced into the national medical insurance, the incremental expenditure from 2020 to 2022 would be 19.61 million yuan, 23.17 million yuan and 25.40 million yuan, respectively. Accounting for the total expenditure of the national medical insurance, the ratios were 0.00093%, 0.00091% and 0.00082%, respectively.

Figure 2. Incremental Expenditure of National Medical Insurance

◆ **Parameter Uncertainty Analysis Results**

As illustrated in Figure 3, Figure 4 and Figure 5, the incidence of melanoma and the reimbursement policy of URRBMI were the key drivers.

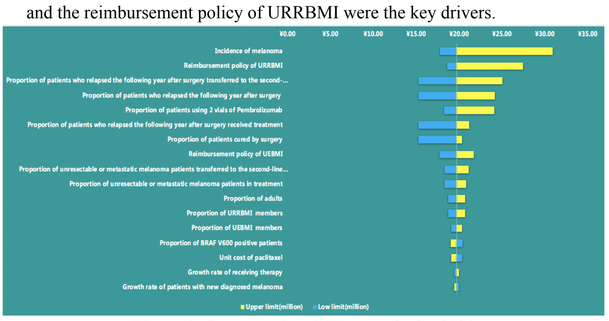

Figure 3. One-way Sensitivity Analysis (2020)

Figure 4. One-way Sensitivity Analysis (2021)

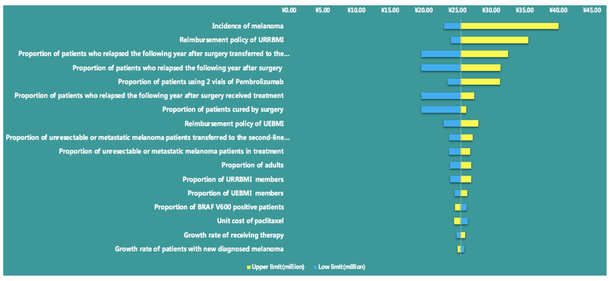

Figure 5. One-way Sensitivity Analysis (2022)

DISCUSSIONS AND CONCLUSIONS

• After Pembrolizumab introduced into the medical insurance catalogue, the number of patients receiving treatment increased, and the expenditure on medical insurance fund increased accordingly.

• Accounting for the total expenditure of the national medical insurance, the expenditure for treatment of unresectable or metastatic melanoma patients who failed first-line treatment would be decreasing year by year.

• The incidence of melanoma were reported early in the literatures published in China, and the rates from different sources were different. For this reason, it led to uncertainty in the target population.

• Among the target population, the proportion of the patients covered by URRBMI was higher. Therefore, the reimbursement policy of URRBMI had a great impact on the budget of medical insurance funds.

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