

Rationalization of healthcare expenses may be beneficial for both the healthcare system and patients - a case of Hymenoptera venom immunotherapy

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Abstract

Background: Venom immunotherapy is the only method to radically reduce the risk of a systemic reaction to a Hymenoptera sting. Currently, venom immunotherapy in Poland is generally carried out in a hospital setting. Covering venom extracts with a pharmacy refund, which would allow them to be administered on an outpatient basis could generate savings for the public payer.

Methods: Alutard SQ® is in the process of applying for reimbursement for the first time. Due to the progress in negotiations, the price of the drug proposed by MAH, is close to the upper price level of the drug currently available commercially in pharmacies. In this paper, the potential savings for the payer related to drug reimbursement were estimated, taking into account the currently used procedure and drug valuation as well as the expected reimbursement price. The indirect costs and the advantages of the proposed solution for patients were estimated.

Results: In the 5-year horizon of the therapy, savings may reach up to PLN 40,000 per patient, which, in the case of 2,000 patients amounts to PLN 80 million. Additionally, potential annual indirect savings related to lost productivity and transportation cost amount to as much as PLN 5 million.

Conclusion: Proposed solution would be beneficial for the public payer generating substantial savings as well as patients, whose access to therapy would increase. During COVID-19 epidemic treating patients in ambulatory care would allow avoiding unnecessary contact with hospital care and decrease the risk of infection.

Introduction

Taking into consideration the growing health care expenses in Poland, it is worth to systematically verify the effectiveness of clinical and cost benefits financed by the National Health Fund in order to rationalize these expenses. One of the solutions generating savings for the public payer, put forward by ALK-Abelló A/S company, is a proposal to extend the method of financing desensitization with allergen extracts of wasp and bee venoms. The proposal is to cover these products with a pharmacy refund, which allows them to be administered on an outpatient basis, instead of the current financing of insect venom immunotherapy only as part of the procedures settled on the inpatient basis. This proposal should contribute to both limiting the public payer's expenses and improving patients' access to life-saving treatment, which seems extremely important, especially in the times of the prevailing COVID-19 pandemic.

Insect venom allergy is defined as hypersensitivity to insect venom that causes symptoms greater than a normal local reaction.^[1] Venom hypersensitivity may be triggered by immunological mechanisms (IgE-dependent or non-IgE allergy) and non-immunological mechanisms.^[2] The most common is allergy to the venom of Hymenoptera insects, including bees, bumblebees, hornets and wasps. Hypersensitivity reaction to Hymenoptera venom is one of the most common causes of anaphylaxis, a rapidly evolving, life-threatening systemic reaction.^[3] Diagnostics for insect venom allergy is required by all people who experienced a systemic reaction as a result of a sting. The basic diagnostic tools are: history, analysis of the medical records of an anaphylaxis episode, testing for the presence of specific IgE antibodies for a specific species of venom: in vivo (skin tests) and/or in vitro (in blood serum).^[4]

In most cases, both for the patients themselves and their families, any allergic reaction - no matter how severe it is - is a frightening experience. Therefore, allergy to Hymenoptera venom has a negative impact on the quality of life due to anxiety and the constant need to avoid insect stings and fear during everyday activities, especially outdoors.^[5]

Venom immunotherapy is the only method to radically reduce the risk of a systemic reaction to a Hymenoptera sting.^[6] Positive results for the presence of specific IgE for insect venom allergens in vivo or in vitro tests are found in 15-30% of the population, more often in children and in repeatedly stung people.^[4] Clinical signs of an allergy are less frequent. Nevertheless, the number of patients potentially amenable to treatment may be high. In Poland, in the ECAP (Epidemiology of Allergic Diseases in

Poland) study, allergy to insect venom was diagnosed in 2% of children aged 6-7 years, 2% of children aged 13-14, and 3% of adults, i.e. 2,000-3,000 per 100,000 people.^[7] Calculated per population in Poland (38,354,173 according to the Central Statistical Office), this may even mean 770,000 – 1,150,000 people at risk.

The lack of awareness of the disease and the need for diagnostics limit the size of the population of patients receiving venom immunotherapy in clinical practice. The number of patients desensitized to Hymenoptera venom in recent years seems to be stable – it is approx. 3,000 patients^[8,9], which is a low number compared to the population estimates presented above. Such a low number of patients treated in relation to the total population eligible for treatment also results from difficult access to treatment – venom immunotherapy is carried out only in 33 centres in Poland^[8], mainly in large cities. On the other hand, the abovementioned frequent lack of disease awareness significantly reduces the number of patients receiving this immunotherapy and even if better access to appropriate services is ensured, the number of patients shall not change significantly.

Financing of venom immunotherapy in an inpatient setting

Currently, venom immunotherapy in Poland is generally carried out in a hospital setting. It consists of two stages: the initial phase (initiation), lasting up to several weeks (depending on the protocol used) and the maintenance phase, optimally lasting 3-5 years. Currently, both treatment phases are carried out within two Diagnosis-related Groups (DRG), separately for adult patients (group S33) and paediatric patients (group P32). Within the both above-mentioned groups, the procedures “Insect venom vaccine (fast method) - initial course” with code 99.122 and “Insect venom vaccine - maintenance dose” with code 99.123 are financed. The financing covers the cost of purchasing the drug by the centre (usually as part of a tender), its administration, and patient supervision

after the injection. In addition, in case of outpatient treatment, funding is provided for the “Insect venom vaccine - maintenance dose” procedure with code 99.123 – however, financing does not include the purchase of medicine. The valuations of procedures are presented in the table below.

According to the survey assessing compliance with recommendations in Polish allergy centres, in 94% of allergy centres where patients are desensitized to Hymenoptera venom, the treatment is inpatient, not outpatient.^[8] Undoubtedly, this is due to the disproportionate valuation of the drug administration procedure in an outpatient setting (PLN 53^[10]) in relation to the drug administration procedure in an inpatient setting, which (in the case of maintenance therapy) is valued at PLN 1,182 for adults and PLN 965 for paediatric patients, respectively.^[11]

The single initiation pack of this medicine allows to carry out the initiation phase on a single patient, and the maintenance pack is enough for 5 consecutive administrations, which equates to approximately six months of treatment. The price of the ALK-Abelló product available in the pharmacy and used in the discussed indication, Alutard SQ[®], is approx. PLN 900-1400 for each of the sets.^[12] The drug is not reimbursed. The prices paid by hospitals when purchasing drugs in tenders are lower, in particular due to the lack of a retail margin.

The given prices of extracts and valuation of procedures, both in the case of service providers and patients, justify the choice of available only in a few, often distant for patients, inpatient centres.

Rationalization of expenses - outpatient treatment

According to the position of the European Academy of Allergy and Clinical Immunology, there are currently no reasons for desensitization in the inpatient setting^[5]. Alutard SQ[®] is a depot drug that, unlike aqueous solutions, can also be administered in an outpatient setting, because

Tab. 1. Valuation of financed venom immunotherapy procedures.

Product code	Group code	Group name	Value, PLN	Source
Inpatient setting				
5.51.01.0014032	P32	Allergies - desensitization	965 (hospitalization)	Order of the President of the National Health Fund No. 4/2021/DSOZ
5.51.01.0016033	S33	Allergic diseases > 17 years of age	2362 (hospitalization)/ 2172 (planned hospitalization)/ 1182 (hospitalization <3 days - type of contract hospitalization / planned hospitalization)	Order of the President of the National Health Fund No. 4/2021/DSOZ
Outpatient setting				
5.31.00.0000101	Z101	Treatment procedures - group 101	53	Order of the President of the National Health Fund No. 25/2020/DSOZ

its use does not require the involvement of extraordinary, hospital-reserved surveillance measures. Compared to aqueous solutions use of Alutard SQ® caused fewer large local reactions than the aqueous preparation.^[13,14] There is a risk of any treatment but administration of depo drug will be a feasible and safe alternative to hospital administration. Especially after fulfilling a formal checklist for technical and medical requirements specified in the payer regulations for ambulatory care units.

The proposed solution provides the possibility of dispensing the drug to the patient in a pharmacy as part of full reimbursement and administering it on an outpatient basis, also in the initiation phase of treatment, assuming the current valuation of this service (the description of outpatient procedure should be supplemented with initiation treatment), so that the public payer, like today, would bear the total cost of treatment, but due to a significantly lower use of resources that cost would be significantly lower. In order for the cost of treatment in an outpatient setting to be equal to the current inpatient costs incurred by the payer, the price of the drug would have to rise to PLN 5,000-6,000 for a single package. This shows a huge area to optimize the financing of venom immunotherapy. Alutard SQ® is the first time in the process of applying for reimbursement. Currently (April 2021), it is at the price negotiation stage. The price of the drug proposed by the producer is higher than the one currently used in hospital supplies, but it is justified by the profitability of selling the drug on the Polish market. Currently, drug cost is one of the lowest in Europe and does not cover production and distribution costs. A similar situation occurred in the case of the already reimbursed product Novo-Helisen®, the official prices of which in Poland were so low that the responsible entity Allergopharma considered resigning from its sale^[15], but after negotiations with the Ministry of Health, the price of the product increased.

Due to the progress in negotiations, the price of the drug proposed by ALK-Abelló is close to the upper price level of the drug currently available in pharmacies.

In the context of valuation of services, the financing of a maintenance phase package of the drug in an outpatient setting by a given centre would be twice as expensive as the cost of the service itself offered by that centre. However, in the case of inpatient treatment, the cost of the drug accounts only for approx. 20% of the centre's revenue for the contractual procedure, depending on the group in which it is settled, and according to the data of the National Health Fund, the vast majority of patients are adults, who are valued higher.

More for less - the payer perspective

Savings for the payer may reach 4,500 PLN per single package given (the total difference in costs resulting from financing the drug and procedures including injections). In the 5-year horizon of the therapy, savings may reach up to PLN 40,000 per patient. Assuming the treatment of 2,000 patients out of 3,000 patients currently desensitized in this indication in Poland^[8,9] in the outpatient clinic instead of the inpatient setting, the financial benefit from the perspective of the public payer would amount to approx. PLN 80 million.

The savings estimated above can be used to refund desensitization to a larger group of patients. The savings from treating 2,000 patients on an outpatient basis instead of a hospital basis could be used to treat an additional approximately 5,400 patients. This is a total of approximately 7,400 patients treated on the same reimbursement budget. Over 5,000 patients more than those currently treated, who can be treated without exceeding the current budget, constitute a kind of "safety buffer" (Figure 1). The payer may be concerned about an increase in the target population and an uncontrolled increase in spending. However, it is very unlikely that such a large number of additional patients eligible for desensitization therapy (disease-aware and correctly diagnosed) will be achieved and the budget for venom desensitization will be exceeded.

Estimates were based on current procedures costs (April 2021). If ambulatory or hospital tariffs will be adjusted during the tariffifications process presented savings need to be updated.

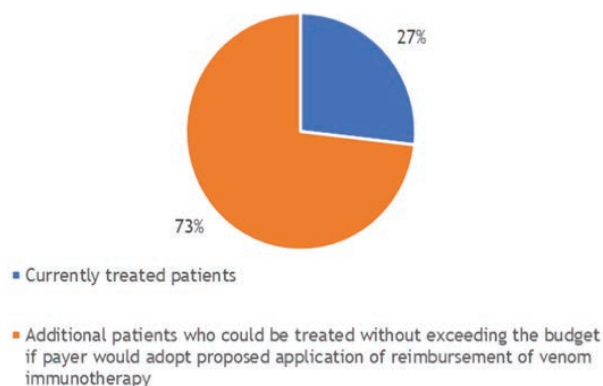


Figure 1. Budget buffer - ratio of currently treated patients to the number of additional patients who could be treated without exceeding the budget if payer would adopt the proposed application of reimbursement of venom immunotherapy.

Benefit for the patient

Enabling outpatient desensitization may increase the number of patients using this therapy - the outpatient system means not only savings for the payer, but also easier access for patients to centres where they can be treated. Desensitization to Hymenoptera venom is currently carried out in 33 centres in Poland^[8] - in particular voivodships there are one to four centres, which are most often located in large cities. Treatment in these centres often forces patients to travel for several hours due to the distant location of the centre from their place of residence as well as stay there, and thus the loss of working time. Therefore, a large number of patients do not start treatment, and it also happens that they discontinue it. Therefore, a rational solution would be to enable outpatient desensitization in local centres. Despite the described self-limitation of the treated population resulting from the lack of awareness of the need for desensitization, offering treatment outside selected hospital centres will increase access to treatment and the chances of treating patients who were not able to maintain regular hospitalizations, not to mention savings in time and costs related to travel.

Based on the methodology presented in the Rønborg 2016^[17] publication on the determination of costs related to travel to a treatment centre and lost productivity of patients, as well as Polish data presented in the patient organization report^[18], the costs of commuting to the centres from the patient's perspective and the costs of lost productivity in Poland were estimated. According to data from 2017, 17% of patients have to drive less than 5 km from their place of residence to the clinic, 30% more than 6 km but less than 15 km, 41% more than 16 km but less than 99 km, and other patients more than 100 km.^[17] These data concern commuting to rheumatological centres, however, according to the data of the Supreme Medical Chamber, the number of specialists in the field of allergology (1,443) is much lower than the number of rheumatologists (1,780)^[19], hence the number of inhabitants per allergist in particular voivodships is usually higher than the corresponding rate for rheumatology and therefore the travel cost estimate below is a conservative variant

that underestimates the actual costs for patients. Assuming the cost per 1 km at the level of PLN 0.8358^[20], determined by the rate for 1 km of the vehicle mileage in 2021, and the average value of the distance from the patient's place of residence to the clinic taken into account twice (travel to and from the clinic), the average one-time cost of transporting single patient is 70,46 PLN. The annual cost of travel related to this therapy among 2,000 patients may amount to as much as PLN 1.8 million (Table 2).

In addition, assuming the patient's average travel time of 0.76 hours based on averaging the data contained in the patient organization report^[17], the average visit time equal to 2.0 hours based on the Rønborg 2016^[16] publication and the average cost of 1 hour of work equal to PLN 34.84 based on the Central Statistical Office data (the average monthly gross salary in the national economy in 2019 was PLN 4,918.17, and the average working time in this period was 1,694 hours)^[21], the total cost of loss of productivity related to single visit is PLN 122.63. The annual loss of productivity related to visits to canthers among 2,000 patients may therefore amount to as much as PLN 3.2 million (Tab. 3), while summing up the costs of travel and loss of productivity, indirect expenses amount to as much as PLN 5 million, which, after changing the method of financing venom immunotherapy, could be significantly reduced.

Desensitization in the time of the COVID-19 pandemic

Transferring desensitization to the outpatient setting may contribute to the improvement of epidemiological safety, which seems particularly important in the era of COVID-19. Avoiding the hospital environment means less exposure to bacteria and viruses. Collected data from other European countries^[22] and expert opinions^[23] indicate that during the pandemic fewer patients started desensitization compared to previous years or discontinue treatment.^[24] However, there are no grounds to limit the availability of this treatment during COVID-19 pandemic. Moving the patients to the selected outpatient clinic would allow this treatment to be carried out, especially in the maintenance phase, away from hospitals.

Tab. 2. Estimation of the annual cost of travel to an allergy centre.

Average distance from the place of residence to the clinic (one way) ^[17] , km	Average cost of travel per 1 km ^[19] , PLN	Average cost of transport per single visit, PLN	Annual travel cost for 2,000 patients, PLN
42.15	0.8358	70.46	1.8 mln

Tab. 3. Estimation of the annual loss of productivity associated with visiting an allergy centre.

Average labour cost for 1 hour ^[20] , PLN	Average one-way travel time ^[17] , h	Average time associated with the visit ^[16] , h	Average cost of lost productivity/visit, PLN	Annual loss of productivity for 2,000 patients, PLN
34.84	0.76	2.0	122.63	3.2 mln

Conclusions

Extending the method of financing desensitization with wasp and bee venom allergenic extracts has a triple benefit. The solution would be beneficial for public payer, who would bear much lower unit costs while maintaining the current effectiveness and safety of the treatment. Access to therapy financed by the National Health Fund would increase, and patients would not, as a rule, be forced to stay in hospitals that were logistically inconvenient. In turn, hospitals will thus reduce the number of procedures to be performed and free up medical resources that can be directed to patients for whom hospitalization is a necessity. It should also be noted that not all patients undergoing desensitization could take the drug only on an outpatient basis, hence some patients would still be treated in the inpatient setting.

Considering the global functioning on the pharmaceutical market and the very low level of financing of drugs for desensitization indicated by other entities^[14], the adoption of the solution proposed by the producer is an opportunity to keep the product on the market. If this did not happen, Polish patients would lose access to modern therapy and would only be left with desensitization with older generation preparations (aqueous solutions), the administration of which is possible practically only in hospital conditions.

It is difficult to identify the limitations associated with introducing changes in the method of financing venom immunotherapy.

It is also worth mentioning that this proposal is in line with the course of action, the adoption of which was declared by the Minister of Health in connection with the COVID-19 pandemic, i.e. depart from administering medications in hospitalization to outpatient or home applications, wherever current medical knowledge allows.

Conflict of interest

The publication was prepared at the request of ALK-Abelló Poland sp. z o.o. who financed the work. The authors declared no other type of conflict of interest.

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