

THE AUSTRIAN VACCINATION PARADOX: TICK-BORNE ENCEPHALITIS VACCINATION VERSUS INFLUENZA VACCINATION

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SUMMARY

This paper describes a paradoxical situation in Austria. The vaccination rate against tick-borne encephalitis (TBE) in the general population is 82%, which is the highest worldwide, whereas the vaccination rate against influenza is about 8% and is among the lowest worldwide. A high awareness of TBE among the Austrian population achieved by an annual social marketing programme and the wide use of effective and well-tolerated vaccines have led to a successful containment of that disease. The vaccination coverage increased from 6% in 1980 to 82% in 2013 and exceeds 90% in some high-risk areas. This has led to a steady decline in the number of TBE cases from several hundred cases to 50 to 100 cases per year. The situation in regard to influenza vaccination is the opposite. Although Austria has issued one of the most extensive recommendations for influenza vaccination worldwide, the vaccination rate of the general population is extremely low. The possible reasons for the failure in the implementation of recommendations are ignorance, lack of social marketing and the predominance of a distinct discordance within the health system in general, and the Austrian medical fraternity in particular.

Key words: tick-borne encephalitis, influenza, vaccination, vaccination coverage, Austria, epidemiology

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INTRODUCTION

Tick-borne encephalitis (TBE) and influenza are both dangerous infectious diseases that carry a potential risk of a complicated course of disease, sequelae and death. Both diseases have a substantial impact on health systems, and both can be effectively prevented by vaccination. This paper describes an interesting paradoxical situation with respect to these two infectious diseases in Austria: the vaccination rate against TBE in the general population is 82%, which is the highest in the world, whereas the vaccination rate against influenza of about 8% is among the lowest worldwide. Awareness of TBE among the general population is very high, but influenza awareness is nearly non-existent. The aim of this paper is to describe the marked differences in awareness and implementation of vaccination against these two diseases and to analyse the reasons for this difference.

MATERIALS AND METHODS

TBE

TBE is a vector-borne disease that is transmitted primarily to humans through a bite from an infected tick (*I. ricinus* and *I. persulcatus*) and occasionally by the consumption of contaminated unpasteurized dairy products (1). There are three subtypes within the species TBE virus (TBEV) of the genus *Flaviviridae*: the European, Siberian and Far-Eastern subtypes. These subtypes are all closely related, both genetically and antigenically (1, 2). The

vertebrate hosts of *I. ricinus* and *I. persulcatus*, which may carry TBEV, are wild and domestic animals. The virus prevalence in ticks and the prevalence of infected ticks can vary substantially within and between risk areas.

The spectrum of clinical presentations ranges from uncomplicated fever only to severe encephalitis with or without myelitis. Infection may result in death (0.5–2.0%, possibly higher for the Siberian subtype) or long-term neurological sequelae (up to 58%, according to the World Health Organization) (3, 4). To date, no causal treatment is known, but infection and disease can be prevented by preventing tick bites and vaccination.

In the past, TBE epidemiology across Europe has shown substantial differences between so-called low- and high-risk areas. For example, in 2010, the incidence rates in the low-risk areas of Finland, Sweden and Norway were 0.8, 1.9 and 0.2 per 100,000, respectively, and the incidence rates in the high-risk areas of Austria, the Czech Republic, Estonia, and Latvia were 5.0 in an unvaccinated group, 5.5, 15.0 and 22.0 per 100,000, respectively. Most of these countries have experienced an increase in both the spread and incidence in the unvaccinated population in recent years (5–9).

In different endemic areas, the risk of infection for humans after a single tick bite varies between 1 : 200 and 1 : 1,000 (10). Recent changes in human behaviour are important to the risk of infection; e.g., people have more leisure time, which is often spent in outdoor activities (9). Hence, the risk of infection has shifted in some areas from daily life and occupational exposure to leisure-time activities, including travelling.

Licensed vaccines include an Austrian vaccine (also used in all Baltic and Scandinavian countries) and a German vaccine,

which are available throughout Europe. These vaccines are well tolerated and efficacious for individuals aged > 1 year and appear to protect against all TBEV subtypes circulating in Europe and Asia (11, 12).

TBE Vaccination: an Austrian Success Story

In the pre-vaccination era, Austria had the highest recorded morbidity for TBE in Europe. There were several hundred hospitalized patients per year and several deaths, and in some years the number of patients exceeded 1,000 (13). To achieve protection at least for those who were most at risk (e.g., people handling the infectious virus in the laboratory and professional people working in forests in highly endemic regions), an Austrian virologist, Prof. Christian Kunz, invented a vaccine that became commercially available in 1976. During the next few years, it became obvious that high vaccination coverage of the professional groups at risk would not suffice to substantially reduce the morbidity from TBE because it had become a disease acquired predominantly during leisure activities. Therefore, a mass vaccination campaign organized by the Austrian Ministry of Health, the Chamber of Physicians, and the Chamber of Pharmacists began in 1981. Since then, the campaign has continued during the first six months of each year (13). During this period, the vaccine is made available at a reduced price in pharmacies and doctors charge less than usual for vaccination. People with an occupational risk of infection receive the vaccine free of charge, but the rest of the population pays the cost, although some health insurance companies cover part of the cost. The vaccination campaign is accompanied by an awareness campaign. A press conference in February marks the starting point of the new season and is followed by promotion in social media using various forms such as billboards, radio announcements, articles and expert interviews in newspapers, posters and information booklets in doctors' practices and pharmacies, and, in some years, television coverage. These measures have been very effective in maintaining a high awareness of the potential risk of acquiring TBE from a tick bite.

The vaccination coverage of the Austrian population increased from 6% in 1980 to 82% in 2013 and has exceeded 90% in some of the high-risk areas (14). The increasing vaccination coverage led to a steady decline in the number of TBE cases, and now only 50 to 100 hospitalized cases are registered annually. It has been estimated that, between 2000 and 2011, about 4,000 hospitalized TBE cases were prevented by vaccination (15). The high awareness among the Austrian population achieved by the annual social marketing programme and the wide use of an effective and well-tolerated vaccine have led to the successful containment of this disease. However, it will be a future challenge to maintain the high vaccination coverage, especially considering that, as in many other countries, Austria is faced with vaccination fatigue and increasing scepticism about vaccination.

Influenza

Influenza continues to be an important cause of preventable morbidity and mortality, and only a few other diseases cause such a large degree of suffering and economic loss. Annual influenza epidemics are estimated to be responsible for 3–5 million severe cases and 250,000–500,000 deaths worldwide (16). Yearly

influenza epidemics can seriously affect all age groups, but the highest risk of complications occurs among children younger than 2 years of age, adults aged 65 years or older, and people of any age with an underlying medical condition such as chronic heart, lung, kidney, liver, blood or metabolic diseases, or a weakened immune system.

Safe and effective vaccines prevent 70–90% of infections in healthy adults. Among the elderly, the vaccine reduces the risk of severe illness and complications by up to 60% and deaths by 80% when the vaccine strains closely match those of the circulating influenza viruses (17). Vaccination strategies in Europe are aimed primarily at high-risk groups such as the elderly or persons with underlying disease. Hence, the EU Council has recommended a vaccination coverage rate of 75% in the elderly and in other risk groups by the 2014/15 influenza season (18).

Influenza Vaccination in Austria: Superior Vaccination Recommendations, but almost no Implementation

In the Austrian population of about 8 million, 350,000–400,000 cases of influenza occur during an average epidemic. Because of the poor surveillance system, the estimated numbers are probably inaccurate. However, 1,000–1,200 annual influenza-related deaths were observed during the 2001–2009 influenza seasons; this equates to an average of 15.5 deaths/100,000 people (19). As in many European countries, there are no population-based Austrian studies of influenza vaccination coverage. Austria's current vaccination rate of 8% for the 2012/13 season, which was estimated from the vaccine doses sold, is one of the lowest in the world. In the 2013/14 season, only about 440,000 doses were distributed (personal communication).

However, Austria has had one of the most extensive systems for recommendation for influenza vaccination worldwide for many years. The general influenza vaccination recommendation for everyone was established in 2002 (it was not established in the USA until 2010) and Austria and Ireland are the only countries in Europe with the national recommendations for all people over the age of 50 years. In Europe, only Latvia, Estonia, Poland, Slovakia, Slovenia, and Austria recommend vaccination for children over the age of 6 months (with different upper age limits) (20).

Despite these superior recommendations, the appropriate implementation has failed, and Austria has one of the lowest influenza vaccination rates in the world. The target of 75% of people aged over 65 years being vaccinated against influenza by the 2014/15 season will clearly fail. A vaccination rate of 37% (2007/08 data) in Austria, and the low rates in other European countries, such as Hungary (31%), Romania (21%), Lithuania (18%), Poland (14%), and Latvia (2%, all 2011/12 data), are among the lowest in the highly affected age group of over 65 years (21).

Influenza: Neglected Disease and Refused Vaccination

The Austrian population, and unfortunately wide sections of the medical system, have shown ignorance regarding the prevention and control of influenza in the past. As a consequence, the public health impact of this dangerous infectious disease has been

misjudged. A recent paper tried to analyse some of the possible reasons for this development (22). In our opinion, one of the main reasons is the lack of social marketing. An effective vaccination programme can be offered to the general population only through social marketing (23). Marketing is an essential social medicine tool for integrating the concept of disease prevention into public health care. The services of the public health care sector need to be marketed in the same way as other social services. Preventive measures cannot be successful unless the tools of modern communication sciences are put to full use. In Austria, there has been insufficient promotion activity in the past, and the stakeholders were never able to agree on a concordant approach. Hence, there is very little awareness in the general population.

Although it is well known that financial reimbursement and the free supply of vaccines are important factors for increasing vaccination rates (24), self-funding is still the norm in Austria, and no general financial reimbursement has been implemented for influenza vaccination (some health insurance companies pay part of the costs). All countries that have high levels of vaccine use offer vaccination-reimbursement systems covered by their national or social health insurance schemes or private health insurance (25, 26).

Personal opinions and attitudes of physicians (and other health care workers) towards vaccination in general, and influenza vaccination in particular, are of specific importance and are often critical to the decision to vaccinate or not (27). It is well documented that the recommendation of a trusted doctor is essential to improving patients' attitudes towards (preventive) measures in general, and to vaccinations in particular, and is the major driver for people to be vaccinated (28–31). It appears that most Austrian doctors simply do not recommend the vaccine.

Most notably, the predominance of a distinct discordance within the health system in general, and the Austrian medical fraternity in particular, about the potential hazards of influenza and the importance of vaccination has had a large impact on the vaccination rate. Additionally, conflicting messages from the media cause confusion and therefore interfere with the ability of the messages to convince people to be vaccinated. The media and public opinion are gaining in importance and are almost as influential as the effectiveness of medical interventions and academic medicine (32).

CONCLUSION

The Austrian situation in relation to the two infectious diseases TBE and influenza is very specific. We call it a paradox because, to us, it seems to be absurd but, unfortunately, it is a reality. On the one hand, the world envies Austria in respect to the most successful TBE vaccination programme, but, on the other hand, the low rate of influenza vaccination is puzzling and of concern. The main drivers of and barriers to influenza vaccination coverage are well known (33). To improve awareness of this infection disease and the vaccination rate in Austria, we suggest implementation of the following steps:

- A basic rethinking of the need for improving the rate of influenza vaccination among wide sections of the medical system.
- Education of health care workers must be emphasized.
- Awareness of the population should be increased; e.g. through

social marketing with the successful TBE vaccination programme as a model.

- Reasonable financial reimbursement for influenza vaccination should be offered by the health authorities.

Conflict of Interests

None declared

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