

POST-EXPOSURE ANTI-RABIES PROPHYLAXIS IN LUBLIN PROVINCE (EASTERN POLAND) IN 2004-2005

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Abstract: Rabies is considered a disease of the highest mortality rate and all humans are vulnerable to infection. Specific anti-rabies immunoprophylaxis is the only efficient method of protection. The analysis of indications for active alone and active and passive immunization among patients reported to the dispensary of rabies prophylaxis in the Department of Infectious Diseases of Medical University of Lublin (eastern Poland) in 2004-2005 is presented. Prophylactic procedures were applied in 120 persons (14.98% of overall number consulted). Passive immunization, i.e. rabies immune globulin, was administered in 1 person (0.12%). In 2004, 64 persons (7.99%) received active vaccination, and 56 patients (6.99%) were vaccinated in 2005. Most of vaccinated patients lived in an urban area where the risk of rabies should be lower; however, in cities like Lublin there is a higher risk of being bitten by homeless animals. The most common species with rabies suspicion were dogs and cats. The decrease in the number of patients bitten by animals with confirmed rabies in Lublin province, and of the number of cases of animal rabies may indicate that oral vaccination of red foxes, representing a main reservoir of rabies virus in Poland, has been shown to be effective.

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INTRODUCTION

Animal and human rabies is a consequence of an acute infection of the nervous system caused by the rabies virus (*Lyssavirus*), belonging to the Rhabdoviridae family. In Poland 2 genotypes of *Lyssavirus* were identified: genotype 1, typical for different mammals except bats, and genotype 5 isolated from insectivorous bats [9].

Every animal shedding the virus with saliva can be the source of infection. Man may become infected by rabid animal bites or when his/her damaged skin or mucous membranes are contaminated with animal saliva or brain tissue [10].

Human rabies has been reported from all continents except Australia and the Antarctica. Actually, most of wild and domestic mammals can be the reservoir of the virus. In Poland, the infection has been recognized mainly in red foxes, martens, roe-deer, and domestic cats, dogs and cattle. Extensive vaccinations of domestic dogs have caused a considerable decline in the prevalence of dog rabies [2, 12]. According to World Health Organization (WHO) data, up to 90% of human rabies cases are in consequence of the transmission of rabies virus from domestic animals, particularly from dogs [4, 15]. Nevertheless, in Poland a negative correlation between animal rabies cases and the number of persons requiring

post-exposure vaccinations is observed. Incidence of animal rabies has decreased due to the massive vaccination of wild animals, mainly red foxes, that was introduced in Poland in 1993 [10].

Mortality rate in rabies is the highest among all known infectious diseases. Rabies is almost invariably fatal, and only a few cases of recovery from rabies have been reported [7, 8].

Although the worldwide incidence of human rabies is not known, it is considered to range between 30,000-70,000 per year. More than 90% of cases reported to the WHO occurred in developing countries and the highest numbers of human rabies deaths were noted in India, Thailand and Philippines. The importance of this distribution of the disease is enhanced by increasing number of travellers in these parts of Asia [15, 16]. In Poland, the last case of human rabies was reported in 2000 and was the first one that has occurred since 1986 [7].

Because animal rabies is still present in Poland and the disease has a fatal course and invariably bad prognosis, prophylactic activities of medical and veterinary services are of great importance. Moreover, a large number of people exposed to animal bites or with nonbite exposure is evaluated for prophylaxis each year.

Neutralization of source of infection or stamping out of epizootic by cessation of roots of transmission is very difficult, therefore, both passive antibody administration and vaccination are the only efficient methods of prophylaxis [8, 11]. The basic guidelines concerning postexposure prophylaxis are determined by some legal regulations of the Ministry of Agriculture (Dz.U. of 2001, No. 126, item 1384; and Dz.U. of 2003, No 45, item 391), and instructions of the Main Sanitary Inspectorate.

According to the recommendations of the Expert Group of WHO, in 1985 vaccines derived from human diploid cells and/or purified chick embryo cell vaccines were introduced. Imovax-Rabies Vero from Pasteur-Merieux is widely used in Poland and is considered safe, well-tolerated and effective. Protective activity of the vaccine was demonstrated in the 90s. Both extracellular virus neutralization and suppressive action on intracellular viral RNA transcription were proved. In passive immunization, Immogam Rage from Aventis Pasteur has been accepted since 2001 [1, 8, 11].

In clinical practice, the most important and difficult question is whether or not to initiate specific immunoprophylaxis at all, and what kind of prophylaxis should be eventually introduced. The decision requires

Table 2. Demographics of anti-rabies vaccinated persons.

Year	Vaccinated persons	Gender				Age				City residents		Village residents	
		Females		Males		≤14 years		>14years		n	%	n	%
		n	%	n	%	n	%	n	%				
2004	64	29	45.3	35	54.8	10	15.6	54	84.4	49	76.6	15	23.4
2005	56	28	50.0	28	50.0	11	19.6	45	80.4	43	76.8	13	23.2
Total	120	57	47.5	63	52.5	21	17.5	99	82.5	92	76.7	28	23.3

Table 1. Numbers of persons consulted and vaccinated in the dispensary of rabies prophylaxis in the Department of Infectious Diseases of Medical University of Lublin.

Year	Number of consulted persons	Vaccinated patients		Patients with passive and active prophylaxis	
		n	%	n	%
2004	399	64	16.04	1	0.25
2005	402	56	13.93	0	0
Total	801	120	14.98	1	0.12

accurate epidemiological history to be taken, considering the type of exposure, animal species and behaviour of the animal, and current epizootic situation.

In Lublin province, 26 cases of animal rabies were reported in 2004, including 21 in wild species (2 in martens and 19 in foxes) and 5 cases in domestic cats. In 2005 there were no rabies cases in domestic animals and only 3 in wild ones (in 1 marten and 2 foxes) [13].

The aim of this study was to perform the analysis of patients admitted to the dispensary of rabies prophylaxis in the Department of Infectious Diseases of Medical University of Lublin in 2004-2005 in whom anti-rabies prophylaxis was applied.

PATIENTS AND METHODS

Databases and medical documentation of the dispensary of rabies prophylaxis in the Department of Infectious Diseases of Medical University of Lublin in 2004-2005 were reviewed. Patients with active only and both passive and active anti-rabies prophylaxis were selected for further study. The demographic data of patients and animal species were analyzed.

RESULTS

The numbers of persons consulted and vaccinated in the dispensary of rabies prophylaxis in the Department of Infectious Diseases of Medical University of Lublin are shown in Table 1. 801 patients were admitted in 2004-2005 (399 in 2004 and 402 in 2005). Prophylactic procedures were applied in 120 persons (14.98% of total consulted). Passive immunization, i.e. rabies immune globulin, was administered in 1 person (0.12%) and active immunization (vaccination) in all 120 persons (14.98%). In 2004, 64 persons (7.99%) received active vaccination, and 56 patients (6.99%) were vaccinated in 2005. In the

Table 3. Numbers of persons vaccinated in the dispensary of rabies prophylaxis in the Department of Infectious Diseases of Medical University of Lublin after exposure to particular species of rabid or rabies-suspected animals.

Animal species suspected as a source of exposure	Vaccinated persons			
	2004		2005	
	n	%	n	%
Dog (<i>Canis familiaris</i>)	38	59.38	29	51.78
Cat (<i>Felis catus</i>)	19	29.69	14	25.0
Norway rat (<i>Rattus norvegicus</i>)	4	6.25	4	7.14
Squirrel (<i>Sciurus vulgaris</i>)	1	1.56	3	5.36
Red fox (<i>Vulpes vulpes</i>)	0	0	2	3.57
Big-eared rat (<i>Plecotus auritus</i>)	1	1.56	1	1.79
House mouse (<i>Mus musculus</i>)	0	0	2	3.57
Mole (<i>Talpa europaea</i>)	0	0	1	1.79
Hedgehog (<i>Erinaceus europaeus</i>)	1	1.56	0	0
Total	64	100.0	56	100.0

group of vaccinated patients, 57 (47.5%) were women and 63 (52.5%) men. The age of vaccine recipients ranged from 1-78 years. 21 persons (17.5%) were under 14 years of age and 99 (82.5%) were more than 14 years old. In the group of vaccine recipients, 92 persons (76.7%) resided in cities and 28 (23.3%) lived in small villages (Tab. 2).

The most common animal species suspected as a source of rabies exposure were dogs (38 in 2004 and 29 in 2005) and cats (19 cases in 2004 and 14 in 2005) (Tab. 3). Rabies post-exposure prophylaxis was also applied in people exposed to rats (4 cases each year), foxes (2 in 2005), mice (2 in 2005), squirrels (1 in 2004 and 3 in 2005), mole (1 in 2005) and hedgehog (1 in 2004). Rabies was confirmed in 1 cat in 2004, and no case of rabies was diagnosed in 2005 in animals that were responsible for application of rabies post-exposure prophylaxis.

DISCUSSION

Although rabies is one of the oldest known human diseases it still remains an epizootic, epidemiologic and economic problem [3]. Since obligatory dog vaccination and the programme of oral vaccination for foxes were introduced, the epizootic situation of animal rabies has improved. There are still a number of cases reported in Wielkopolskie province and in Eastern Poland, including Lublin province, where oral vaccination was started later compared to other parts of Poland. The presence of small epizootics is the reason of vaccination of large number of humans exposed to animals in which rabies could not be ruled out [8].

On the basis of analysis of cases consulted in the dispensary for rabies prophylaxis in the Department of Infectious Diseases in Lublin, it can be concluded that the number of people with exposure to animals (bites, scratches, etc.) was rather stable during last 2 years. When

compared with the data we published 5 years ago, the number of vaccinated persons in 2000 was similar to those reported in the present work (67 in 2000 versus 64 in 2004 and 56 in 2005) [3].

Among 120 vaccinated patients, passive immunization with specific immune globulin was administered in 1, who had been exposed to a cat with confirmed rabies. The data from other regions of Poland have shown that cats are considered the domestic species with the highest incidence of rabies [8, 10, 17]. Nevertheless, our own observation has revealed that about half of the vaccinated persons received their prophylaxis after dog bites.

It should be mentioned that in 2000 in 11 cases anti-rabies vaccination was applied in patients bitten by animals with confirmed rabies [3]. Extensive and obligatory vaccination of domestic dogs has lowered significantly the incidence of rabies in these animals, so that only a small number of sporadic cases is observed each year in Poland [2, 3, 5, 10, 12].

Demographic analysis of vaccinated patients has shown that most of them were more than 14 years old. There were no statistic differences between numbers of male and female patients. It is particularly interesting that more than 3/4 of them lived in urban area where the risk of rabies should be lower. On the other hand, in a crowded urban population the risk to be bitten by unknown domestic animals is higher. Most vaccinations are performed when animals suspected of being rabid bite patients. These are predominantly domestic animals - dogs and cats - that have run away or died and there was no opportunity to test them for rabies. The problem is also increasing, compared to 2000, with regard to the number of bats and small rodents. Reported cases of rabies in these species in other parts of the country have caused the fear of possible rabies when one is exposed to these animals. Most of them cannot be caught and observed [3, 17].

Concerning rare sporadic cases of rabies in domestic animals, even in cities or suburbs, the decision whether prophylaxis is necessary should be made carefully. Difficulties that are met in practice may justify starting vaccination against this fatal disease.

CONCLUSIONS

1. The results of epidemiological analysis and evaluation of post-exposure vaccinations revealed that the numbers of vaccinated patients during last 2 years were similar.

2. Most of the vaccinated patients lived in urban areas where the risk of rabies should be lower; however, in cities like Lublin there is a higher risk of being bitten by homeless animals.

3. The decrease of number of patients bitten by animals with confirmed rabies in Lublin province, and of the number of cases of animal rabies may indicate that oral vaccination of red foxes, representing a main reservoir of rabies virus in Poland, has been shown to be effective.

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