

The Experience of Rabies Post-exposure Treatment in Pakchong NaNa Hospital

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Abstract: The purpose of this study was to assess the rabies exposure and treatment in Pakchong NaNa Hospital during September 1, 1996 to August 31, 1997. There were 567 patients with 306 males and 261 females. Patients aged less than 10 years had the highest incidence rate. Patients who had been bitten with or without bleeding were 86.36%. The upper and lower limbs were injured in 60.98% of all exposures. Holding, stepping on and playing with dog were the first three common causes of exposure, with 31.76%, 22.36% and 12.94%, respectively. Domestic dogs had received rabies vaccine only 6.35%. Patients who had properly cleansed their wounds before seeking medical attention were 34.39%. Complication of vaccination (2.5%) were headache and limb pain. The dogs with abnormal symptoms might be assumed to be rabid. Prevention of rabies in dog was under performed even though it is the primary measure for combating rabies worldwide. Only 12.87% of the treatments were correct according to WHO recommendations. After exposure, physician or local health officers should educate patients and help them evaluate the risks and benefits of the treatment.

บทคัดย่อ: ประสบการณ์การรักษาผู้ป่วยหลังสัมผัสสุนัข ที่โรงพยาบาลปากช่องนานา
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การศึกษานี้มีวัตถุประสงค์ เพื่อศึกษาผลการรักษาผู้ป่วยที่สัมผัสสุนัข ที่โรงพยาบาลปากช่องนานา ระหว่างวันที่ 1 กันยายน 2539-31 สิงหาคม 2540 มีผู้ป่วยรวม 567 คน เป็นชาย 306 คน หญิง 261 คน ผู้ป่วยอายุน้อยกว่า 10 ปีพบมากที่สุด ร้อยละ 86 ของผู้ป่วยมีลักษณะการสัมผัสโดยถูกสุนัขกัดทั้งชนิดมีเลือดออกและไม่มีเลือดออก พบว่าแขนขาเป็นส่วนที่ถูกสุนัขสัมผัสถึงร้อยละ 60.98 ของการสัมผัสทั้งหมด การจับ เหยียบ และเล่นกับสุนัขเป็นสาเหตุสามอันดับแรกของการสัมผัส คิดเป็นร้อยละ 31.76, 22.36 และ 12.94 ตามลำดับ สุนัขที่มีเจ้าของได้รับวัคซีนป้องกันโรคพิษสุนัขบ้าเพียงร้อยละ 6.35 ผู้ป่วยทำความสะอาดแผลอย่างถูกวิธีก่อนมารับบริการคิดเป็นร้อยละ 34.39 ผลแทรกซ้อนจากการให้วัคซีนป้องกันโรคพิษสุนัขบ้า คิดเป็นร้อยละ 2.5 ประกอบด้วยอาการปวดศีรษะและอาการปวดแขนขา การศึกษานี้พบว่าสุนัขที่มีอาการผิดปกติอาจคาดคะเนได้ว่าเป็นสุนัขบ้า การป้องกันโรคพิษสุนัขบ้าในสุนัขยังได้รับการปฏิบัติต่ำกว่าที่ควรจะเป็น ถึงแม้ว่าวิธีนี้เป็นวิธีเบื้องต้นในการป้องกันโรคพิษสุนัขบ้า พบว่าเพียงร้อยละ 12.87 ของการรักษาถูกต้องตามคำแนะนำขององค์การอนามัยโลก แพทย์และเจ้าหน้าที่ที่เกี่ยวข้องควรให้ความรู้กับผู้ป่วย และช่วยประเมินความเสี่ยงและประโยชน์ของการรักษาหลังสัมผัสสุนัข

Rabies is deadly infectious disease in animal and human, yet readily prevented. It has been the object of human fascination and fear since the disease was recognized by Celsus in the first century AD.¹ The epidemiology of human rabies is a reflection of both the distribution of the disease in animals and the degree of human contact with these animals. It has afflicted animals and human throughout history and distributes throughout the world. Its prevalence is high in the tropical countries. The annually incidence of human rabies in Thailand is nearly one hundred cases. It has declined from the past decades. Approximately 150,000 persons in Thailand and 1,000 persons in Pakchong district had received post exposure treatment each year. The disease is still endemic in Thailand and dogs account for 90 % or more of the reported cases in animals.² The remaining of rabies animals are cats, cattle, monkeys and bats. It is caused by many strains of highly neurotropic viruses, mostly lyssavirus.

Rabies is mainly transmitted by a bite from a rabid animal, others are transmission of virus in saliva through mucous membranes, open wounds or scratches, handling nerve or brain tissue of a rabid animal, aerosol inhalation through nasal mucosa to the olfactory nerve and corneal transplants.³ Once the rabies virus inoculated, it slowly replicates in skeletal muscle cells and subsequently invades the spinal cord and brain through unmyelinated sensory and motor terminals with speed at 8 to 20 millimeters per day. When it replicates up the spinal cord and brain, it backs out to the peripheral sensory nerves.⁴ This probably causes intense paresthesias or pruritus at the site of original wound. The incubation period in human ranges from 5 days to many years. The average incubation is 1 to 3 months.

Human rabies has an extremely wide variety of clinical manifestations with a final fatal outcome. It simply divides into two presentations. The first and most

common presentation is the furious form, hydrophobia and hypersalivation are the classic symptoms. The second presentation is the paralytic form which often confuses with transverse myelitis or Guillain-Barre syndrome. Both of them finally progress to paralysis of pharyngeal and respiratory muscles, seizures and coma. The risk of infection is depend on many factors; the infecting strain, the host's genetic background, the concentration of nicotinic acetylcholine receptors in skeletal muscle, the size of the inoculum, the degree of innervation of the site of the bite and its proximity to the central nervous system.^{5,6}

It is a public health problem although highly improvement in prevention and control during many decades. The numbers of persons in Pakchong district receiving post-exposure treatment were substantially high each year because of heightened awareness of rabies. Diagnosis rabies in animal is a direct fluorescent antibody test with unfixed brain tissue. The Public Health Ministry used a high budget to prevent and control rabies each year. We provide a strategies to halt the spread of the disease in dogs and proper guide of treatment for local health officers.

Patients and methods

The study population consisted of patients who had exposed to a dog and received rabies post-exposure treatment at Pakchong NaNa Hospital during September 1, 1996 to August 31, 1997. Pakchong NaNa is a 120 beds community hospital in Nakhon Ratchasima province. The exposure with dogs included bites, scratches, mucous membrane exposure, wound exposure, contact rabies case, dog blood exposure and licked by dog. The data collection followed through the rabies exposure record of the Department of Communicable Disease Control (R 36). It included address, age, sex, occupation, nature of exposure, injured

part of body, cause of exposure, history of dog receiving rabies vaccine, wound cleansing, starting day of vaccination and complication of vaccination. We selected only records that patients had exposed to a dog. After completely interview the patients, we cleansed all wounds with povidone iodine antiseptic solution. TRCS-VERORAB (Pasteur Merieux Connaught, Thailand) or PCEC (Hoechst Marion Roussel, Thailand) rabies vaccine was administered intramuscularly on Day 0, 3, 7, 14 and 30. Diagnosis of rabid dog was performed by using fluorescent antibody testing for the presence of rabies virus antigen in brain tissue. Three months after completely treatment, we sent letter to ask about their health and the dogs that they had been exposed and complication of vaccination.

Results

Five hundred and sixty seven patients who had exposed to a suspected rabid dog were included in the study. The median age of patients was 14 years (range 5 months to 85 years) with 306 male (54%) and 261 female (46%). Patients aged less than 10 years had the highest incidence rate (39.68%). The numbers of patients decreased in contrast to their ages. The first three occupations of patients were student, employee and farmer, with 37.74, 18.87 and 7.59%, respectively. The infant and old age groups were another highly affected. The other occupations were governor, home worker, merchant, officer, monk and engineer. Bites with or without bleeding and scratches by dog were 75.52, 10.84 and 6.12% of nature of exposure respectively. The upper and lower limbs were injured in 60.98%. It was the most common injured part of body. Only 31.84% of the causes of exposure was known. Holding,

stepping on and playing with a dog were the first three common causes of exposure, with 31.76, 22.36 and 12.94%, respectively. The other causes were puppet bite, fierce dog, entering into other home, giving food, catching food, hitting dog and vaccinating dog (Table 1).

Dogs that had not been received rabies vaccine were 93.30%. Only 3% of domestic dogs had received one dose of rabies vaccine and 3.35% of them had received more than one dose. They had totally received only 6.35%. Patients who exposed to domestic dogs were 77.84%. The remainders were exposed to stray dogs (Table 2).

Of the total patients receiving rabies post exposure treatment, 89.08% were exposed as individuals and 10.92% were exposed in groups of two or more by a dog. Natural dead and killed dogs were 64.02 % after exposure. Restriction and observation was 16.05%. The other status was escape and no restriction, as shown in Table 2. The dogs were confirmedly proved to be rabid only 8.92%. The remainders might be normal. Patients who had properly cleansed their wounds were 34.39% and 25.22% of them had used antiseptic solution before seeking medical attention. Half of patients had received rabies vaccine on the first day. Nearly all patients had received rabies vaccine within 4 days (91.36%). Only 4.41% of patients had received rabies vaccine later than 10 days after exposure (Table 3).

Patients who had a complete rabies vaccine were 82.54% and 6.88% of them had 3 doses due to the dog remains healthy until to the day of the fourth dose of vaccine. Loss follow up was 10.58%. Complication of rabies vaccination was 2.5%, those were 2 cases of headache and 3 cases of limb pain (Table 4).

Table 1 Characteristics of patients

Characteristics	number (%) (n=567)
Age (yr)	
<10	225 (39.7)
10-19	83 (14.6)
20-29	60 (10.6)
30-39	76 (13.4)
40-49	60 (10.6)
50-59	30 (5.3)
60-69	21 (3.7)
≥70	12 (2.1)
Sex	
Male	306 (54.0)
Female	261 (46.0)
Occupation	
Student	214 (37.7)
Employee	107 (18.9)
Farmer	43 (7.6)
Other	203 (35.8)
Nature of exposure*	
Bites with bleeding	432 (75.5)
Scratches	35 (6.1)
Bites without bleeding	62 (10.8)
Other	43 (7.5)
Part of injury †	
Limb	361 (61.0)
Hand	101 (17.1)
Head and neck	54 (9.1)
Other	76 (12.8)
Cause of exposure †	
Holding dog	27 (31.8)
Stepping	19 (22.4)
Playing with dog	11 (13.0)
Other	28 (33.0)

* Someone had more than one nature of exposure

† Someone had injured more than one part

Table 2 Characteristics of dogs

Characteristics	number (%) (n=567)
Type*	
Domestic dog	274 (77.8)
Stray dog	78 (22.2)
History of dog receiving rabies vaccine	
No receiving	529 (93.3)
Receiving one dose	17 (3.0)
Receiving >one dose	19 (3.3)
Unknown	2 (0.3)
Status of dog after exposure	
Killed	268 (47.3)
Restriction and observation	91 (16.0)
Natural dead	95 (16.7)
Other	113 (19.9)

* The choice of type of dog is missed in the early records

Table 3 Post-exposure treatment

Treatment	number (%) (n=567)
Wound cleansing	
By water	21 (3.7)
By water and soap	195 (34.4)
No wound cleansing	351 (61.9)
Using antiseptic solution	
By povidone iodine	87 (15.3)
By alcohol	56 (9.9)
Other	5 (0.9)
No antiseptic solution	419 (73.9)
Starting day of vaccination	
>1	284 (50.1)
1-4	234 (41.3)
5-9	24 (4.2)
>10	25 (4.4)

the direct supervision of the veterinarian. This practice will aid persons who administer rabies control procedures.

Rabies human is controlled by determining whether patient's exposure occurred and assess the risk that dog was rabid¹⁵ and the risk of infection.^{5,6} The judgment whether an attack by a dog was provoked or unprovoked is very difficult to assess and it should therefore not influence the decision whether to give vaccination, although there is a significant association between unprovoked attacks and rabies. Treatment after exposure by a potentially dog should not be delayed in endemic areas.

A healthy dog that bites a person should be confined and observed for 10 days. Any illness in the dog must be reported immediately to physician or the local health officers. If signs suggestive of rabies develop, the dog should be humanely killed, its head removed and shipped under refrigeration for examination. Any stray dog that bites a person should be humanely killed immediately and the head submitted as described above for rabies examination. There are 6.88% of patients received 3 doses of vaccine and stop treatment due to dog remains normal. Although it is correct according to WHO recommendations.¹⁴ We suggested that completely vaccination should be administered to these patients especially in those had history of repeatedly exposed because apparently healthy dogs occasionally have been observed to excrete virus intermittently in their saliva for up to 3 years.^{16,17}

In conclusion, an effective program of rabies prevention in dog needs to be established and performed. After exposure, it is the responsibility of physician or local health officers to educate the patients and help them evaluate the risks and benefits of the treatment.

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Table 4 Complication of vaccination

Complication	number (%) (n=200)
No complication	195 (97.5)
Headache	2 (1.0)
Upper and lower limb pain	1 (0.5)
Upper limb pain	2 (1.0)

Discussion

The study consisted of 567 patients with 306 male and 261 female. Male and female are nearly equally affected. The young is more affected than older age. Patients aged less than 10 years old have the highest incidence rate. They may be unaware of danger and they like to holding and playing with a dog. They should be guarded against contact with an unknown dog. The upper and lower limbs are the most common injured part as the study by Rungpitarangsi V, et al.⁷ Bites with or without bleeding are the highest nature of exposure. Nearly all patients with rabies reported their exposures by bite.⁸ The overuse of post exposure treatment for insignificant exposures is 2.82%, and a national public health objective for the year 2000 is to reduce the number of such patients by 50%.⁹ It is unlikely to be achieved because many patients insisted to have received vaccine. They ought to be educated to restricting and observing that dog throughout 10 days period instead of vaccination. This study shows that 34.39% of patients, lower than expected, have properly cleansed their wounds before seeking medical attention. So education about cleansing wound by water and soap needs to be more emphasized because this practice reduces the likelihood of rabies.¹⁰

Patients who had received the first dose of rabies vaccine within 4 days after exposure were

91.36%. This indicates that they were concerned about rabies risks and sought medical attention early. Those who had received vaccine more than 10 days after exposure were 4.41%. They have high risk for rabies because 3.25% of rabies patients in Thailand have been recognized signs and symptoms within 10 days¹¹ and the efficacy of vaccine decreases sharply if the delay exceeds two weeks.¹² Fortunately, all patients in this study are healthy. More than a half of dogs were killed. But only 12.69% of them were investigated for proving rabies. The positive result of investigation for proving rabies in dog is 75.43%. Nearly all dogs had abnormal symptoms. This may be guideline to be assumed that dog is rabid. Complication of rabies vaccination was 2.5%, those were 2 cases of headache and 3 cases of limb pain. It may be under report. The previous study¹³ reported that local reaction such as pain, swelling and itching at the injection site occurred in approximately 70% and mild systemic reactions such as headache, nausea, abdominal pain, muscle aches and dizziness were reported by 5% and 40%.

This study shows that domestic dogs had vaccinated only 6.35% and stray dogs had not vaccinated. Prevention rabies in dog is under performed because at least 8.92% of dogs infected with rabies in this study. An effective program needs to be established and continued until that rabies is not a public health problem.

Only 12.87% of the treatments were correct according to WHO recommendations.¹⁴ Because most patients who had history of bite exposure have not received rabies immune globulin. Prevention of rabies has simply divided in human and dog. Rabies in dog is controlled by restriction of dog movement, vaccinating domestic dogs, controlling stray dogs and vaccination. Dogs should be vaccinated against rabies at 3 months of age, revaccinate 1 year later and then annually. Dog rabies vaccines should be restricted to use by or under

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