



FROM THE ARCHIVES OF THE ZAGREB ANTIRABIES CLINIC: HOSPITALIZED PERSONS DUE TO ANIMAL BITES FROM 2007 TO 2021 (PART TWO)

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SUMMARY – The aim of this paper is to present data on hospitalized patients in Zagreb clinics and hospitals, from 2007 to 2021. This paper is a continuation of our previous paper, but for a different time period. All data were collected from the official patient registry of the Zagreb Antirabies Clinic, which operates within the Reference Center for Rabies at Andrija Štampar Teaching Institute of Public Health. During this period, there were 9960 patients examined for injuries inflicted by animals, of which 98 (0.98%) were hospitalized in different departments and hospitals in Zagreb due to wound severity. All the hospitalized patients were examined to exclude the possible risk of rabies. The official patient registry of the Zagreb Antirabies Clinic is the source of the presented data, which were collected and analyzed retrospectively. We conducted a descriptive analysis. The ages of the hospitalized patients ranged from 17 days to 82 years, 55 (56.12%) were adults, and 43 (43.88%) were children; among the adults, there were 29 (29.59%) men and 26 (26.53%) women, while among the children there were 25 (25.51%) boys and 18 (18.37%) girls. The most common causes of hospitalization after an animal bite were infectious diseases (cat-scratch disease, rat-bite fever) and severity of wounds, which is comparable to the data available from other countries. There is no statistically significant difference in the frequency of hospitalization between children and adults, while dogs are statistically significantly more likely to inflict injuries that result in hospitalization than other animals. However, no specific anatomical location exhibited a statistically significant higher frequency of bites compared to others, as one might expect.

Keywords: *Rabies; Animal injuries; Children; Adults; Hospitalization*

Introduction

Rabies is a well-known lethal zoonotic disease. Despite persistent and numerous public health interventions and efforts to eliminate it, rabies still takes

approximately 40,000 – 70,000 human lives annually, among which roughly 40% refer to children. The vast majority of these human victims are in underdeveloped and poor countries with limited health care resources¹. Confirming this, the available data state that 95% of all human deaths caused by rabies occur in Africa and Asia. Around 99% of human rabies cases are related to dog bites. Therefore, the biggest public-health intervention has been directed towards vaccinating dogs². Human rabies in Europe is very rare, with only a few cases reported annually. This is due to good vaccination

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Received June 19, 2024, accepted July 27, 2024

policies and available health care facilities. There were five cases of human rabies reported in 2019, of which four were travel-related, and only one had been acquired locally³.

This paper is a continuation of our previous paper about hospitalized persons due to animal bites recorded in the Zagreb Antirabies Clinic, and it describes the same topic, but covers a different time period⁴. The first paper described hospitalized persons from 1995 to 2006, and this one presents an analysis of data gathered from 2007 to 2021. Among the 9960 patients examined in the Zagreb Antirabies Clinic due to injuries inflicted by animals during the observed period, 98 people were hospitalized. In this study, we included all patients hospitalized after animal bites, because hospitals and clinics asked that we assess the possible risk of rabies in hospitalized patients. The most common reasons for hospitalization were infections of wounds, followed by the need for surgical treatment of wounds. Luckily, there were no cases of human rabies.

Through the aforementioned period, the Republic of Croatia was affected by sylvatic rabies, with the red fox (*Vulpes vulpes*) being the most frequently diagnosed animal up to 2014. In 2007, there were 635 proven rabid animals (wildlife and domestic ones) in total: 596 wild animals were positive for rabies (of which 589 foxes), and 39 domestic (15 dogs, 12 cats, etc.); in 2008, there were 1061 proven rabid animals: 982 wild (of which 970 foxes) and 79 domestic (29 dogs, 30 cats, etc.); in 2009, that number was 784 in total: 718 wild (of which 703 foxes) and 66 domestic (30 dogs, 20 cats, etc.); in 2010, the total number was 652: 588 wild (of which 580 foxes) and 64 domestic (23 dogs, 12 cats, etc.); in 2011, there were 375 proven rabid animals: 323 wild (320 of them were foxes) and 52 domestic (3 dogs, 7 cats, etc.); in 2012, the total number was 166: 145 wild animals (of which 140 foxes) and 21 domestic (5 dogs, 3 cats, etc.); in 2013, there were 37 proven rabid animals: 35 wild ones (34 of them were foxes) and 2 domestic (1 dog, 1 equine). In 2014, there was only a single proven rabid animal, and that was a fox. There were no positive rabies cases of domestic animals in 2014 at all⁵.

Today, the Republic of Croatia is a rabies-free country⁶. This aim was accomplished through a diligent and persistent program of fox oral vaccination across Croatia (islands excluded), combined with the

obligatory vaccination of pet dogs. The program started in 2011 and has been conducted twice a year ever since⁷.

From 2015 up to today, there have been no recorded proven rabid animals on the entire territory of the Republic of Croatia, due to the oral vaccination of foxes in two vaccination campaigns (spring and autumn). Based on this success, the European Commission proclaimed the Republic of Croatia a rabies-free country on 15 April 2021⁶.

Aim

This paper is an overview of patients hospitalized due to animal bites in hospitals and departments in the City of Zagreb from 2007 to 2021.

According to archival data, we formulated three hypotheses:

1. Children were more often hospitalized due to animal bites compared to adults;
2. Patients were more often hospitalized due to a dog bite than any other species of animal; and
3. Patients were more frequently hospitalized due to multiple injuries than injuries on the lower extremities, upper extremities, fingers and hand, head, or trunk.

Participants and Methods

The data presented in this paper were collected from the official patient registry of the Zagreb Antirabies Clinic for the time period from 2007 to 2021. The data stored in the registry includes age and gender of the patient, animal species involved in the incident, veterinary analysis of the biting animal, if any, wound localization, type of treatment received, whether the patient was hospitalized, and where.

There have been two possible options for treatment conducted in the Zagreb Antirabies Clinic regarding rabies prevention: post-exposure prophylaxis (PEP) with rabies vaccine, which can be administered with or without human rabies immunoglobulin. PEP was usually given according to the Zagreb 2-1-1 regimen: 2 doses of rabies vaccine administered on day 0, followed by 1 dose administered on day 7 and day 21. The Essen (5-dose) regimen was continued if that was the regimen that had been started somewhere else.

Since our Teaching Institute of Public Health has not been digitally connected to the hospital IT program, our access to the real number of cases following animal bites is not expected to be accurate, as it depends only on the good practice of reporting those incidents by our colleagues and/or patients themselves. This is the main limitation of our descriptive analysis.

In this paper, we provide an overview of 9960 files in total, focusing only on the hospitalized cases for further analysis. We describe the sample using descriptive statistics and frequencies. Categorical variables are compared using the χ^2 -test, and the differences are considered significant at $p < 0.05$. We performed all statistical analyses using Statistica 13.1. (StatSoft, Tulsa, OK, USA).

Results

During the period 2007–2021, 9960 patients were examined by Zagreb Antirabies Clinic health-care providers operating under the Andrija Štampar

Teaching Institute of Public Health due to animal bite wounds, of whom 3590 (36.04%) were vaccinated and 98 (0.98%) were hospitalized (Table 1). As can be seen in Table 1, hospitalization rates did not differ significantly between the observed years. This is also consistent with the data in our previous paper. Furthermore, dog bites that have led to hospitalization have been recognized as Level 4 and 5 according to Dr. Ian Dunbar's Dog Bite Scale, which also remains unchanged compared to the previously observed period of time⁸. In 2022, we did not record a single case of hospitalization due to animal bites/injuries in the City of Zagreb. In comparison with the previously observed period of time (in our previous paper), the number of examinations due to animal bites has dropped significantly, though hospitalization rates remained similar⁶. Those hospitalization rates are comparable to the data presented by the National Canine Research Council: among all patients visiting emergency rooms due to dog bite injuries, fewer than 1.5% required hospitalization⁹.

Table 1. Patients with animal bites in the 2007 – 2021 period

Year	Examined	Vaccinated	Hospitalized	Hospitalized incidence proportion (risk) (%)
2007	811	150	4	0.5
2008	841	242	6	0.7
2009	746	227	7	0.9
2010	667	207	4	0.6
2011	677	176	8	1.2
2012	716	218	9	1.3
2013	685	238	11	1.6
2014	706	318	5	0.7
2015	644	269	8	1.2
2016	630	255	6	0.9
2017	697	276	7	1
2018	645	288	7	1.1
2019	622	289	5	0.8
2020	457	225	7	1.5
2021	416	212	4	0.9
Total	9960	3590	98	
Percentage (%)		36.04		1

The age range of hospitalized patients was from 17 days to 82 years, 55 (56.12%) were adults (29 men and 26 women), and 43 (43.88%) were children aged from 17 days to 13 years (25 boys and 18 girls). In this study, we considered infant patients and patients up to 16 years old as children (n=43), while patients aged 16 years and above were considered adults (n=55). Children were expected to be more often hospitalized due to animal bites than adults, taking into consideration their physical fragility and lack of precaution when approaching animals. Furthermore, in their study, Cohen-Manheim *et al.* showed that children had approximately double the risk for dog-bite injuries compared to persons aged 15 and older¹².

The χ^2 test was used to test if the frequencies between the two groups are statistically different. Our results show that adults had been hospitalized due to animal bites as frequently as children (χ^2 (1, n=98)=1.47, $p>0.05$).

The animal species involved in bite injuries that led to hospitalization are presented in Figure 1. As mentioned in our previous paper, the ABCD scale was used in the entire Republic of Croatia to categorize the risk of exposure¹⁰, instead of the I, II, III categorization used by the World Health Organization (WHO)¹¹.

Out of 98 hospitalized patients involved in this study, one casualty was bitten by a bat (1.02%), one by a vole (1.02%), six were bitten by a rat (6.12%) and the remaining 90 patients were bitten by a cat (n=20; 20.41%) or by a dog (n=70; 71.43%). The χ^2 test confirmed that patients were more frequently hospitalized due to dog bites than cat bites (χ^2 (1, n=90)=27.78, $p<0.05$). The age and sex distributions of hospitalized patients in the period from 2007 to 2001 are presented in Table 2.

Out of 98 hospitalized patients, 53 were male and 45 were female. Of this number, 24 male and 12 female patients received rabies PEP. Among children aged

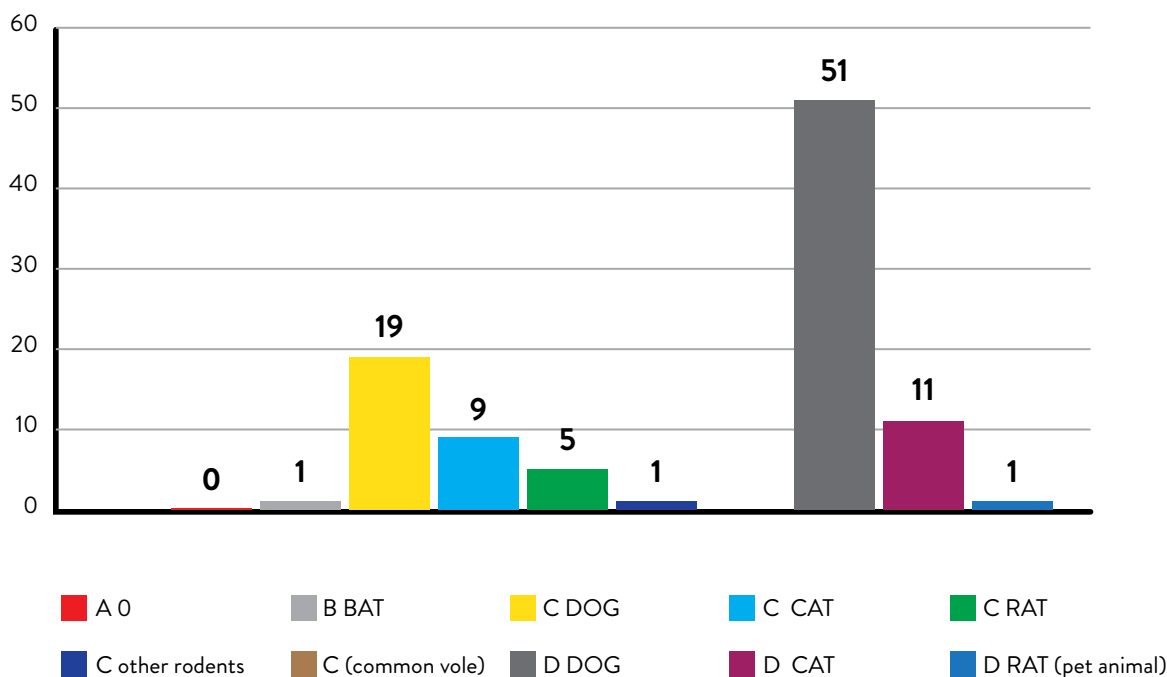


Figure 1. Animals involved in bite injuries that led to hospitalization, according to the ABCD risk scale used in the City of Zagreb

Category A = injury by a proven rabid animal (bite, scratch, contact with saliva against mucous membranes) or generally contact with a proven rabid animal or contaminated material; Category B = injury by a suspect rabid animal; Category C = injury by an unknown, dead, stray, killed, or wild animal; Category D = injury by a known animal that stayed healthy after 10 days of veterinarian surveillance

Table 2. Age and sex distributions of hospitalized patients for the period 2007 to 2021

Age	0–5		6–10		11–15		16–20		21–30		31–40		41–50		51–60		>60		TOTAL	
Sex	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Examined Persons	7	7	12	7	6	5	1	1	1	2	3	2	5	4	8	5	10	12	53	45
Vaccinated persons	2	2	4	2	3	0	1	1	0	0	2	0	3	0	4	0	5	7	24	12

M = male; F = female

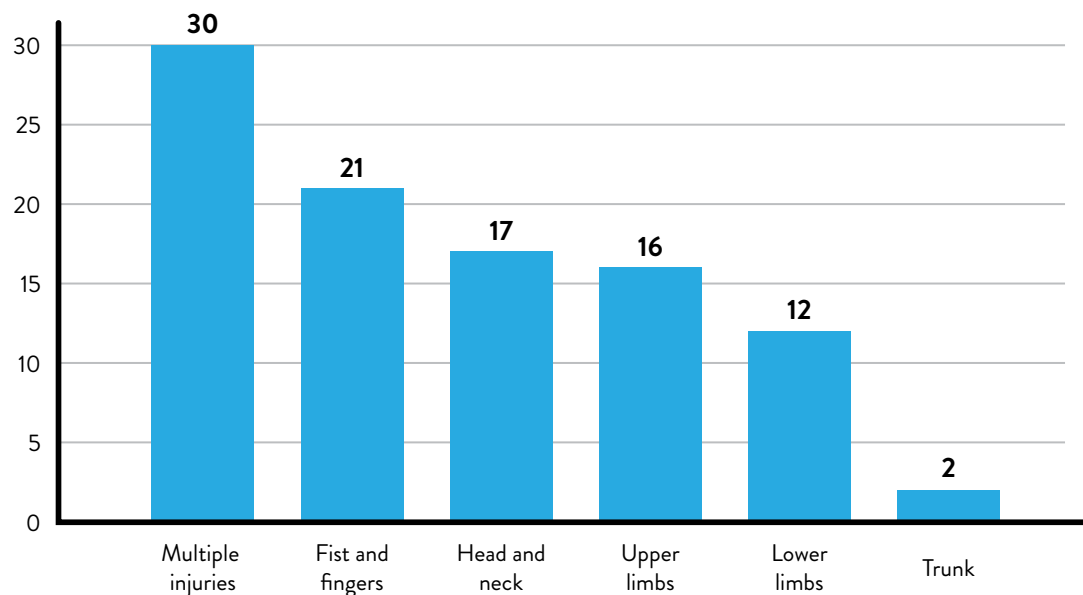


Figure 2. Wound localization in patients hospitalized during the 2007–2021 period

from 0 to 15 years, only 13 children received PEP. The main reason for that is that they have been injured and hospitalized by a pet of a known owner (predominantly, a dog). The dogs that injured children were mostly German Shepherds, Dobermans, Rottweilers, Bull Terriers, or big dogs of mixed breeds.

In the observed period, among patients hospitalized due to animal bite wounds, multiple injuries and injuries on the fist and fingers were the leading anatomical categories compared to the head and neck, upper limbs, lower limbs, or the trunk (see Figure 2).

In this study, the majority of patients were hospitalized with multiple injuries. Only two patients

exhibited bites on the trunk, and because of the small sample, they were excluded from our analysis. Again, we used the χ^2 test to analyze whether multiple injuries had been a more frequent cause of hospitalization due to animal bites than other injuries. Results show, contrary to our initial hypothesis, that there is no statistically significant difference in hospitalization frequency depending on the localization of injuries ($\chi^2(4, n=96)=9.72, p>0.05$).

Patients hospitalized due to animal bite wounds were treated in different facilities in the City of Zagreb. Departments and hospitals in the City of Zagreb, in which observed patients were detained, are listed

in Table 3. Most of the children were hospitalized in Zagreb Children's Hospital (35), while adults were primarily hospitalized in the University Hospital for Infectious Diseases Dr. Fran Mihaljević (27), and other clinics and departments mentioned in Table 3.

Table 3. Departments and Hospitals in the City of Zagreb where patients were hospitalized in the 2007–2021 period

Name of department/hospital	Number of hospitalized persons
1. Zagreb Children's Hospital	35
2. University Hospital for Infectious Diseases Dr. Fran Mihaljević	27
3. Zagreb University Hospital Center, Pediatric Surgery	10
4. The Teaching Hospital Sisters of Charity, Department of Traumatology	9
5. Sveti Duh University Hospital	8
6. The Teaching Hospital Sisters of Charity in Zagreb	4
7. Dubrava University Hospital	4
8. Merkur University Hospital	1
TOTAL	98

Out of 98 cases of hospitalization in total, in 42 cases a veterinarian surveillance of the biting animal had been conducted, and PEP was not ordered at all. Out of 56 remaining patients, 16 received PEP with antirabies vaccine and human rabies immunoglobulin. In one case, PEP with rabies vaccine and human rabies immunoglobulin was discontinued because the animal (e.g., dog) had been found, put under veterinarian surveillance for 10 days, and stayed healthy after that. The distribution of PEP and human rabies immune globulin (HRIG) in hospitalized patients was as follows: 9 patients received PEP and HRIG due to multiple bite wounds; 3 upon the upper limbs; 2 upon the fist and fingers; one upon the lower limbs, and one upon the head and neck. There was not a single case of PEP and HRIG administered upon injuries on the trunk.

The vaccines used for PEP were: vaccine produced on purified chick embryo cells (RABIPUR, Germany), vaccine made on human diploid cells (HDC vaccine, PASTEUR-MÉRIEUX, France), and vaccine produced on VERO cells (VERORAB, France). Human rabies immunoglobulin used was from different manufacturers in vials of 2.00 and 5.00 ml (see Table 4). PEP in patients was ordered upon official indication of ABCD categories (risk of exposure), which are in use in the Republic of Croatia¹⁰.

Table 4. Human rabies immunoglobulin used in the Zagreb Antirabies Clinic in the period 2007–2021

Name of the product	Manufacturer/Country	Package: vials (2.00 ml; 5.00 ml)
HRIG	Institute of Immunology, Zagreb, Croatia	2.00 ml (376 IU)
HRIG	Institute of Immunology, Zagreb, Croatia	2.00 ml (350 IU)
HRIG	Institute of Immunology, Zagreb, Croatia	2.00 ml (400 IU)
HRIG	Institute of Immunology, Zagreb, Croatia	2.00 ml (562 IU)
HRIG	Institute of Immunology, Zagreb, Croatia	2.00 ml (668 IU)
HRIG	Institute of Immunology, Zagreb, Croatia	2.00 ml (520 IU)
HRIG	Institute of Immunology, Zagreb, Croatia	5.00 ml (1.600 IU)
HRIG	Institute of Immunology, Zagreb, Croatia	5.00 ml (1.280 IU)
Imogam Rage	Sanofi Pasteur, France	2.00 ml (150 IU)
Berirab	CSL Behring, Germany	2.00 ml (300 IU)
Berirab	CSL Behring, Germany	5.00 ml (750 IU)

Discussion

In our study, the most common reason for hospitalization following an animal bite in adults is infection. Infection was previously found to be the most common complication following an animal bite¹³. This can be compared to risk factors for hospitalization after a dog bite (infection upon arrival to the emergency room and multiple anatomic localization of wounds) identified during the case-cohort study conducted by Rhea *et al.*⁴. In other studies, cat-related injury and late arrival to a hospital were identified as the main predictors for infection following an animal bite^{15,16,17,18,19}. Interestingly, according to Wangler *et al.*, wound swabs following cat bites showed no bacterial growth in up to 43% of observed cases²⁰.

Various zoonotic agents can cause diseases in humans. For example, *Pasteurella multocida* is a well-known pathogen causing local wound infections, and it can be isolated in 50–90% of cat nasal swabs and 50–66% of dog nasal swabs²¹. The most common causative agents of infections after animal bites are *Bartonella henselae* (causing the „cat-scratch disease“) and *Streptobacillus moniliformis* (causing the „rat-bite fever“). Infections following animal bites can be prevented by using antibiotic prophylaxis^{22,23}.

Of the 27 patients hospitalized at the University Hospital for Infectious Diseases Dr. Fran Mihaljević in Zagreb during the observed period of time, 15 were hospitalized for developing the cat-scratch disease, four due to the development of the rat-bite fever and one due to the squirrel fever after a bite of a common vole. Six other patients were hospitalized due to complications (cellulitis in most cases) after a dog bite, and one other patient after a bat bite (cellulitis).

Cat-scratch disease was first described as a clinical entity in 1950^{24,25} and *Bartonella henselae* was definitively identified as its cause in 1992²⁶. One female patient deteriorated to a coma after the development of the cat-scratch fever, but she fully recovered afterwards. She had been bitten and scratched by four domestic cats, which were all captured, put into cages, sent to a veterinarian, euthanized, and then delivered for rabies analysis to the Croatian Veterinary Institute. All four cats tested negative for rabies^{27,28}.

Although cat-scratch disease is usually a benign, self-limited disease (typically causing

local lymphadenitis), complications can occur, mostly among children. The most common complication of cat-scratch disease is encephalopathy, usually following noticeable lymphadenitis. It is estimated that 2–4% of this disease leads to encephalopathy. In their paper, Knezović *et al.* reported two cases of the cat-scratch disease diagnosed in children admitted to the University Hospital for Infectious Diseases Dr. Fran Mihaljević, both resulting in recovery after treatment²⁹. Furthermore, four different clinical manifestations of this disease were described in another paper written by physicians from the University Hospital for Infectious Diseases in Rijeka, showing a variety of possible clinical presentations³⁰. Two very rare presentations of cat-scratch disease were described in case reports written by Croatian scientists: one is neuroretinitis caused by *Bartonella henselae*³¹ and another is a six-year-old patient who exhibited multiple hepatosplenic abscesses which required splenectomy as treatment³². It is interesting to mention that studies show almost 2/3 of patients with „idiopathic neuroretinitis“ have *Bartonella henselae* infection as the underlying cause of this diagnosis³³.

Valenčak-Ignjatić *et al.* conducted a single-center study from 2014 to 2019 at the University Hospital for Infectious Diseases Dr. Fran Mihaljević in Zagreb. It included a total of 104 children diagnosed with cat-scratch disease during that period of time, and 88.2% of the enrolled children displayed regional lymphadenopathy. While four of them had been lost in follow-up, the others fully recovered. It was found that 11.8% of the children suffered from atypical/disseminated disease, including liver/spleen abscesses, fevers of unknown origin, and encephalopathy. In all of those patients, recovery was complete³⁴.

Two cases of hospitalization during the observed period of time were particularly difficult. Both were caused by rat-bite exposure. In the first one, a young male child, 17 days of age, had been bitten all over the body by rats, and due to the development of rat-bite fever, was hospitalized at the Zagreb University Hospital Center Pediatric Surgery Ward. He received PEP with the rabies vaccine produced on human diploid cells and human rabies immunoglobulin. Due to suspected poor living conditions, police had been notified by the hospital management regarding this incident, which led to the criminal prosecution of his

parents and, ultimately, the removal of the child from their home by the Social Security service. The second one was a female child, less than 3 months of age, who was admitted to the University Hospital for Infectious Diseases Dr. Fran Mihaljević after developing a rat-bite fever. She had not suffered severe injuries reported in the first case, and she therefore received PEP with the rabies vaccine made on Vero cells.

Streptobacillus moniliformis, a pathogen commonly found among rats, has been identified as the most common causative agent of the rat-bite fever³⁵. The disease itself was first recognized in 1914³⁶. Transmission to humans occurs after close contact with a rat, which may or may not be a bite. There have been described cases of acquiring a rat-bite fever not through a bite, but through close contact with pet rats (kissing, etc.). Furthermore, in very rare cases, rat-bite fever can occur after ingesting food and/or water that has been contaminated with rodent excretions^{37,38}. According to the case report review published by Coessens and De Laere, the majority of transmissions of rat-bite fever occur in domestic settings after an incubation period of 5 to 21 days following direct contact with a rat³⁹. Patients may experience recurrent fever, headache, skin rash, polyarthralgia, malaise, etc. When untreated, reported mortality rates of rat-bite fever vary from 7% to 13%. After treatment, it usually ends in complete resolution^{35,40}.

Regarding exposure risk categories, there were no registered patients hospitalized from Category A (laboratory-confirmed rabies). There was only one person hospitalized from Category B, following bat bite exposure. A female, age 78, was hospitalized at the University Hospital for Infectious Diseases Dr. Fran Mihaljević, after bat bite exposure and the subsequent development of cellulitis in her right forearm. She received a full course of rabies PEP with rabies vaccine on purified chick embryo cells and human rabies immunoglobulin.

Finally, a very rare case of meningitis caused by *Capnocytophaga canimorsus* was published as a case report, describing a patient who developed this rare disease following an influenza A infection. The patient later recalled having been bitten by their own dog, approximately 45 days prior to the onset of symptoms⁴¹.

Another case report was published by Taniyama *et al.*⁴² where *Capnocytophaga canimorsus* was the causative agent of bacteremia in a young immunocompetent patient, which is very rare. This patient was also bitten by their own dog. This emphasizes the importance of collecting anamnestic data in detail, given that some infections tend to have long incubation periods.

The World Health Organization (WHO), the World Organization for Animal Health (OIE), the Food and Agriculture Organization of the United Nations (FAO) and the Global Alliance for Rabies Control (GARC) have joined forces in the form of the United Against Rabies collaboration, and are determined to reach this goal: zero human dog-mediated rabies deaths by 2030, worldwide⁴³. This is expected to be reached through yearly mass vaccination of at least 70% of the dog population⁴⁴.

Conclusion

Although in our data we found no statistically significant difference between the total number of hospitalized adults and children, the main difference between them was the reason for hospitalization. In adults, the main reason for hospitalization was the wound infection after a bite, while in children, it was the severity of wounds. There were no patients (adults of children) hospitalized due to suspected rabies. Animals involved in childrens' hospitalization were predominantly dogs of known owners (German Shepherds, Rottweilers, Bullterriers, Dobermans, or big dogs of mixed breeds). Many bites that resulted in hospitalization, especially in children, could have been avoided; the main underlying cause of injuries was inattention or the lack of parental control.

A fraction of infections leading to complications and hospitalization could have been prevented by proper wound management and application of antibiotic treatment as chemoprophylaxis after animal bites. The hospitalization rate described in this paper remains around 1% of all incidents caused by animal bites, which is comparable to other countries and cannot be reduced completely.

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Sažetak

IZ ARHIVE ANTIRABIČNE AMBULANTE GRADA ZAGREBA: HOSPITALIZIRANE OSOBE ZBOG UGRIZA ŽIVOTINJA U RAZDOBLJU OD 2007. DO 2021. GODINE

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Cilj je ovoga rada prikazati podatke o hospitaliziranim bolesnicima u zagrebačkim bolnicama i klinikama u razdoblju od 2007. do 2021. godine. Ovaj rad predstavlja nastavak našeg prethodnog rada, ali za različito vremensko razdoblje. Svi su podaci prikupljeni iz službenog registra pacijenata zagrebačke Antirabične ambulante, koja djeluje u sklopu Referentnog centra za bjesnoću Nastavnog zavoda za javno zdravstvo „Dr. Andrija Štampar“. Tijekom navedenog razdoblja pregledano je 9960 pacijenata zbog ozljeda nanesenih od životinja, od kojih je zbog težine ozljeda 98 (0,98%) hospitalizirano u različitim odjelima i bolnicama u Zagrebu. Svi su hospitalizirani bolesnici pregledani kako bi se isključio mogući rizik od bjesnoće. Službeni registar bolesnika zagrebačke Antirabične ambulante izvor je prikazanih podataka, koji su prikupljeni i retrospektivno analizirani. Proveli smo deskriptivnu analizu. Dob hospitaliziranih bolesnika kretala se od 17 dana do 82 godine; 55 (56.12%) bili su odrasli, a 43 (43.88%) djeca; među odraslima bilo je 29 (29.59%) muškaraca i 26 (26.53%) žena, dok je među djecom bilo 25 (25.51%) dječaka i 18 (18.37%) djevojčica. Najčešći uzroci hospitalizacije nakon ugriza životinje bile su infektivne bolesti (bolest mačjeg ogreba, groznica štakorskog ugriza) i težina ozljeda, što je usporedivo s podacima dostupnim iz drugih zemalja. Nema statistički značajne razlike u učestalosti hospitalizacije između djece i odraslih, dok psi statistički značajno češće nanose ozljede koje rezultiraju hospitalizacijom u odnosu na druge životinje. Međutim, nijedna anatomska lokacija nije statistički značajno češće ugrizena od ostalih, kao što bi se moglo očekivati.

Ključne riječi: Bjesnoća; Ugrizi životinja; Djeca; Odrasli; Bolničko liječenje