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Post-exposure Rabies Prophylaxis in People Bitten by Warm-blooded Animals at the Epidemic Treatment Center of Kindia Regional Hospital, Guinea

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: The objective of this work was to describe post-exposure prophylaxis to rabies in patients admitted to the CT-EPI of the Kindia regional hospital.
Material and Methods: The data was collected retrospectively over 5 years 10 months (from January 1, 2014 to October 2019) and covering all usable files of people who consulted for bites, scratches or licking of mucous membranes or skin eroded by an animal warm-blooded, domestic or wild, showing obvious or non-obvious signs of rabies.
The study variables were epidemiological, clinical then prophylactic and concerned the biting animal, the person bitten and the therapeutic regimen used for the prevention of rabies infection.
Results: From January 2014 to October 2019, 415 patients exposed to the risk of rabies were received at the epidemic treatment center of the Kindia regional hospital. The average age of the patients was 25 years with extremes of 1 and 90 years and the sex ratio (M/F) was 1.18. The dog was responsible for most cases of risk of rabies infection (91.81%), the bite was the main reason for consultation (91.81%). The foot was the site of the bite in 84.34% of cases. A large proportion of exposed subjects (42.89%) were treated within 24 hours of their exposure. Almost all patients benefited from the Zagreb protocol with a post-exposure prophylaxis (PEP) discontinuation rate of 39%.
Conclusion: Stray dogs are responsible for the majority of bites. The Zagreb protocol was used much more often for the treatment of exposed individuals to eliminate the risk of rabies.

Keywords: Rabies risk; treatment; CT-Epi of Kindia; Guinea.

1. INTRODUCTION

The risk of rabies is the mode of contamination which is most often caused by a bite, but also by scratching or licking damaged skin [1].

Despite therapeutic research, declared rabies is an always fatal encephalomyelitis, against which the only weapon remains either preventive vaccination of exposed people, or curative vaccination associated or not with serotherapy from the supposedly accidental inoculation of the virus [2].

Rabies is one of the neglected tropical diseases that mainly affects already marginalized, poor and vulnerable populations. Although there are effective vaccines and immunoglobulins for humans, these products are often not readily available or accessible to those who need them [3].

Management after exposure follows stereotypical attitudes and only requires emergency medical and surgical treatment, likely to stop an abscess [4]. You should always start with local wound care immediately to eliminate or prevent the virus from entering the body. After very careful washing with soap and water for at least 15 minutes, an antiseptic must be applied followed by vaccination and +/- administration of anti-rabies immunoglobulins [5].

Worldwide, between 6.5 and 12 million post-exposure prophylaxis (PEP) are administered each year [6].

In Conakry (Guinea) in 2013, Youla AS et al reported 11 cases of human rabies among 7994 people exposed to the risk of rabies over a period of 11 years [7].

However, data on the prophylactic aspects of exposure to the risks of rabies infections are rare in the regions for the simple reason that there are not enough studies initiated in this area. Added to this is the lack of clear political will on the part of the authorities to make the care of people exposed to risks free.

It is with this in mind that we initiated this study in order to take stock of post-exposure prophylaxis to rabies in people bitten by warm-blooded animals at the epidemic treatment center of the Kindia regional hospital in Guinea.

2. METHODOLOGY

This is a retrospective and descriptive study over a period of 5 years 10 months (January 1, 2014 to October 31, 2019) at the epidemiological treatment center (CT-Epi) of Kindia in collaboration with the private veterinary practice of the place which should receive all animals suspected or not affected by rabies, responsible for lesions raising suspicion of a risk of rabies infection in the population. This CT-Epi, in addition to its role dedicated to the management of the various epidemics in the region, also represents the infectious diseases unit of the region and therefore a reference center for the

therapeutic and preventive management of certain infectious diseases including human rage. Kindia is one of the administrative regions of Guinea located 113 kilometers from Conakry, with an area of 28,875 km2 with a density of 54 inhabitants per km2. The Kindia region brings together five prefectures (Coyah, Dubréka, Forécariah, Kindia and Télimélé).

All complete records of patients of all ages and genders admitted for rabies exposure during the study period were included in this study.

Complete file:any patient record including the age and sex of the patient, the name of the biting animal, the type of lesion, the vaccination protocol used, the number of vaccine doses administered and the patient's lifestyle).

2.1 Definition of Variables

Exposure to rabies is any person admitted to a consultation for a bite, scratch or lick of skin/mucosa, damaged or not, by a warm-blooded animal.

Age: Number of years lived by the person exposed to rabies until the day of hospitalization. Patients were grouped into 10-year age groups.

Sex: Permanent physical character of a person making it possible to distinguish male and female individuals but also to determine the sex ratio.

Marital status: This is the marital status of the person exposed to rabies and we have grouped the patients.

Married: Two people united by a marital bond.

Bachelor: People who are not married.

Divorce: A person whose marriage has been legally dissolved.

Widower: Person whose spouse has died.

2.2 Socio-professional Layer

This is the professional activity of the patient and is classified into:

Official: Person working for private or public institutions and paid periodically.

Liberal: People who are not self-employed are: the trader, the shopkeeper, the farmer, the driver, the hairdresser, the miner.

Pupils and students: people who receive education at a pre-university school, university or professional establishment.

Origin: This is the location where the rabies exposure took place.

Urban area: (urban municipality): This concerns all patients coming from the town center of Kindia.

Rural area: (excluding urban communes): These are all patients coming from the outskirts of the city center of Kindia and other surrounding prefectures.

Delay before prophylaxis: This is the period from exposure to administration of the first dose of rabies vaccine.

Animal involved: Determines the source of exposure to risk. These can be the dog, the monkey, the cat, the fox and the bat.

Domestic: Animals belonging to a person or family.

Wandering: Animals that do not belong to anyone or whose owner is unknown.

2.3 Vaccination Status of the Animal Concerned

Vaccinated: Animal having received an anti-rabies vaccine or whose vaccination record is up to date.

Unvaccinated: Animal that has not received anti-rabies vaccinations or whose vaccination record is not up to date.

2.4 Type of Lesion

This involves biting, licking or scratching.

Lesion site: This is the part of the human body (upper or lower limb, trunk) which constitutes the area from which contact with the animal in question occurred.

2.5 Therapeutic Variables

The terms were as follows:

Zagreb Protocol: Simplified post-exposure prevention treatment regimen including four (4) injections: 2 on D0, 1 on D7 and 1 on D21.

So-called Essen Protocol: Therapeutic regimen for post-exposure prevention of rabies comprising five (5) injections: 1 on D0, 1 on D3, 1 on D7, 1 on D14, 1 on D28.

2.6 Unspecified Protocol

Compliance with the vaccination schedule after exposure:

Full protocol: Total intake of all injections (4 for the Zagreb protocol and 5 for the Essen protocol) regardless of the vaccination schedule.

Incomplete protocol: Incomplete dose taken regardless of the proposed vaccination schedule.

For data collection, we carried out an exhaustive recruitment of all cases of exposure to the risk of rabies infection declared in the department during the period considered.

Data entry and analysis were carried out using EPI data software in version 3.1 and SPSS software in version 21, then processed by Microsoft Word and Excel 2013 software.

3. RESULTS

From January 1, 2014 to October 31, 2019, we collected 415 patients exposed to the risk of rabies and who consulted the Kindia CT-Epi and the year 2014 (1st year of investigation) recorded the highest number of cases with 116 (27 0.96%) (Fig. 1).

The average age of the patients was 25 (± 15.80) years with a male predominance, i.e. a sex ratio of 1.18. Singles were the most affected in 260 (62.65%) cases. Almost all patients (84%) resided in urban areas and the Kindia area was home to 343 cases (Table 1).

The dog was the main animal involved in 381 cases (91.81%), followed by the monkey in 29 cases (6.99%). Less than half of the dogs (44.10%) were domestic and only 16/415 dogs (i.e. 3.85%) were regularly vaccinated according to the owners (Table 2).

The bite was found in 381 patients (91.81%) and it was category III in almost a third of cases (35.18%). The bite site was located on the lower limbs in 350 cases (84.34%) (Table 3).

Almost half (42.49%) of the cases treated within 24 hours and the majority of patients (60.99%) took the full four (4) doses recommended by the Zagreb vaccination protocol with a rate of 39.01% abandonment of post-exposure prophylaxis against rabies. Almost all of the patients, i.e. 405 (97.60%), were put on antibiotics including amoxicillin-clavulanic acid in 250 patients (60.24%) followed by amoxicillin in 155 patients (37.35%).) (Table 4).

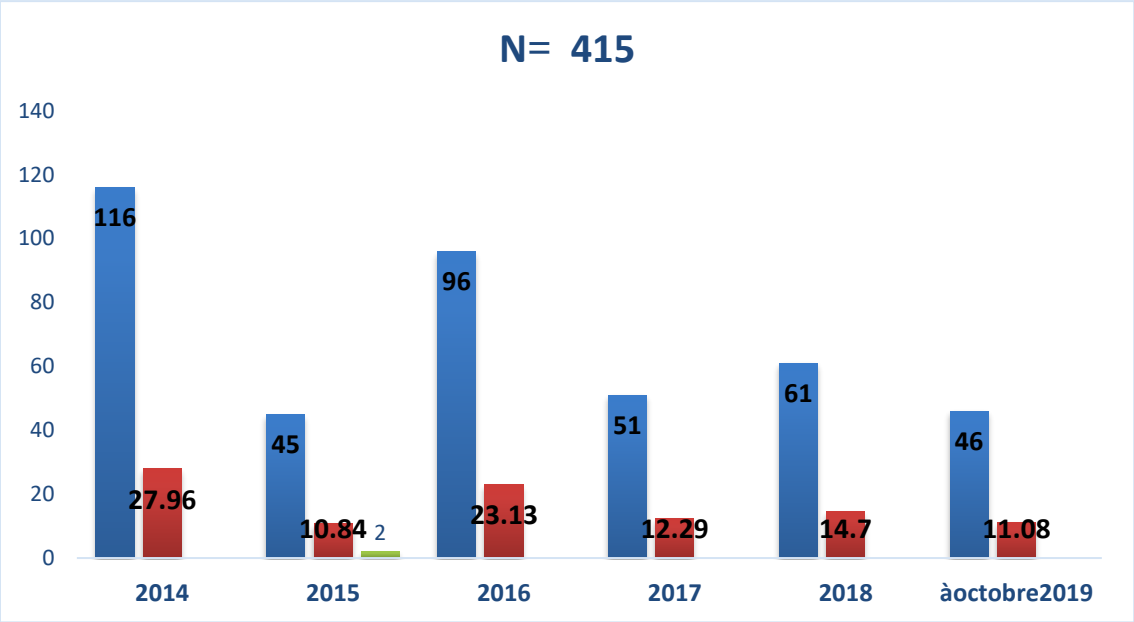

Fig. 1. Yearly cases of rabies exposure during the study period at CT-Epi of Kindia in Guinea from 2014 to 2019

Table 1. Distribution according to sociodemographic characteristics of the 415 people exposed to rabies during the study period at CT-Epi of Kindia in Guinea from 2014 to 2019

Characteristics	Number (N=415)	Proportion(%)
Average Age	25 (± 15,80) ans	
Sex		
Male	224	54
Sex ratio M/F	**1,18**	
Marital status	260	62,65
Married	99	23,86
Others	56	13,49
Level of study		
Low level	332	80
Secondary	54	13,01
Academic	29	6,99
Occupation		
Pupil/Student	248	59,76
Liberal	99	23,86
Employee	15	3,61
Housewife	53	12,77
Residence		
Kindia	343	82,65
Others prefectures	72	17,35
Type of residence		
Urban	349	84
Rural	66	16

Table 2. Distribution according to the profile of the biting animal of the 415 people exposed to rabies during the study period at CT-Epi of Kindia in Guinea from 2014 to 2019

Profile	Number (N=415)	Proportion(%)
Animal in volved		
Dog	381	91,81
Cat	29	6,99
Monkey	5	1,20
Behavior of the animal in question		
Restless	287	69,16
Slow motion	51	12,29
Normal	77	18,55
Animal rabies vaccination status involved		
Vaccinated	16	3,85
Unvaccinated	399	96,15
Situation of the biting animal		
Domestic	183	44,10
Wandering	232	55,90

Table 3. Distribution according to the characteristics of the lesion among the 415 people exposed to rabies during the study period at CT-Epi of Kindia in Guinea from 2014 to 2019

Lesion characteristics	Number	Percentage (%)
Contact type		
Bite	381	91,81
Scratch	25	6,02
Licking	9	2,17
Seat		

Lesion characteristics	Number	Percentage (%)
Lower limb	350	84,34
Upper limb	52	12,53
Trunk	11	2,65
Head	2	0,48
Category		
Category II	259	62,41
Category III	146	35,18
Category I	10	2,41

Table 4. Distribution according to type of care of the 415 people exposed to rabies during the study period at CT-Epi of Kindia in Guinea from 2014 to 2019

Type of care	Number (N=415)	Proportion(%)
Locale care		
Washing abundantly with soap and water	275	66,70
Application of 70° alcohol	140	33,73
Delivery time		
The first 24 hours	178	42,89
24 to 48 hours	142	34,21
From 48 to 72 hours	41	9,88
>72 hours	54	13,01
Rabies vaccine doses		
Vaccination not offered	10	2,41
1 dose	17	4,10
2 doses	52	12,53
3 doses	89	21,44
4 doses	247	59,52
Antibiotic therapy		
Amoxicillin- clavulanic Acide	250	60,24
Amoxicillin	155	37,35
Without antibiotic	10	2,41
Evolution		
Improved	257	61,93
Lost to follow-up	158	38,7

4. DISCUSSION

This is a retrospective study lasting 5 years 10 months from January 2014 to October 2019 on post-exposure rabies prophylaxis in people bitten by warm-blooded animals at the epidemic treatment center. from the Kindia regional hospital (CT-Epi). /HRK), Guinea.

Despite the retrospective nature and the absence of long-term follow-up of exposed people, this study made it possible to understand the extent of the phenomenon and the type of care provided to these patients victims of injuries by warm-blooded animals.

We collected 415 people exposed to the risk of rabies infection at the CT-Epi of the Kindia regional hospital during the study period. It should also be noted a significant decrease in cases over the years, going from 116 cases in 2014 to 46 cases in 2019, a reduction of more than half of cases.

This could be explained by under-reporting linked to the high cost of the rabies vaccine, therefore inaccessible to citizens with medium or low incomes, but also to the campaign to cull stray dogs in 2014.

The average age of our patients was 25 years with extremes of 1 and 90 years and the most affected age groups were those from 0 to 10 years (62.65%) followed by 11 to 20 years (26. 99%).

These results are close to those of Dao S. et al in 2006 in Mali and Sylla K et al in Senegal who noted a clear predominance of cases in these two age groups [8,9].

This clear predominance of cases (80%) among children under 15 years old could be explained by their immaturity, lack of awareness of the danger linked to dogs in general and stray dogs in particular and also the decline in parental control over children. . After the classrooms thus making them more vulnerable to the risk of injury from these warm-blooded stray animals.

Men were the most affected at 54%.

This result is similar to those of Youla in Guinea in 2013 and Sylla K in Senegal [7,9] and different from those of Marta et al who noted a female predominance of 53% [10].

The male predominance could be explained by the fact that boys are the most mobile, turbulent and can move away from the family home for their leisure activities and therefore more exposed to contact with stray animals including dogs which are the potential culprits of these risks. rabies from biting, scratching or licking mucous membranes or damaged skin.

In our study, pupils and students were more affected with 59.76%. Other authors have reported similar results [8,11,9].

The majority of patients (82.65%) came from the urban area of Kindia.

Similar results were reported in Bamako and Dakar by Dao S and Sylla K [8,9].

This observation could be explained by the fact that populations in urban centers are better informed about the risk of rabies than those in rural areas and consult a health establishment for appropriate rabies prevention care as soon as they are exposed to it. this risk. Also, the urban area constitutes the ideal place for the proliferation of stray animals in hot weather, including dogs presenting a much higher risk of rabies, especially since there is no health control policy or to cull stray dogs.

In almost all cases (91.81%), the biting animal involved was the dog.

This result is similar to those observed in Bamako (97.7%), Abidjan (90.8%), Dakar (89%) and Conakry (99.4%) [7,8,9,11].

This state of affairs was consistent with the literature which states that the dog is the animal most involved in the occurrence of human rabies [12].

No biting animal involved was observed for veterinary follow-up.

This result is similar to that of Sylla K [9] and different from that of Youla et al in Guinea where 36.5% of biting dogs were observed [7].

This could be explained by the fact that not only were more than half of the biting animals stray and therefore inaccessible, but also by the fact that domestic biting animals are more or less followed according to the owners' declarations because they are not documented and also the reluctance of the owners of these animals to send them to veterinarians. However, the only way to know if a biting animal could be excreting the rabies virus in its saliva at the time of the bite is to observe it and see if it remains healthy in the following days.

However, collaboration with veterinary medicine is essential to achieve WHO targets and it has been proven that vaccinating more than 70% of the dog population will eliminate rabies in both dogs and humans [13].

The bite represented the most frequent lesion (91.81%) and in almost 2/3 of cases (62.41%) the bite was category II.

These results corroborate those found by other authors [7,14,15].

The site of the bites was mainly located in the lower limbs in 84.34% of cases.

Similar results were reported by Sylla K [9] Abdillahi AM (90.67%) [16], Diallo MK (88.7%) [17] and Dangba BC (86%) [18].

This state of affairs could be explained by the fact that the lower limbs are the most accessible parts of the body for the biting animal.

More than 42.89% of exposed subjects were treated within 24 hours of their exposure.

This result is higher than that of Dao S in Bamako who reported that only 18.8% of bitten subjects went to a health establishment in the first 24 to 48 hours [8].

Nearly two thirds of patients (66.27%) benefited from washing the wound with soap and water.

This measure is strongly recommended to reduce the risk of progression of the virus [5].

The most prescribed antibiotic was amoxicillin-clavulanic acid in 60.24% of cases.

Almost all patients (98%) had started the Zagreb protocol and almost half (42.74%) had abandoned it and 247 patients received the full dose of four injections, a completeness of 55.26 % of cases.

Nearly a third (35.18%) of the cases presented a grade III lesion, but none of these cases benefited from the administration of anti-rabies immunoglobulins.

This result is lower than that of Sylla K et al. [9] who found 59% completeness and higher than those of Rysava K et al. [15] who reported that 32.5% and Marta DM et al. [10] that only 10% of patients in category II received rabies vaccines and immunoglobulins simultaneously.

The almost systematic use (98%) of this protocol in our patients would be linked to its simplicity and the fact that it is less expensive compared to other protocols used in Guinea, but despite everything, the dropout rate (42, 74%), which remains very high, would be linked to the inaccessible cost of the vaccine for citizens with average incomes on the one hand, but also to a lack of conviction of the risk incurred by these people. The non-use of immunoglobulins in people with grade III lesions would be linked to their unavailability in this region at this date.

Nearly 40% (158/415) of patients were lost to follow-up.

This state of affairs did not allow us to understand the medium or even long term evolution of these patients, particularly for the majority of them incompletely or not vaccinated.

5. CONCLUSION

The treatment of people bitten by warm-blooded animals is a complex subject, as we can see through this study and at different levels.

Urban areas are at greater risk of bites.

Stray dogs are responsible for the majority of bites.

The Zagreb protocol was almost exclusively used for the vaccination treatment of victims to reduce the risk of rabies infection.

Other larger-scale studies should focus on the outcome of these bitten patients.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

No generative AI technologies such as large language models (ChatGPT, COPILOT, etc.) and text-to-image generators were used in the writing or editing of this manuscript.

CONSENT

It is not applicable.

ETHICAL APPROVAL

The study protocol was approved by the ethics committee of the Faculty of Health Sciences and Technologies of the Gamal Abdel Nasser University of Conakry.

The anonymity and confidentiality of patients were respected.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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