



ORIGINAL RESEARCH

RETROSPECTIVE STUDY: PROFILE OF PATIENTS WITH BITE WOUNDS OF RABIES TRANSMITTING ANIMALS AT RSD GUNUNG JATI CIREBON, 2019-2023

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Background: Bite wounds from animals that transmit rabies are often treated by physician in the emergency room, but sometimes they still require consultation with a Plastic Surgery Specialist for further treatment. In this study, we present retrospective data on animal bites that transmit rabies at RSD Gunung Jati, Cirebon. Objective: To describe the number of data on patients bitten by animals transmitting rabies in the emergency room at RSD Gunung Jati Cirebon in 2019-2023.

Method: Descriptive retrospective study by looking at medical record data of new patients bitten by rabies-infecting animals in the emergency room at RSD Gunung Jati Cirebon in 2019-2023.

Results: The number of new patients with bites from rabies-infecting animals in the ER at RSD Gunung Jati Cirebon in 2019-2023 was 410 patients. The largest distribution was in the 30-59 year age group, namely 163 people (39.80%) and there were more male patients than female patients (51.22%). A total of 211 cases of bites were cats (51.46%). The most common injury conditions were mild risk injuries, amounting to 293 people (71.46%). The most frequent bite locations were on the upper extremities, 208 people (50.73%). The most common diagnosis was low risk animal bite wounds and received debridement + VAR treatment in 409 cases (99.76%).

Conclusion: There were 410 new patients with bites from rabies-transmitting animals at RSD Gunung Jati Cirebon in 2019-2023, 293 patients with mild risk injuries, 117 patients with high risk injuries, and 7 patients on craniofacial bite locations.

Keywords: Rabies, Profile, Medical Record, Retrospective

1. INTRODUCTION

Although often treated by the emergency room (ER) physician, bite wounds are also treatment issues for the plastic surgeon because they often occur on the hands and face or can be the cause of significant soft tissue destruction on the body. More severe and violent bites can be associated with complex composite tissue defects with devitalized tissue.

General management includes:

1. Infiltrate local anesthesia to anesthetize the wound to allow thorough evaluation and débridement.

2. Removal of foreign bodies (teeth) and débridement of devitalized tissue.
3. Copious irrigation with NS.
4. Determine if tetanus or rabies prophylaxis is indicated.
5. Repair of wound/laceration-consider loose closure or leaving open if infected or contaminated.
6. Postclosure antibiotics and monitoring.

Cat

Cat bites are deeply penetrating wounds that are heavily contaminated, and approximately 80% of these wounds become infected. Organisms include *Pasteurella multocida* and *Staphylococcus species*. Irrigate heavily, wash daily, treat with antibiotics, and see below for rabies vaccination criteria. Evaluate for tetanus prophylaxis. Do not close the wound.

Dog

Dog bites constitute 80 to 90% of all animal bites. Organisms include *P. multocida*, *Bacteroides viridans streptococci*, *Fusobacterium*, and *Capnocytophaga*. Massive force can often cause significant avulsion injuries; however, due to the lower bacterial count, infection is not seen as frequently as in cat bites. Large avulsion injuries can be reapproximated loosely as long as the wound can be packed and allowed to drain should an infection ensue. Elevate and treat with antibiotics.

Rabies

Rabies is a viral infection of the central and peripheral nervous system that causes encephalitis with or without paralysis. If left untreated, it has close to 100% mortality. In the United States, rabies is most common in bats, raccoons, skunks, foxes, coyotes, ferrets, cats, and dogs. Bats are the most common wild animals to carry rabies. Cats are the most common domestic animals to carry rabies because of the high number of unvaccinated strays and their contact with raccoons, bats, and other wild animals. Transmission is through the mucous membranes and saliva through breaks in the skin. The virus then replicates locally in the muscle and eventually travels through peripheral nerves to the spinal cord, then to the brain. Incubation times have ranged from as short as 5 days to as long as 7 years; however, the average incubation time is approximately 1 to 3 months. Common signs and symptoms of rabies are detailed in the box below.

The most common signs and symptoms of rabies infection:

- Paresthesias at the site of the bite
- Hypersalivation
- Hydrophobia
- Altered mental status
- Anxiety
- Hyperactivity
- Bizarre behaviors

- Hypertension
- Hyperthermia
- Hyperventilation
- Spasms and contractions of the neck muscles
- Pharyngeal and respiratory muscle paralysis
- Seizures

Domestic Animals

If the rabies status of the domestic animal (e.g., cat, dog, ferret) is unknown, the animal should be quarantined and observed for 10 days; prophylaxis can be postponed if suspicion is relatively low. If the animal is rabid or if the presence of rabies is highly suspected, human rabies immunoglobulin (RIG) and human diploid cell rabies vaccine (HDCV) should be administered.

- RIG: 20 IU/kg, 50% into the wound and 50% given IM.
- HDCV: Given on days 0, 3, 7, 14, and 28.¹

EPIDEMIOLOGY

Rabies is spread on almost all continents except the Antarctic continent, more than 150 countries have been affected by this disease. Every year more than 55,000 people die from rabies and more than 15 million people worldwide receive prophylactic anti-rabies vaccine treatment to prevent the development of this disease. Bite wounds are a common emergency department (ED) presentation accounting for approximately 5% of traumatic wounds and representing 0.3-1.1% of all ED presentations in the US. However, only 20-50% of patients actually present to the ED for medical attention following dog bites in the US.

WHO estimates that a million people in the United States got bitten by animals each year. Animal bites are responsible for 1% of emergency hospital visits. In the United States, dogs and cats are responsible for 60–80% and 20–30% of animal bites cases, respectively. Furthermore, 10–15% of animal bites cases are caused by snakes, while other animal bites, such as rabbits, hamsters, rats, and monkeys, contribute to 1–2% of animal bites. In Indonesia, the total number of rabies cases is 16,258 in 2013. 40% of all people bitten by animals suspected of having rabies are children under 15 years of age. The first case of rabies in Indonesia was reported by Esser in 1884 in a buffalo, then by Pening in 1889 in a dog and by Eileris de Zhaan in 1894 in humans. All cases

occurred in West Java Province and after that rabies continued to spread to other areas of Indonesia. To date, 26 provinces have been infected with rabies and only 8 (eight) provinces in Indonesia remain rabies-free, namely Papua, West Papua, Bangka Belitung, Riau Islands, DKI Jakarta, DIY, Central Java and East Java. West Kalimantan Province has actually succeeded in achieving Rabies-free based on Minister of Agriculture Decree No. 885/Kpts/PD.620/8/2014 concerning the Liberation of Rabies in West Kalimantan Province dated 14 August 2014, however on 19 October 2014 a case of death due to human rabies was reported in Jelai Hulu sub-district, Ketapang Regency. Based on data from the Ministry of Health, in the last 5 (five) years (2011–2018) the average number of cases of animal bites transmitting rabies per year was 78,413 cases and an average of 63,534 cases received the anti-rabies vaccine (VAR).

ETIOLOGY

The causative agent of rabies is a virus from the genus *Lyssa virus* and belongs to the *Rhabdoviridae* family. This virus is neurotropic, shaped like a bullet with a length of 130 – 300 nm and a diameter of 70 nm. This virus consists of a single-chain RNA (Ribonucleic Acid) core surrounded by lipoproteins. On the outer sheath there are protrusions consisting of glycoprotein G which plays an important role in the emergence of vaccine-induced immunity and is important in serological identification of the rabies virus.

The rabies virus can survive heat for a long time. When heated to a temperature of 56°C, the virus can survive for 30 minutes and when heated to a dry temperature of 100°C it can still survive for 2-3 minutes. In saliva at hot temperatures it can survive for 24 hours. In freeze-dried conditions when stored at 4°C the virus can survive for years, this is the basis why anti-rabies vaccines must be stored at 4°C – 8°C. Basically the lower the temperature the longer the virus can survive. The rabies virus is easily killed by sunlight and ultraviolet light, the influence of acidic and alkaline conditions, fat dissolving substances, for example ether and chloroform, Na deoxycholate, and soapy water (Akoso, 2007). Therefore, it is very important to wash the wound with soap for 15 minutes as soon as possible after the bite to kill the rabies virus around the bite wound.

MODE OF TRANSMISSION AND INCUBATION PERIOD

The mode of transmission of rabies is through bites and non-bites (scratches or licks on open skin/mucosa) by animals infected with the rabies virus. The rabies virus will enter the body through open skin or mucosa but cannot enter through intact skin.

In the world, 99% of deaths from rabies are caused by dog bites. In most developing countries, dogs are the main reservoir for rabies, while wild animals that are the main reservoir for rabies are foxes, ferrets and wild dogs. In Indonesia, animals that can be a source of transmission of rabies to humans are dogs, cats and monkeys, but the main source of infection is dogs, around 98% of all rabies sufferers are infected through dog bites.

The incubation period for rabies varies greatly, namely between 2 weeks and 2 years, but in general it is 3 - 8 weeks. According to WHO (2007) it is stated that the incubation period is an average of 30 - 90 days.

The difference in incubation period is influenced by several factors, namely:

- a) Type/strain of rabies virus.
- b) The number of viruses entered.
- c) The depth of the bite wound, the deeper the bite wound, the greater the possibility of the rabies virus reaching the nervous system.
- d) Location of the bite wound, the closer the bite wound is to the brain, the quicker clinical symptoms will appear. Therefore, bite wounds in the shoulder area and above are high risk wounds.
- e) The amount of nerves in the wound area.
- f) Immunity of the sufferer.

Clinical symptoms of rabies will appear after the virus reaches the central nervous system and infects all neurons, especially in the limbic cells, hypothalamus and brain stem. The rabies virus is neurotrophic, which means it has a predilection for the nervous system. This virus travels through the nervous system, so it is not detected through blood tests. Until now there is no technology that can make an early diagnosis before clinical symptoms of rabies appear. Animal bites require wound care, and in many cases, antibiotics, surgery, and consideration of post-exposure prophylaxis (Aziz et al., 2015). However, the data that inform management strategies of animal bite wounds often come from temperate, metropolitan locations and may be less relevant in tropical settings where the animals responsible, and the environment in which they are encountered, is quite different. Animal

bites occurring in the sea and freshwater are not uncommon and increase the likelihood of wound infections by water-borne organisms (Abrahamian and Goldstein, 2011). In tropical low- and middle-income countries, where access to sophisticated healthcare is frequently limited, delays in appropriate wound care may also be more common, further increasing the risk of infection.

Australian guidelines currently recommend thorough cleaning, irrigation, debridement, elevation, and immobilization of animal bite wounds (Therapeutic Guidelines, 2021). Amoxicillin-clavulanate is recommended, either as presumptive therapy (before the infection is established in those at high risk of wound infection) or as empiric therapy for active infection. Intravenous piperacillin-tazobactam is an alternative if deeper tissues are involved or if the infection has systemic features. These agents are recommended, as they cover dog, cat, and human oral flora, although they also cover other animals' oral flora and most human skin flora (Abrahamian and Goldstein, 2011, Dendle and Looke, 2009). For bite wounds that have occurred or been immersed in water, antimicrobial regimens are modified to include coverage for aquatic organisms such as *Aeromonas* and *Vibrio* species (Therapeutic Guidelines, 2021).^{2,3,4}

Most animal bites occur in the hands, followed by arm, leg, and face. Certain bite locations have a higher risk for infection. Bite in the hand area has an 18–36% risk of infection. Many dog bites involve the upper extremities, especially the hand area. Animal bites can cause bacterial and viral secondary infections. *Pasteurella multocida* 50–60% are found in dogs' nasopharynx. Rabies, which is caused by Rhabdovirus, is the most dangerous viral infection caused by animal bites. In recent years, epidemiology has changed due to increased control of rabies in domestic animal populations. Currently, only 8% of rabies cases are caused by dogs and domestic animals. Post-bite prophylaxis treatment, which is almost 100% effective, can lower the number of rabies in humans. One century ago, there were 100 cases compared to the average of 1–4 cases annually in the United States today.⁵

The effects of dog bites are wide ranging. They may be as minor as superficial bruising or as serious as life- and limb-threatening injuries. While government data exist on the number and nature of dog bite injuries, there is a lack of large, academic studies evaluating the burden of dog bites. There has also been little research describing the interventions

required to manage dog bite-related injuries. Of note, prophylactic antibiotics, as well as primary v. secondary wound closure, are ongoing controversies, with scant evidence to guide treatment. It is also not known how often dog bites become infected and whether primary closure affects the rate of infection.⁶

OBJECTIVE

To describe the number of data on patients bitten by animals transmitting rabies in the emergency room at RSD Gunung Jati Cirebon in 2019-2023.

2.METHOD

Descriptive retrospective study by looking at medical record data of new patients bitten by rabies-transmitting animals in the emergency room at RSD Gunung Jati Cirebon in 2019-2023. The sample for this study was all medical records of new patients bitten by rabies transmitting animals in the emergency room at RSD Gunung Jati Cirebon in 2019-2023 who match with the inclusion and exclusion criteria. The variables in this study were age, gender, type of biting animal, condition of the bite wound, location of the bite, and treatment.

3. RESULTS

The number of new patients with bites from rabies-transmitting animals in the ER at RSD Gunung Jati Cirebon in 2019-2023 was 410 patients. The largest distribution was in the 30-59 year age group, namely 163 people (39.80%) and the least was the 0-12 month age group, 2 person (0.49%). The largest gender is male, namely 210 people (51.22%). The type of animal with the most cases of bites was cats, namely 211 cases (51.46%), dogs, 161 cases (39.27%), monkeys, 27 cases (6.59%), ferrets, 5 cases (1, 22%), bats were 1 case (0.24%) and cases of bites by other animals (rats) were 4 cases (0,98%). The most common injury conditions were mild risk injuries, 293 people (71.46%), while high risk injuries were 117 people (29.54%). The most frequent bite locations were on the upper extremities experienced by 208 people (50.73%), on the lower extremities experienced by 146 people (35.61%), in multiple locations experienced by 37 people (9.02%), on the head was experienced by 14 people (3.41%), on the body was experienced by 4 people (0.98%), and on the genitalia was 1 people (0.24%). A total of 409 people received wound washing treatment + VAR, while 1 person diagnosed with a high risk animal bite wound received wound washing treatment + VAR + SAR.

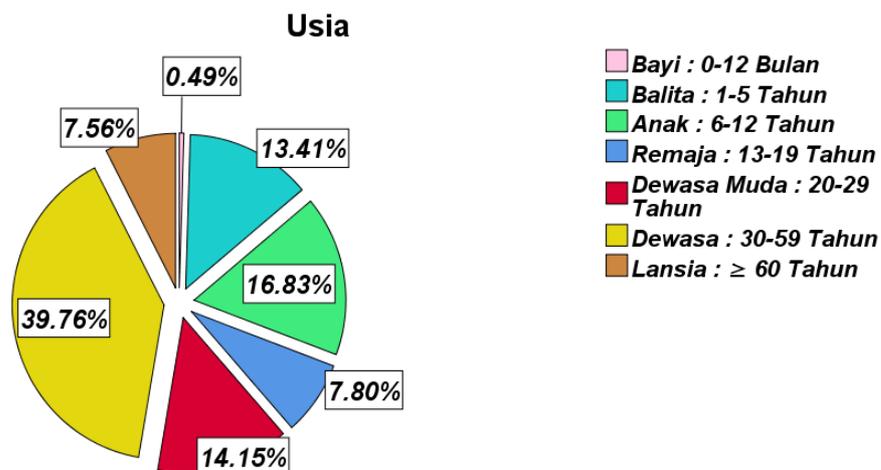


Figure 1. Distribution of Age Groups of New Patients with Animal Bites that Transmit Rabies in the ER of RSD Gunung Jati in 2019-2023

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		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bayi : 0-12 Bulan	2	.5	.5	.5
	Balita : 1-5 Tahun	55	13.4	13.4	13.9
	Anak : 6-12 Tahun	69	16.8	16.8	30.7
	Remaja : 13-19 Tahun	32	7.8	7.8	38.5
	Dewasa Muda : 20-29 Tahun	58	14.1	14.1	52.7
	Dewasa : 30-59 Tahun	163	39.8	39.8	92.4
	Lansia : ≥ 60 Tahun	31	7.6	7.6	100.0
	Total	410	100.0	100.0	



Figure 2. Gender of new patients with rabies-transmitting animal bites in the ER at RSD Gunung Jati in 2019-2023

Table 2. Gender of new patients with rabies-transmitting animal bites in the ER at RSD Gunung Jati in 2019-2023

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Laki-laki	210	51.2	51.2	51.2
	Perempuan	200	48.8	48.8	100.0
Total		410	100.0	100.0	

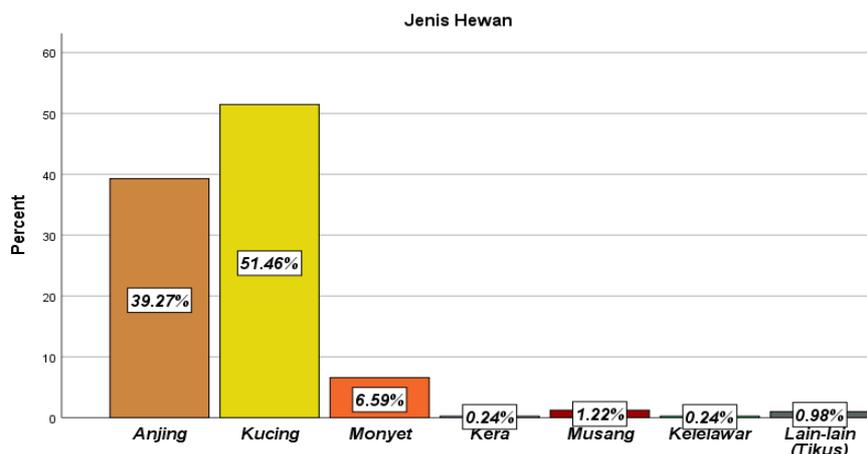


Figure 3. Types of Animals in New Cases of Animal Bites Transmitting Rabies in the ER of RSD Gunung Jati in 2019-2023

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		Jenis Hewan			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Anjing	161	39.3	39.3	39.3
	Kucing	211	51.5	51.5	90.7
	Monyet	27	6.6	6.6	97.3
	Kera	1	.2	.2	97.6
	Musang	5	1.2	1.2	98.8
	Kelelawar	1	.2	.2	99.0
	Lain-lain (Tikus)	4	1.0	1.0	100.0
	Total	410	100.0	100.0	

Kondisi Luka

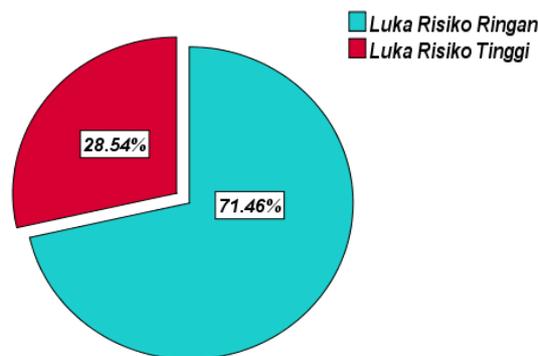


Figure 4. Wound conditions in new cases of animal bites that transmit rabies in the ER at RSD Gunung Jati in 2019-2023

Table 4. Wound conditions in new cases of animal bites that transmit rabies in the ER at RSD Gunung Jati in 2019-2023

		Kondisi Luka			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Luka Risiko Ringan	293	71.5	71.5	71.5
	Luka Risiko Tinggi	117	28.5	28.5	100.0
Total		410	100.0	100.0	

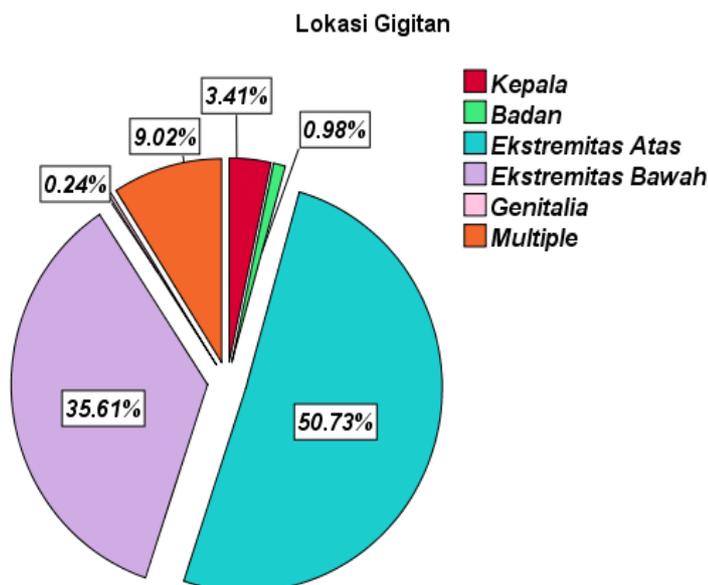


Figure 5. Distribution of Bite Locations in New Cases of Animal Bites Transmitting Rabies in the ER of RSD Gunung Jati in 2019-2023

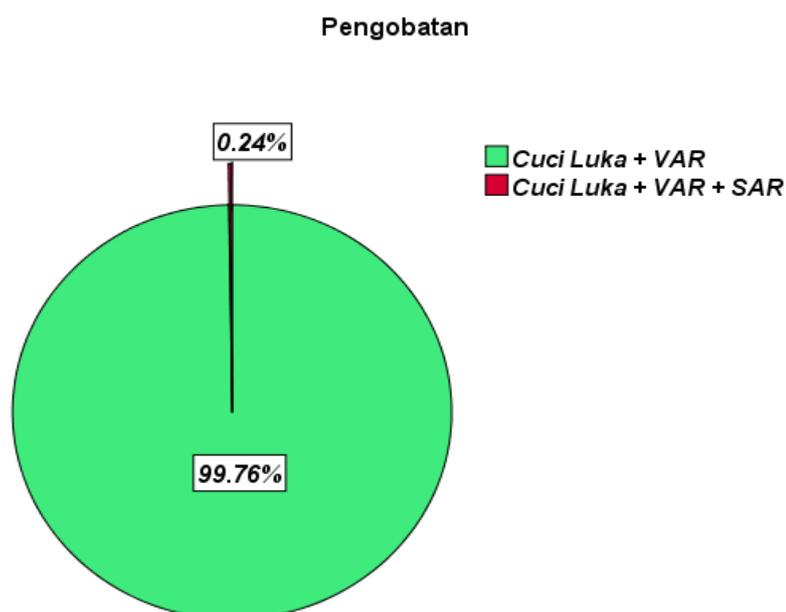


Figure 6. Treatment in New Cases of Animal Bites Transmitting Rabies in the ER of RSD Gunung Jati in 2019-2023

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Table 5. Distribution of Bite Locations in New Cases of Animal Bites Transmitting Rabies in the ER of RSD Gunung Jati in 2019-2023

		Lokasi Gigitan			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Kepala	14	3.4	3.4	3.4
	Badan	4	1.0	1.0	4.4
	Ekstremitas Atas	208	50.7	50.7	55.1
	Ekstremitas Bawah	146	35.6	35.6	90.7
	Genitalia	1	.2	.2	91.0
	Multiple	37	9.0	9.0	100.0
	Total	410	100.0	100.0	

Table 6. Treatment in New Cases of Animal Bites Transmitting Rabies in the Emergency Room of RSD Gunung Jati in 2019-2023

		Pengobatan			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cuci Luka + VAR	409	99.8	99.8	99.8
	Cuci Luka + VAR + SAR	1	.2	.2	100.0
	Total	410	100.0	100.0	

4. DISCUSSION

This retrospective study provides valuable epidemiological data on animal bite wounds from rabies-transmitting animals at RSD Gunung Jati Cirebon over a five-year period (2019-2023), yielding several important findings that warrant detailed discussion.

Demographic Characteristics

The study identified 410 new patients presenting with animal bites, with the highest prevalence in the 30-59 year age group (39.80%). This finding aligns with existing literature suggesting that productive-age adults are frequently exposed to animal contact through daily activities and occupational exposure. The slight male predominance (51.22%) is consistent with global patterns, as males typically have higher outdoor exposure and risk-taking behaviors that increase animal encounter frequency.

Notably, children accounted for a substantial proportion of cases (13.41% in the 1-5 year group and 16.83% in the 6-12 year group), which is concerning given that WHO reports indicate 40% of rabies-exposed individuals are children under 15 years. This vulnerable population requires special attention in prevention programs, as children may not recognize dangerous animal behaviors and are less likely to report minor bites or scratches.

Animal Species Distribution

The predominance of cat bites (51.46%) over dog bites (39.27%) is particularly noteworthy and differs from many international studies. Globally, dogs account for 60-80% of animal bites and are responsible for 99% of human rabies deaths. The higher cat bite proportion in this study may reflect several factors:

1. Higher stray cat populations in the region
2. Behavioral patterns where cat bites are deeply penetrating wounds with approximately 80% infection rates due to *Pasteurella multocida*
3. Changing pet ownership patterns in Indonesia
4. Underreporting of dog bites if patients seek care elsewhere

This finding has important implications for rabies prevention strategies, as cats represent a significant reservoir in Indonesia due to high numbers of unvaccinated strays and their contact with wild animals. The 6.59% monkey bite rate also reflects Indonesia's unique epidemiology, as monkeys are recognized rabies transmitters in the region alongside dogs and cats.

Wound Risk Classification

The majority of injuries were classified as mild risk

(71.46%), while 28.54% were high risk. This distribution is favorable, as mild risk injuries require only wound washing and VAR (anti-rabies vaccine), whereas high-risk injuries necessitate additional anti-rabies serum (SAR/RIG). However, the study revealed that only one patient (0.24%) received SAR in addition to VAR, which appears disproportionately low given that 117 patients had high-risk injuries.

This discrepancy raises several concerns:

1. Potential undertreatment of high-risk cases
2. Supply limitations for rabies immunoglobulin
3. Classification inconsistencies or documentation errors
4. Economic barriers to complete post-exposure prophylaxis

The Indonesian Ministry of Health guidelines emphasize that high-risk wounds (Category III: deep wounds, multiple wounds, wounds in highly innervated areas) require both VAR and SAR for optimal protection against rabies, which has nearly 100% mortality if untreated.

Anatomical Distribution

The upper extremities were the most commonly affected (50.73%), followed by lower extremities (35.61%). This pattern is consistent with literature indicating that hands and arms are frequent bite locations, carrying an 18-36% infection risk. The 3.41% head involvement and seven craniofacial cases are particularly concerning, as these represent high-risk injuries due to proximity to the central nervous system, shorter incubation periods, and potential for significant soft tissue and cosmetic damage requiring plastic surgery intervention.

Treatment Patterns and Management

Nearly all patients (99.76%) received wound debridement and VAR, demonstrating good adherence to basic rabies post-exposure prophylaxis protocols. However, several management considerations deserve attention:

Wound Closure Controversy.

The literature suggests that cat bite wounds should generally not be closed due to high contamination risk, while dog bite wounds may be loosely approximated if adequate drainage is ensured. The study does not specify closure practices, representing an area for further investigation.

Antibiotic Coverage

Standard treatment should include antibiotics covering *Pasteurella multocida*, *Staphylococcus*, *Streptococcus*, and anaerobes. Amoxicillin-clavulanate is recommended as first-line therapy, with alternatives

for more severe infections. The current study does not detail antibiotic prescribing patterns.

Tetanus Prophylaxis

While VAR administration was well-documented, tetanus immunization status is not reported, representing another important aspect of comprehensive bite wound management.

Public Health Implications

Indonesia has 26 provinces infected with rabies, with only 8 remaining rabies-free. West Java, where Cirebon is located, has historical rabies presence since the first **Indonesian** cases in the 1880s. The average of 78,413 annual animal bite cases nationally (2011-2018), with 63,534 receiving VAR, indicates gaps in treatment coverage.

This study's findings support several public health priorities:

1. Enhanced rabies surveillance in domestic animals, particularly cats
2. Mass vaccination programs for both dogs and cats
3. Community education about rabies transmission and immediate post-bite care
4. Improved access to complete post-exposure prophylaxis (VAR + SAR)
5. Healthcare provider training on risk classification and appropriate treatment protocols

Study Limitations

The authors acknowledge important limitations:

1. Absence of data for patients not receiving VAR, potentially underestimating true bite incidence
2. Lack of standardized classification for rabies-transmitting animal bite wounds in Indonesia
3. Retrospective design limiting data quality to medical record completeness
4. Single-center study limiting generalizability
5. No follow-up data on infection rates, treatment compliance, or outcomes

Comparison with Regional Data

The study's findings can be contextualized within broader regional patterns. Tropical settings face unique challenges including different animal reservoirs, water-associated wounds increasing infection risk from *Aeromonas* and *Vibrio* species, and limited healthcare access. The Australian guidelines emphasizing thorough irrigation, debridement, elevation, and appropriate antimicrobial coverage provide a useful framework that may require adaptation for Indonesian settings.

Future Directions

Several areas warrant further investigation:

1. Prospective studies evaluating infection rates, treatment outcomes, and rabies development
2. Standardization of wound classification systems
3. Cost-effectiveness analyses of various prophylaxis strategies
4. Barriers to SAR administration in high-risk cases
5. Long-term surveillance of vaccination coverage in animal populations
6. Integration of plastic surgery consultation protocols for complex wounds

5.CONCLUSSION

There were 410 new patients with bites from rabies-transmitting animals at RSD Gunung Jati Cirebon in 2019-2023, 293 patients with mild risk injuries, 117 patients with high risk injuries, and 7 patients on craniofacial bite locations. In this study, we were hampered by the absence of data for patients who did not receive VAR treatment. In Indonesia there are no standard rules for classifying types of bite wounds from animals that transmit rabies.

6.DECLARATION

Funding

No Funding

Conflict of Interest

None to declare

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