

Animal and Human Bites

Dr Kalpesh S Sukhwani
Apollo Hospitals
Chennai

- ⦿ **Why animal bites discussion?**
- ⦿ **Wound management**
- ⦿ **Who gives you what?**
- ⦿ **Antibiotic management**
- ⦿ **Vaccines –Rabies**

Epidemiology

- ◎ **1% of ER visits**
- ◎ **97% are from dogs**
- ◎ **2% are from cats**
- ◎ **65,000 deaths across globe**

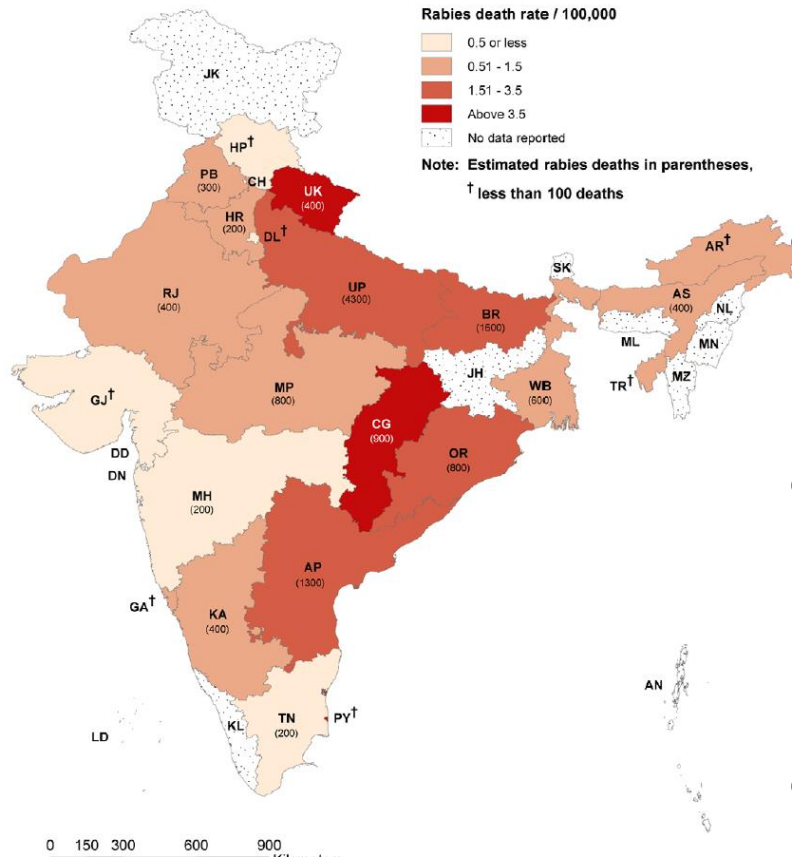
Bites

- ◎ Age <20 and males more frequent victims for all bites
- ◎ Females and elderly -cat bites.

Human Deaths in Asia

Country	Deaths	Rate/million
India	20,000	20.0
Pakistan	2,490	17.0
Bangladesh	1,550	12.0
Myanmar	196	4.1
Sri Lanka	76	4.0
Phillippines	248	3.3
China	3000	2.4
Nepal	44	2.2
Lao People s Democratic Republic	2	1.3
Vietnam	86	1.1
Cambodia	2	0.8
Mongolia	2	0.8
Indonesia	40	0.2
Thailand	11	0.1
Total	Total: 28,006	Average: 5.3

Rabies in India



- ◎ Globally, 2 persons die every hour due to rabies.
- ◎ **40% of people** who are bitten by suspect rabid animals are children **under the age of 15 years.**
- ◎ It is estimated that in the absence of post-exposure prophylaxis, about 3,27,000 persons would die from rabies in Asia and Africa each year
- ◎ Roughly 36% of the world's rabies deaths occur in India each year. Most **animal bites in India (91.5%)** are by dogs, of which about **60% are strays and 40% pets.**
- ◎ The annual number of person-days lost because of animal bites is 380 lakh, and the cost of post-bite treatment is **about INR 140 crore** in India.



ANIMALS TRANSMITTING RABIES IN INDIA

APCRI - 2006

Domestic

Dogs & Cats

Peridomestic

Cows & Buffaloes

Sheep & Goats

Pigs

Donkeys

Horses

Camels

Wild

Foxes & Jackals

Monkeys

Mongoose

Bears

Not reported

Bats *

Rodents *

Birds

Squirrel

Note:

All exposures in wild are considered as category III exposures.

* Bite by Bats or Rodents do not ordinarily necessitate rabies vaccination.

However, bites by Bats or rodents in unusual circumstances may be considered for vaccination in consultation with an expert in the field of rabies.

Cause of death in rabies?

Insufficient knowledge about rabies dangers and prevention

particularly prompt PEP

wound management

Case -1

- **30 yr/F**
- **H/o of dog bite while she was getting back her home from office.**
- **She is not able to recognize the dog, it has bitten her at multiple sites around her left leg near ankle, on examination multiple abrasions were present.**
- **She presented to your clinic 2 hours after bite.**



What would you do now?

1. TT
2. Rabies vaccine + TT
3. TT, Vaccine & antibiotics
4. No need to clean wound is > 2hrs
5. Suture immediately
6. TT, rabies Vaccine, antibiotics and RIG

Case Study 1..

- ◎ She came back showing her pregnancy report showing positive. She started itching following second dose injection.
- ◎ She came on day 7 telling that bitten dog was died yesterday after biting two more persons.
- ◎ What will you do now?



Pregnancy and Rabies

- ◎ Specific testing of reproductive outcomes has not been performed, but **pregnancy is not a contraindication to postexposure prophylaxis against rabies.**
- ◎ Vaccination has not been associated with adverse outcomes.
- ◎ Prophylaxis is appropriate after exposure to protect the life of the mother and the fetus.
- ◎ Exposure, or the diagnosis of rabies in the mother, is **not an indication for termination of the pregnancy.**
- ◎ **Prophylaxis should not be discontinued after the development of local or mild systemic signs.**

General principles on animal bite management

HELICOPTER: An Acronym for Management of Animal Bite Wounds

H	History
E	Examination
L	Liberal cleansing and
I	Irrigation
C	Closure, culture consideration
O	Operative cleansing and closure
P	Prophylactic or therapeutic antimicrobial agent use
T	Tetanus immunization status
E	Elevation
R	Rabies risk

W- wound A- antibiotic prophylaxis R- rabies PEP T- Tetanus PEP



History taking

- **Circumstances of the injury (provoked or unprovoked)**
- **Animal involved**
- **Current location of the animal/ ownership/ vaccination status**
- **Patient's underlying medical conditions**

WHO Classification of Bite

Category	Description	Action
Cat 1	licking, touching, on intact skin	None
Cat 2	saliva on scratches or abrasions on the skin without bleeding; or nibbling of uncovered skin	Clean wound Immediate rabies vaccination
Cat 3	Bites or scratches that penetrate the skin. Exposure (coming in contact) of the eye or mouth to saliva from licks.	Clean wound Immediate rabies vaccination Immediate rabies immunoglobulin

Do's

Physical	Wash with running water	Mechanical removal of virus from the wound(s)
Chemical	Wash the wound(s) with soap and water Apply disinfectant 	Inactivation of the virus
Biological	Infiltrate immunoglobulin into the depth and around the wound(s) in Category III exposures 	Neutralization of the virus

Don'ts

- Touch the wound(s) with bare hand
- Apply irritants like soil, chilies, oil, lime, herbs, chalk, betel leaves, etc.

Number of post exposure doses of vaccine

- **Revised CDC recommendation is 4 doses of vaccine on 0, 3, 7, and 14**
- **0, 3, 7, 14, and 28 in Immunocompromised**

Question to the panelists

- What are the vaccines which are approved/recommended.
- What is available in india?

Would you do skin closure?



Indian guidelines 2013

- ◎ **Suturing of wound should be avoided as far as possible. If surgically unavoidable, minimum loose sutures should be applied after adequate local treatment along with proper infiltration of rabies immunoglobulins.**



National Institute of Communicable Diseases
Directorate General of Health Services
Ministry of Health & Family Welfare
Government of India
New Delhi

When & What antibiotic will you start now?



Antibiotic prophylaxis

- ⦿ Prophylactic antibiotics reduce the rate of infection due to some animal bites, especially cat/human bites.
- ⦿ Although routine antibiotic prophylaxis is not recommended, prophylaxis is warranted in certain high-risk wounds.
 - Deep puncture wounds (especially due to cat bites)
 - Moderate to severe wounds with associated crush injury
 - Wounds in areas of underlying venous and/or lymphatic compromise
 - Wounds on the hand(s), genitalia, face, or in close proximity to a bone or joint (particularly the hand and prosthetic joints)
 - Wounds requiring closure
 - Bite wounds in compromised hosts (eg, immunocompromised, absent spleen or splenic dysfunction, and adults with diabetes mellitus)

Bacteria commonly isolated from Dog/Cat bite

Aerobes:

- Streptococci species
- Staph aureus and other species
- Pasteurella multocida
- Moraxella species
- Corynebacterium species
- Neisseria species

Anaerobes:

- Actinomyces
- Bacteroides
- Fusobacterium
- Peptostreptococcus
- Prevotella
- Capnocytophaga species
- Eikenella corrodens

TABLE
319-2

Antimicrobial Susceptibilities of Bacteria Frequently Isolated from Animal Bite Wounds*

	Percentages of Isolates Susceptible					
	<i>Staphylococcus aureus</i> ⁺⁺	<i>Eikenella corrodens</i>	<i>Anaerobes</i>	<i>Pasteurella multocida</i>	<i>Capnocytophaga canimorsus</i>	<i>Staphylococcus intermedius</i>
Penicillin	10	99	50/95 [†]	95	95	30
Dicloxacillin	99	5	50 ^{†§}	30	NS	70
Amoxicillin/clavulanic acid	100	100	100 [§]	100	95	70
Cephalexin	100	20	40 ^{†§}	30	NS	95
Cefuroxime	100	70	40 ^{†§}	90	NS	NS
Cefoxitin	100	95	100 ^{†§}	95	95	NS
Erythromycin	100	20	40 ^{†§}	20	95	95
Tetracycline	95	85	60 ^{†§}	90	95	NS
TMP-SMX	100	95	0 ^{†§}	95	V	NS
Ciprofloxacin	100	100	40 ^{†§}	95	100	100
Levofloxacin	100	100	60 ^{†§}	100	100	100
Moxifloxacin	100	100	85 ^{†§}	100	100	100
Azithromycin	100	80	70 ^{†§}	100	100	NS
Clarithromycin	100	60	70 ^{†§}	70	100	NS
Clindamycin		0	100 ^{†§}	0	95	95

Questions to panelists

- What antibiotics are appropriate in following categories
- Penicillin allergy
- Pregnancy
- children

Case 2

- 50 year female, She was bitten by her pet dog, when she try to feed food.
 - She has vaccinated her dog.
- What would you do now?**
1. No need for ARV
 2. Observe the dog for 10 days
 3. Check dog antibody titre
 4. Give rabies immunoglobulin and vaccine



National Institute of Communicable Diseases

Directorate General of Health Services

Ministry of Health & Family Welfare

Government of India

New Delhi

Indian animal history.....

Provoked versus unprovoked bites: Whether a dog bite was provoked rather than unprovoked should not be considered a guarantee that the animal is not rabid as it can be difficult to understand what an attacking dog considers provocation for an attack.

Vaccination status of the biting animal: Although unvaccinated animals are more likely to transmit rabies, vaccinated animals can also do so if the vaccination of the biting animal was ineffective for any reason. A history of rabies vaccination in an animal is not always a guarantee that the biting animal is not rabid. Animal vaccine failures may occur because of improper administration or poor quality of the vaccine, poor health status of the animal, and the fact that one vaccine dose does not always provide long-lasting protection against infection in dogs.

Case 3

- ◎ 25 year old gentleman comes with a h/o dog bite (street dog)(grade 3) 2 days ago
- ◎ Visits a hospital and received rabies vaccination(gluteal) and tetanus toxoid
- ◎ Comes to you with fear of developing rabies
- ◎ On examination healed teeth mark over right calf

What would you do?

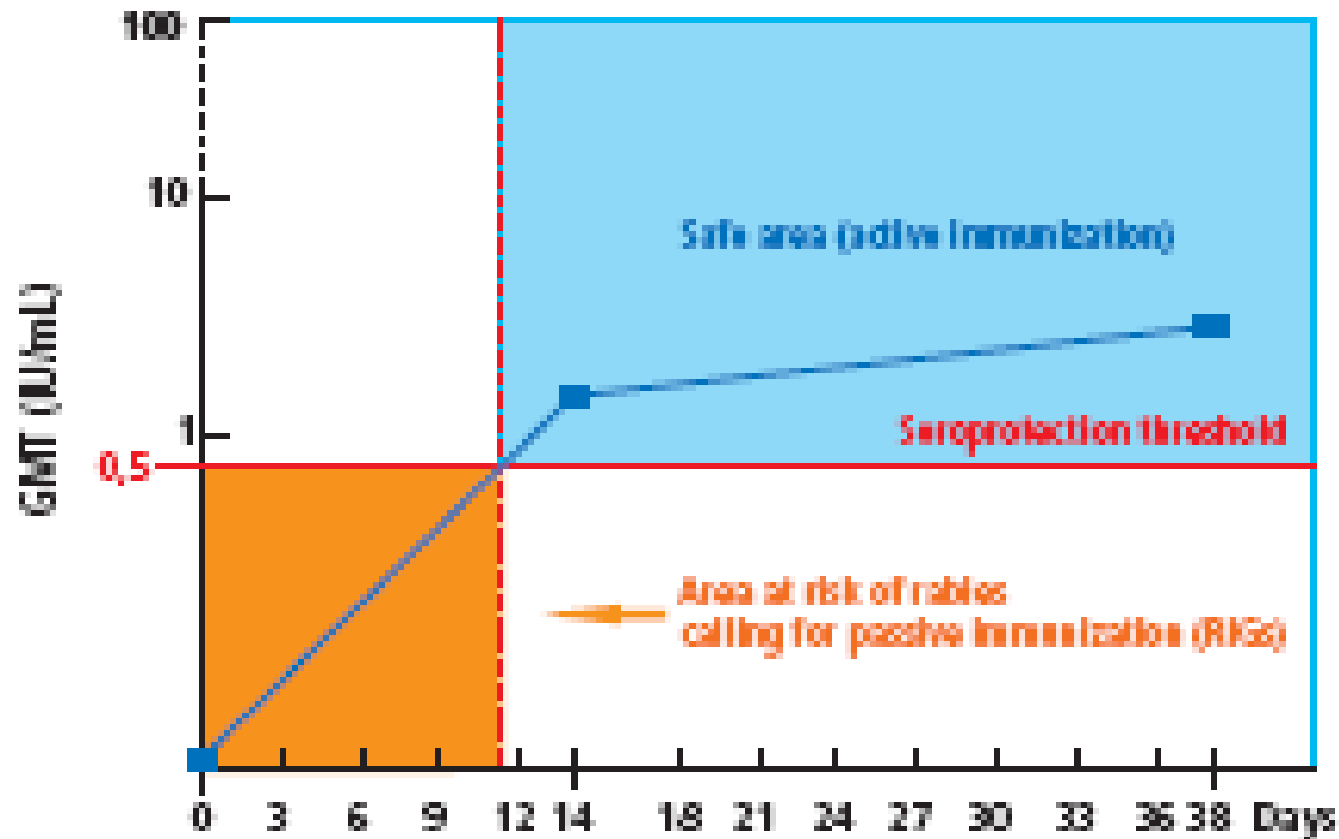
- 1) Finish rest of the rabies vaccination as per schedule
- 2) Give rabies immunoglobulin and finish rabies vaccination as per schedule
- 3) Give rabies immunoglobulin and restart rabies vaccination from 0 dose

Indications for Passive Immunization

- All category III exposures, irrespective of status of biting animal.
- All proven rabid animal bites/exposures.
- **Do not administer 7 days after starting anti-rabies vaccination.**
- Serum is a life saving drug, particularly in immune compromised individuals or in 3rd degree bites where nerve endings are involved

Advantage of passive immunization

Fig 9. Rabies virus neutralizing antibody titres following administration of single doses of vaccine on days 0, 3, 7, 14, 28 (adapted from¹⁴).



Question to the panelists

- Difference between equine and human rabies Immunoglobulin.
- What to prefer?

Case 3

- 34 year old gentleman comes to you with h/o dog bite (unknown dog) **one month back**
- Grade 2 bite in leg
- Patient has received tetanus toxoid

- Do we need to vaccinate?
- Immunoglobulin?

STAGE	DURATION (% OF CASES)	ASSOCIATED FINDINGS
Incubation Period	<ul style="list-style-type: none">➤ 30 d (25%)➤ 30 d – 90 d (50%)➤ 90 d – 1 yr (20%)➤ > 1 yr (5%)	None

Time period of vaccination

- ⦿ Prophylaxis should be instituted whenever exposure is suspected, and it is warranted **regardless of the interval between exposure and presentation.**
- ⦿ Delays in initiating prophylaxis are associated with treatment failure.
- ⦿ Typical incubation periods are between one and three months ; in rare cases, incubation periods are less than two weeks or exceed one year.
- ⦿ **The extent of delay that renders postexposure prophylaxis ineffective is not known.**

Case 4

- A person had a stray dog bite 5 years back and had received the full vaccination schedule.
- He has a cat bite this time.

What would you do?

- 1.Reinitiate the whole vaccine series of 4 doses.
- 2.Give both RIG and Vaccine series.
- 3.Not give any vaccination.
- 4.Give only TT.
- 5.Will give only 0 and 3 days doses.

WHO 2005: Stamp of approval for potency

Rabies post-exposure treatment of previously vaccinated persons

- ◆ Local treatment of wound
- ◆ Vaccination schedule (with vaccines fulfilling WHO requirements)
 - one dose on days 0 and 3. The dose is either 1 standard intra muscular dose (which may be 1 ml or 0.5 ml depending on vaccine type) or one intradermal dose of 0.1 ml per site
 - no RIG should be applied

 - *However full treatment should be given to persons :*
 - who received pre-or post-exposure treatment with vaccines of unproven potency or
 - who have not demonstrated an acceptable rabies neutralizing antibody titer.



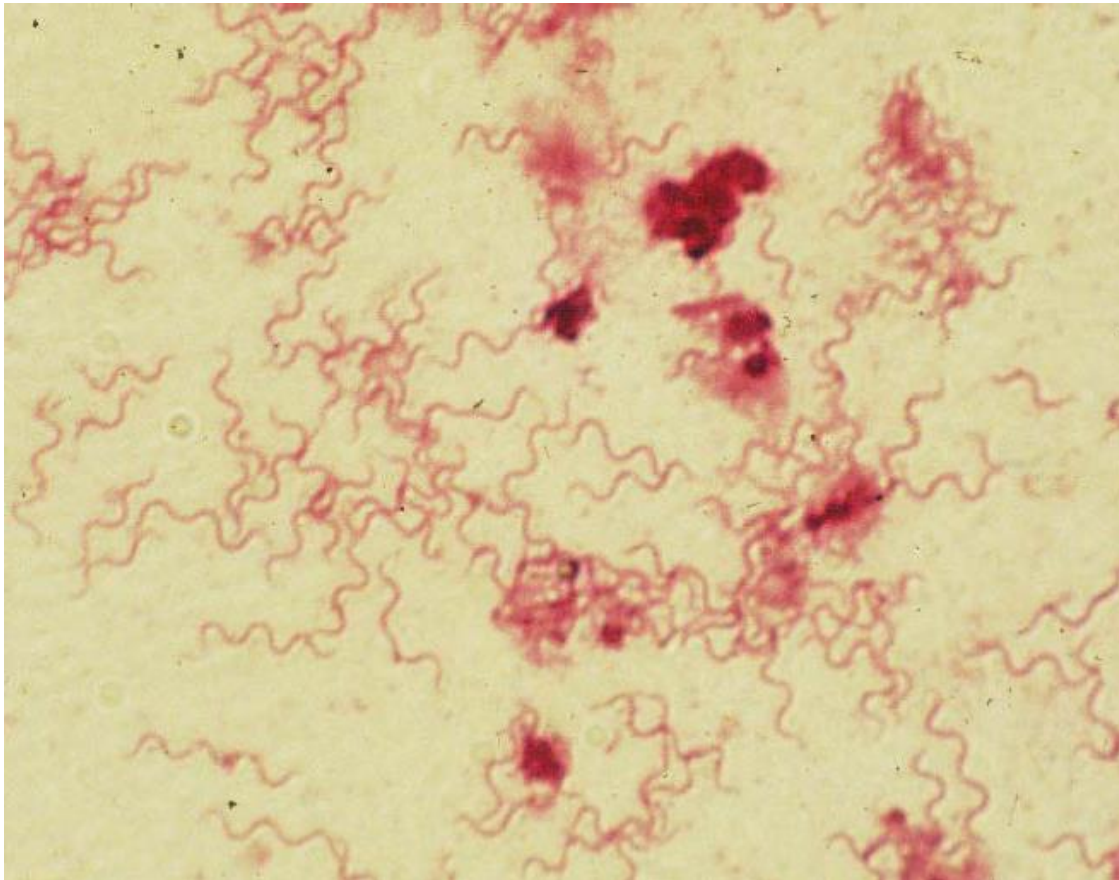
Case 5

- **45 year old male, known case of DCLD, walking on a road, after a rainy day.**
- **He was bitten by a rat.**
- **Minor bleeding.**
- **Now developed fever**
- **What antibiotic would you prefer?**

Rat bite fever

- **Fever, rigors, and polyarthralgias.**
- ***Streptobacillus moniliformis*(USA)**
- ***Spirillum minus*(ASIA)**

Untreated-10% mortality



Streptobacillus moniliformis+*S Minus*

Rat bite fever

- **Diagnosis**
 - Gram or Giemsa stain blood, joint fluid, pus.
 - Culture
 - Serology
 - PCR
- **Treatment**
 - Penicillin , ceftriaxone, clindamycin
 - **Rabies PEP not indicated.**

Question to the panelist

- In which animal bites we can safely avoid rabies vaccine?

Case study 6

- **10 year old girl, while playing with her pet cat, got a scratch in her left hand.**
- **Now presented with history of swelling in the axilla and fever of 5 days.**

Bartonella henselae

Cat Scratch Disease(CSD)

- ⊙ Affect both **normal and immunocompromised** hosts.
- ⊙ 80 % of cases occur in children.
- ⊙ Linked to exposure to cats, especially kitten and cats with fleas. CSD can result from a cat scratch or bite, as well as from a fleabite.
- ⊙ Characterized by **self-limited regional lymphadenopathy near the site of organism inoculation.**
- ⊙ **Occasionally life threatening manifestations (5-14%) include visceral organ, neurologic, and ocular involvement because of the dissemination of organism. In AIDS patients: Bacillary angiomatosis**
- ⊙ Diagnosis : **a positive *B. henselae* antibody titer or a positive Warthin Starry stain or PCR analysis of tissue.** Very difficult to isolate from tissue specimens.

Bartonella henselae

Cat Scratch Disease(CSD)

Treatment

- **Antibiotics are not indicated in most cases** but they may be considered for severe or systemic disease.
- Reduction of lymph node size (no REDUCTION in the duration of symptoms) has been demonstrated with a 5-day course of azithromycin and may be considered in patients with severe, painful lymphadenopathy.
- **Immunocompromised patients should be treated with antibiotics:**
 - Trimethoprim-sulfamethoxazole, Gentamicin, Ciprofloxacin, Rifampin
- B. henselae is generally resistant to penicillin & amoxicillin

Case 7

- A immunocompromised patient is bitten by a dog not rabid comes to ER with high grade fever and blood cultures are growing GNB.
- Most likely organism would be.....



- **Capnocytophaga canimorsus** with sepsis.
- Some of these are betalactamses producers and BL+BLI combination preferred.(Amoxy-clav)

Cat Bites

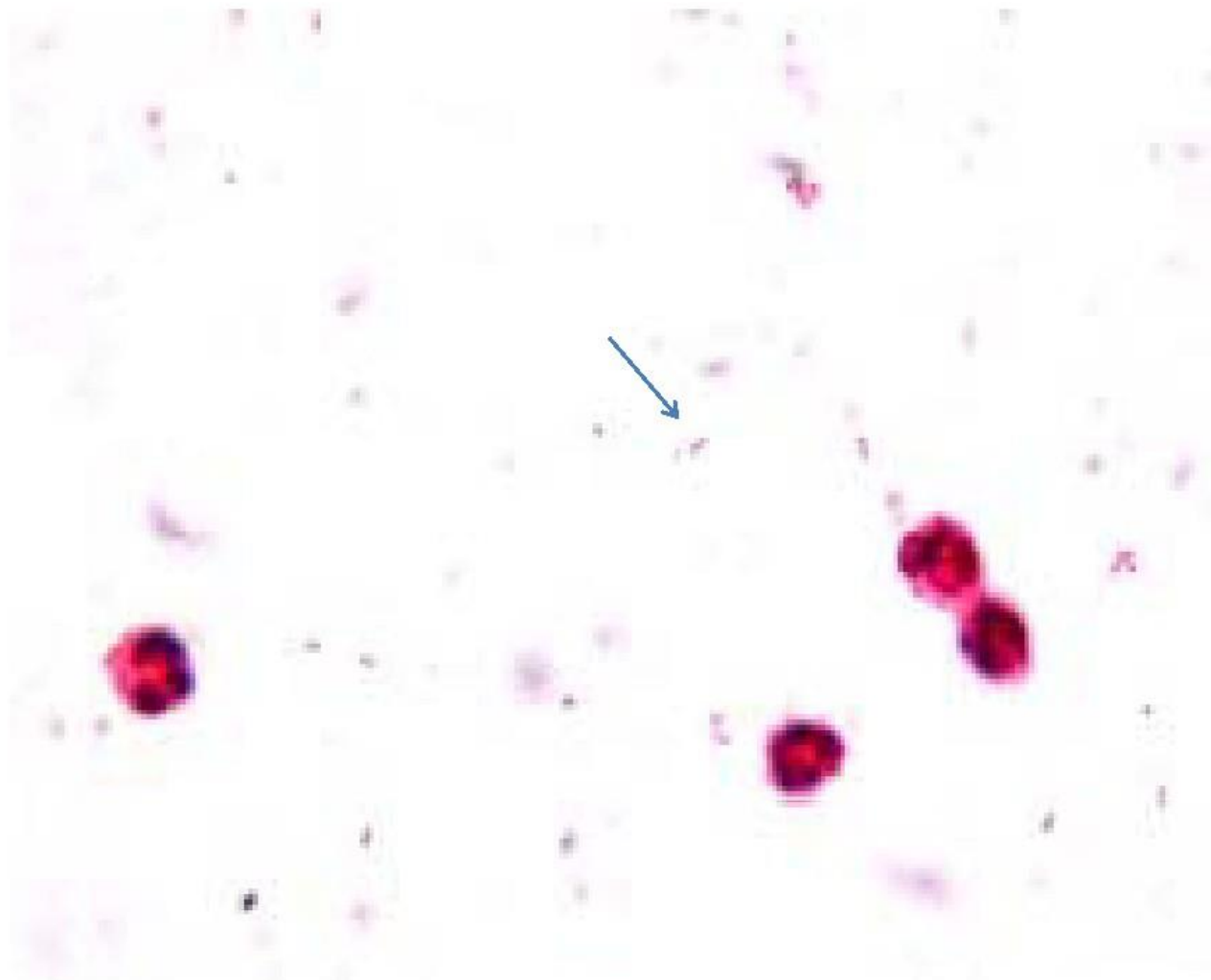


CASE 8

A 44 years female is evaluated in the Emergency room after sustaining a cat bite 2 days ago that has resulted in a tender, red and warm right calf wound.

Radiographs of the distal right lower extremity show no gas or foreign body.

The most likely organism to infect is.....



**Gram-negative, non-spore-forming bacilli consistent with
*Pasteurella multocida***

Pasteurella multocida

Small aerobic GN bacilli

Cause serious infections in immunocompromised host

- Necrotising fasciitis
- Septic arthritis
- Osteomyelitis

● Amoxicillin sensitive.

Case 9

- Couple returning after a movie-drunken driver picks up a fight
- Man gets bitten on the neck and elbow



What will you do now?

- 1. Wash the wounds and take TT**
- 2. Above plus Rabies vaccine**
- 3. Wash, TT, rabies vaccine & antibiotics**
- 4. Option 3 + HBV vaccine**
- 5. Option 4 + HIV PEP**

HIV, HBV infection following human bite

- ◎ **Any unvaccinated patient or individual negative for anti-HBs antibodies who is bitten by an individual positive for HBsAg should receive both hepatitis B immune globulin (HBIG) and hepatitis B vaccine.**
- ◎ **If the source is unknown or not available for testing, the clinician should initiate the hepatitis B vaccine series.**
- ◎ **In addition, although the risk for transmitting HIV through saliva is extremely low, infection is of concern if there is blood in the saliva. Counseling regarding post-exposure HIV prophylaxis is appropriate in this setting.**

Eikenella corrodens

- Anaerobic small GN bacilli
- Common in human oral flora
- Resist to:
 - Cephalexin, Clinda, Erythro, Metronidazole.
- Suscept to:
 - Amoxyclav, FQs, TMP/SMX, Doxy.

Case no 10

- • 22 yr male acute fever, lymphadenopathy, malaise, and dry, non-productive cough 7 days after bitten by a rabbit
- • CXR showed RLL pneumonia, with some findings on LLL
- What is your diagnosis?

Tularemia

- *F. tularensis* can survive in water, soil, and decaying animal carcasses for a long time.
- Tularemia: 6 Presentations

Typhoidal

Pneumonic

Oculoglandular

Oropharyngeal

Ulceroglandular

Glandular

Tularemia / F.Tularensis

- Treatment:
 - Streptomycin 30 mg/kg qd IM for 10-14 days, or gentamicin 3-5 mg/kg qd IV for 10-14 days.

Case 11

- A fisherwoman comes with a swollen thumb had accidental injury while handling the fish.
- What is the most likely organism?

Erysipelothrix rhusiopathiae



Antibiotics

- Pen V
- Amoxicillin
- Cipro/levo
- Clinda
- Resistant to Vanco and TMP-SMX

Summary

- Wash the wound thoroughly with soap and water for 10- 15 minutes.
- Do not bandage.
- Do not suture.
- Tetanus vaccination
- Rabies vaccination only for 2nd degree and RIG and vaccination for 3rd degree wounds.
- Amoxy-clav. for 3rd degree wounds.
- Wound care is most important
- If unavoidable, you can suture
- No time period for vaccination

	Wound	Antibiotics	Rabies	TT	Others
Dog	Yes	+/-	Yes	Yes	Capnocytophaga
Cat	Yes	+/-	Yes	Yes	Pasturella/ Bartonella
Rat	Yes	+/-	No	Yes	S. minor
Monkey	Yes	+/-	Yes	Yes	Hepes B virus
Human	Yes	+/-	No	Yes	HIV/HBV

Thank you