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Toe Gangrene Revealing Septicaemical Rat-bite Fever: About a 41 Day Old Infant

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Authors' contributions

This work was carried out in collaboration among all authors. Authors OB and SB designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors FB, NE, AA and CM managed the analyses of the study. Author OB managed the literature searches. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Rat-bite fever (RBF) is a systemic infectious disease. It is due to *Streptobacillus moniliformis*, a commensal bacterium of the nasopharyngeal mucosa of small rodents, in particular rats. This anthropozoonosis is rare in urban areas. The first clinical sign of infection is a fever, followed by polyarthritis and a rash. It can only start with skin signs, as in our observation. We report the case of a 41-day-old female infant who was the victim of a rat bite at one month of life in the upper nasal and labial areas. A rabies vaccine with local care has been made. The clinical course at 3 days after the bite was marked by a non-pruritic papulopustular rash, the vesiculo-bullous lesions in the bilateral and symmetrical legs evolved into inflammatory ulcerative necrotizing lesions in a geographic map of the lower 1/3 of the lower limbs with gangrenous lesions in the toes, an erythematous base on the face, hands and feet and discreet oral erosions, associated with generalized purpuric spots and fevers at 40°C. The biological assessment was carried out objectifying an inflammatory syndrome made of a leukocytosis at 26770/mm^3, with neutrophils at 10842/mm^3, CRP = 215 mg/L. The diagnosis of RBF was made by the isolation of a Gram-negative bacillus in a blood culture. The final identification of the germ was carried out by

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molecular biology (PCR of 16S rRNA). The lumbar puncture was negative and the cardiac ultrasound was without abnormality. Arterial and venous Doppler ultrasound of the lower limbs was normal. The diagnosis of rat bite fever having been retained. The infant was put on cefpodoxime IV for 3 weeks and metronidazole IV for 10 days. The clinical course at 3 months later, spontaneous amputation of gangrenous toes with residual skin scars was noted.

Keywords: Rat-bite fever; Streptobacillus moniliformis; anthropozoonosis; zoonotic infection.

1. INTRODUCTION

Rat bite fever (RBF) is a rare zoonotic infection caused by the gram-negative bacilli *Streptobacillus moniliformis* and *Spirillium minus* [1,2]. These bacteria are part of the commensal flora of domestic rats [3]. We report the case of an infant who suffered a rat bite and was admitted for a Rat bite fever.

2. CLINICAL CASE

We report the case of a 41-day-old female infant who was the victim of a rat bite at one month of life in the upper nasal and labial areas. A rabies vaccine with local care has been made. The clinical course at 3 days after the bite was marked by a non-pruritic papulopustular rash, the vesiculo-bullous lesions in the bilateral and symmetrical legs evolved into inflammatory ulcerative necrotizing lesions in a geographic map of the lower 1/3 of the lower limbs with gangrenous lesions in the toes (Fig. 1), an erythematous base on the face, hands and feet and discreet oral erosions, associated with generalized purpuric spots and fevers at 40°C. The biological assessment was carried out objectifying an inflammatory syndrome made of a leukocytosis at 26770/mm^3, with neutrophils at 10842/mm3, CRP = 215 mg/L. The diagnosis of RBF was made by the isolation of a Gram-negative bacillus in a blood culture. The final identification of the germ was carried out by molecular biology (PCR of 16S rRNA). The lumbar puncture was negative and the cardiac ultrasound was without abnormality. Arterial and venous Doppler ultrasound of the lower limbs was normal. The diagnosis of rat bite fever having been retained. The infant was put on cefpodoxime IV for 3 weeks and metronidazole IV for 10 days. The clinical course at 3 months later, spontaneous amputation of gangrenous toes with residual skin scars was noted (Fig. 2).

3. DISCUSSION

Following the inoculation of the pathogen, the incubation period of *S. moniliformis* is usually less than seven days, but varies from three days to three weeks, which is observed in our case [4]. RBF is usually characterized by overt symptoms such as fever, chills, rash, and polyarthralgia [5,6]. Other symptoms may include fatigue, vomiting, myalgia, headache and pharyngitis. As the symptoms are non-specific and variable, the clinical diagnosis of FMR is often not established if the history of exposure to rodents is not known [7,8,9,10]. The clinical picture of *S. minus* infections is slightly different, characterized by induration and possible ulceration at the bite site and associated lymphadenopathy after an incubation period of 14-18 days [4].

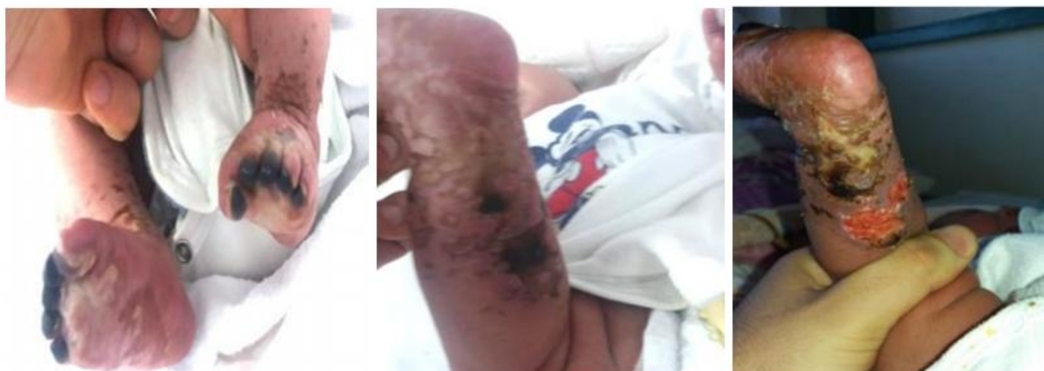

Fig. 1. Ulcerative necrotizing lesions with gangrenous lesions in the toes

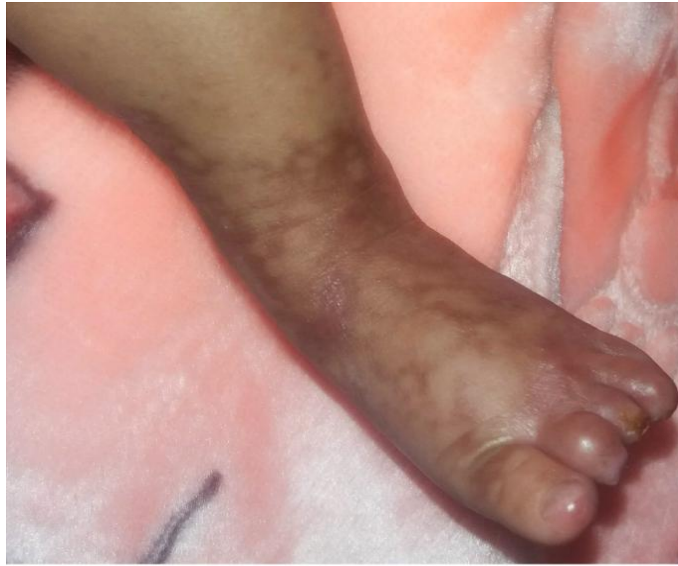

Fig. 2. Amputation of gangrenous toes with residual skin scars

Complications of untreated FMR include the onset of myocarditis, pericarditis, meningitis, amniotitis and abscess in various organs, as well as death in up to 13% of cases [11,12,13, 14]. The diagnosis of FMR in the microbiology laboratory is often difficult to establish and delayed due to the complex nature of the bacilli *S. moniliformis* and *S. minus* [1,4]. The culture of microorganisms is slow and their growth can be inhibited by substances present in the culture medium. Fortunately, microorganisms are usually sensitive to a variety of antibiotics, including beta-lactams, clindamycin, erythromycin, and tetracycline [3,4]. Among these, the recommended treatment is penicillin [15].

4. CONCLUSION

Rat bite fever is relatively rare, but diagnosis is essential because simple antibiotic treatment (penicillin) can prevent life-threatening complications.

CONSENT

As per international standard, patient's parents written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per university standard guideline, ethical approval have been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Dendle C, Woolley IJ, Korman TM. Rat-bite fever septic arthritis: Illustrative case and literature review. Eur J Clin Microbiol Infect Dis. 2006;25(12):791–7.
   DOI:https://doi. org/10.1007/s10096-006-0224-x. PubMed
   Avaiable:https://www.ncbi nlm.nih.gov/pubmed/17096137?dopt=Abstract
2. Suzuki K, Hirai Y, Morita F, Nakamura A, Uehara Y, Naito T. *Streptobacillus moniliformis* bacteremia in a pet shop employee: Case report and literature review. Open Forum Infect Dis. 2017;4 (2):ofx038.
   DOI:https://doi.org/10.1093/ ofid/ofx038. PubMed
   Available:https://www.ncbi.nlm.nih.gov/ pubmed/28730157? dopt=Abstract)
3. Centers for Disease Control and Prevention (CDC). Rat-bite fever--New Mexico. MMWR Morb Mortal Wkly Rep. 1998;47 (5):89–91.
   Available:https://www.ncbi.nlm.nih.gov/ pubmed/28730157?dopt=Abstract

4. Elliott SP. Rat bite fever and *Streptobacillus moniliformis*. Clin Microbiol Rev. 2007;20 (1):13–22.
DOI:https://doi.org/10.1128/ CMR.00016-06
Available:https://www.ncbi.nlm.nih.gov/pubmed/17223620?dopt=Abstract
5. Graves MH, Janda JM. Rat-bite fever (*Streptobacillus moniliformis*): A potential emerging disease. Int J Infect Dis. 2001; 5(3):151–5.
DOI:https://doi.org/10.1016/S1201-9712(01)90090-6
Available:https://www.ncbi.nlm.nih.gov/pubmed/11724672?dopt=Abstract
6. Hirschhorn RB, Hodge RR. Identification of risk factors in rat bites incidents involving humans. Pediatrics. 1999;104(3):e35.
DOI:https://doi.org/10.1542/peds.104.3.e35
Available:https://www.ncbi.nlm.nih.gov/pubmed/10469818? dopt=Abstract
7. Centers for Disease Control and Prevention (CDC). Fatal rat-bite fever - Florida and Washington, 2003. MMWR Morb Mortal Wkly Rep. 2005;53(51):1198–202.
Available:https://www.ncbi.nlm.nih.gov/pubmed/15635289?dopt=Abstract
8. Ordog GJ, Balasubramanium S, Wasserberger J. Rat bites: Fifty cases. Ann Emerg Med. 1985;14(2):126–30.
DOI:https://doi.org/10.1016/S0196-0644(85)81073-8
Available:https://www.ncbi.nlm.nih.gov/pubmed/3970397?dopt=Abstract
9. Eisenberg T, Ewers C, Rau J, Akimkin V, Nicklas W. Approved and novel strategies in diagnostics of rat bite fever and other *Streptobacillus* infections in humans and animals. Virulence. 2016;7(6):630–48.
DOI:https://doi.org/10.1080/21505594.2016.1177694
Available:https://www.ncbi.nlm.nih.gov/pubmed/27088660? dopt=Abstract
10. Ojukwu IC, Christy C. Rat-bite fever in children: Case report and review. Scand J Infect Dis. 2002;34(6):474–7.
DOI:https://doi.org/10.1080/003655402320170345
Available:https://www.ncbi.nlm.nih.gov/pubmed/12160180?dopt=Abstract
11. Carbeck RB, Murphy JF, Britt EM. Streptobacillary rat-bite fever with massive pericardial effusion. JAMA 1967 Aug;201(9):703–4.
DOI:https://doi.org/10.1001/jama.1967.03130090067024
Available:https://www.ncbi.nlm nih.gov/pubmed/5340333?dopt=Abstract
12. Faro S, Walker C, Pierson RL. Amnionitis with intact amniotic membranes involving *Streptobacillus moniliformis*. Obstet Gynecol. 1980;55(3 Suppl):9S–11S.
DOI:https://doi.org/10.1097/00006250-198003001-00003
Available:https://www.ncbi.nlm.nih.gov/pubmed/7360458?dopt=Abstract
13. Tattersall RS, Bourne JT. Systemic vasculitis following an unreported rat bite. Ann Rheum Dis. 2003;62(7):605–6.
DOI:https://doi.org/10.1136/ard.62.7.605
Available:https://www.ncbi.nlm.nih.gov/pubmed/12810419?dopt=Abstract
14. Kondruweit M, Weyand M, Mahmoud FO, Geissdörfer W, Schoerner C, Ropers D, Achenbach S, Strecker T. Fulminant endocarditis caused by *Streptobacillus moniliformis* in a young man. J Thorac Cardiovasc Surg. 2007;134(6):1579–80.
DOI:https://doi.org/10.1016/j.jtcvs.2007.08.010
Available:https://www.ncbi.nlm.nih.gov/pubmed/18023687?dopt=Abstract
15. Vetter NM, Feder HM, Ratzan RM. Rat bite fever caused by a kiss. Am J Emerg Med. 2016;34(6):1190.e3-4.
DOI:https://doi.org/10.1016/j.ajem.2015.11.051
Available:https://www.ncbi.nlm.nih.gov/pubmed/26698680

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