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Rhipicephalus sanguineus sensu lato (Ixodida: Ixodidae) attached to the ear canal and tympanic membrane of two children from Panama

Authors: Sergio E. Bermúdez[1,2,*], Joan Morales[3], Antonio Córdoba[3], Carlos Daza[3,#]

Abstract

In May 2022 and August 2022, two children, ten and 8-years old, respectively, were attended for foreign body sensation, pain, and discomfort in their ears. During the evaluation of the first case, a tick attached to his tympanic membrane was observed, whilst three ticks were evidenced in the ear canal and membrane tympanic of case 2. Ticks were identified as *Rhipicephalus sanguineus* sensu lato. Both patients came from urban places in the Chiriqui province, and ticks were found in their dogs. Moreover, additional clinical considerations of these cases and the relative importance of *R. sanguineus* s.l. are addressed.

Key word: pediatric otorhinolaryngology, ear-canal, tympanic membrane, *Rhipicephalus sanguineus* s.l., Chiriquí, Panamá.

[1]Departamento de Investigación en Entomología Médica, Instituto Conmemorativo Gorgas de Estudios de la Salud, Ciudad de Panamá, Panamá.

[2]Programa de Desarrollo de las Ciencias Básicas (PEDECIBA), Universidad de la República, Salto, Uruguay.

[3]Hospital Materno Infantil José Domingo De Obaldía, David, Chiriquí, Panamá.

[*]https://orcid.org/0000-0003-1830-3133, [#]https://orcid.org/0000-0002-3063-7788

Corresponding author:
Sergio E. Bermúdez
Address: Avenida Justo Arosemena y Calle 35, Panamá 0816-02593. Teléfono: +507 527 4894.
E-mail: sbermudez@gorgas.gob.pa

Carlos Alberto Daza Timana
Address: David, Chiriquí, Panama, San Pablo Viejo, Inter-American Highway. Teléfono: +507 66137943.
E-mail: carlosadazat@gmail.com

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Introduction

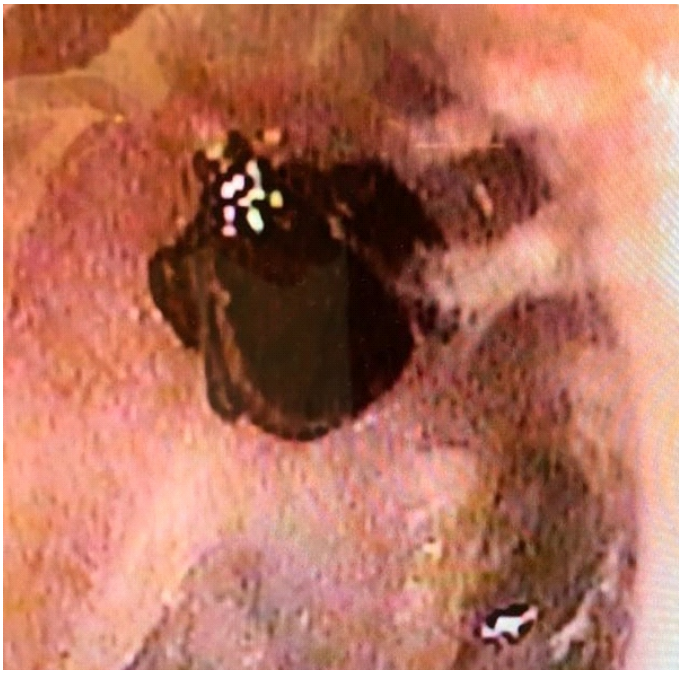
Ticks are considered a threat to global public health due to their capacity to transmit a diverse group of pathogens to humans and animals, as well as the damage that can be produced by their bites, such as irritation, toxicosis, paralysis, or allergic reactions(1). These damages may be more severe and cause greater discomfort depending on the number of ticks or the attachment site in the person. Consequently, tick-bites in eyelids, nostrils, and ears are usually more annoying than those that occur in other body regions(2,3). In the case of the ears, ticks can be found in the ear canal or in the tympanic membrane, where acute pain, vertigo, tinnitus, or even some bleeding can be observed, and these symptoms usually disappear with tick removal. However, in some cases, tick bites can lead to complications, such as tympanic membrane rupture, facial paralysis related to the tick's neurotoxins, or secondary infections(1,2,4). Therefore, effective clinical management of tick-bites in this anatomical region is important to guarantee patient welfare and prevent further problems(5).

In this manuscript, we report the finding of ticks attached to the ears of two children treated at Hospital Materno Infantil José Domingo De Obaldía (HMIJDO) of David City, Chiriquí province, Panama, and we revised literature about this subject.

Clinical Cases

Case 1: In May 2022 a 10-year-old boy was brought by his parents for an otorhinolaryngology pediatric evaluation. The patient reported a foreign body sensation in the right ear with discomfort, slight pain, and a feeling that something was moving inside in the last two days. Fever, vestibular or auditory symptoms were absent. An endoscope was used to look inside the ear and one tick attached to the tympanic membrane was observed. (Fig. 1). To avoid more discomfort at the time of tick removal, a topical 2.5% lidocaine solution was sprayed into the ear; the tick was removed with a suction cannula. Subsequently, some erythema and edema were present but no ear secretions were found. During the anamnesis, the patient's parents reported that the boy had dogs and slept with them. Additional observations no show complications after the extraction of the tick.

Figure 1
Rhipicephalus sanguineus sensu latu female biting a 10-years old boy in the tympanic membrane (Authorship: Antonio Córdoba)



Case 2: In August 2022, an 8-year-old girl was brought by her parents to pediatric care for a feeling of discomfort, slight pain, and the presence of a foreign body in the left ear for the last day. No other symptoms were observed. All laboratory test results were normal, including complete blood count, erythrocyte sedimentation rate, C-reactive protein, creatinine, and transaminases. During the ear checking, three ticks were observed, and one could be removed by ear washing, while the others were extracted with tweezers. Additionally, her parents mentioned that the patient had a dog, which had been treated three days before with afoxolaner and milbemycin oxime to control external and internal parasites. She underwent a follow-up on-call on the fifth day, where she underwent mentioned as asymptomatic.

In the Medical Entomology Research Department of the Gorgas Memorial Institute for Health Studies, the ticks from both cases were identified as a *Rhipicephalus sanguineus* sensu lato (s.l.), according to Bermúdez et al. (6). In case 2, although the girl did not present additional symptoms that would suggest any febrile illness attributable to tick parasitism, ticks was bisected longitudinally using sterile scalpels and washed with distilled water to remove ethanol. Half of this tick was processed by a set of tick-borne pathogens primers, according to procedures described by Bermúdez et al. (7) for Rickettsial bacteria. No Rickettsial DNA was detected in this tick. Tick's DNA is deposited in the Department of Research Surveillance and Biological Risk of the Gorgas Memorial Institute for Health Studies, and the rest of the tick is deposited in the Ectoparasite Collection of the "Dr. Eustorgio Méndez" Zoological Collection of Gorgas Memorial Institute. Considering the importance of the findings, the parents of both children were asked about the possibility of publishing the data, ignoring the names and addresses of the patients, a fact that was accepted in both cases.

Discussion

Ticks parasitizing human ears have been reported worldwide, although most reports have been in Asia. According to Indudharan et al.(2), Dilrukshi et al.(4), and Ariyarathne et al.(9), children were the group most affected by tick bites in their ears in Malaysia and Sri Lanka. Authors describe that children may be more exposed to playing with pets or sleeping with them, but also when doing outdoor activities. In this age range, to avoid damage or inopportuneness during the extraction of the ticks, in some cases, the patients must be under local or general anesthesia, and tick removal must be performed with surgical equipment(10). Anesthesia like lidocaine has been required for its anesthetic effect on the bite site inside the ear(2,10). In our case, the use of lidocaine was necessary for in case 1.

In general, communication with parents is essential for pediatric cases to verify warning signs such as fever, malaise, altered alertness, convulsions, or paralysis. In our cases, these communications were essentials to check for local signs associated with the ticks-bite site. Likewise, other important questions can help understand each situation, which is critical for establishing prevention plans. In these cases, the anamnesis revealed that the children maintained close contact with their dogs, which allowed the ticks to adhere to them, especially after the pet received antiparasitic treatment, as in case 2. With this information, it was possible to provide patients and their parents with information on risk factors for exposure to ticks, which vary according to the behavior of each species.

Several species of ticks have been reported in human ears worldwide(8,9). Even so, ear parasitism is not restrictive behavior in these species; in fact, *Otobius megnini* is considered a true parasite of the mammalian ear canal(11). As expected, the species of ticks that parasitize humans will depend on the distribution and behavior of each species. For example, species such as *Amblyomma integrum, Dermacentor auratus* or *Rhipicephalus haemaphysaloides*, were reported among the most common species in human ears in Sri Lanka(2,4), and there are reports of Dermacentor variabilis parasitizing human's tympanic membrane in the United States(10,12). These species are exophilic, so the risk of contact is related to outdoor activities. In our cases, *R. sanguineus* s.l. is a synanthropic, endophilic, and intradomiciliary species; consequently, the risk of exposure occurs inside the houses that inhabit rural and urban localities(13).

Rhipicephalus sanguineus s.l. corresponds to ticks morphologically and genetically close to *R. sanguineus* sensu stricto and are also known as *R. sanguineus* tropical lineage because of their distribution in tropical areas in the Old and New Word(14). In America *R. sanguineus* s.l. is the vector of pathogens in dogs as *Babesia vogeli* (canine babesiosis), Anaplasma canis (canine cyclic trombocytopenia), and *Ehrlichia canis* (tropical canine pancitopenia ehrlichiosis), and

are also implicated in the transmission of Rickettsia rickettsii (Rocky Mountain Spotted Fever) and other rickettsiosis to humans(13). These ticks can also cause problems such as irritation or pain, which requires treatment aimed at controlling local effects.

In Panama, *R. sanguineus* s.l. inhabit mainly lowlands below 1000 meters of elevation(15,16). Like other countries in the region, Panama is endemic for canine ehrlichiosis and canine anaplasmosis(17). Furthermore, the reports of parasitism in humans from Panama are not unusual(18,19), and its potential role as a vector of human pathogens has been discussed in the transmission of R. rickettsii spotted fever(20,21), and canine ehrlichiosis in a boy cared at HMIJDO(22). One aspect to consider in avoiding contact with humans after antiparasitic treatments in dogs is proper cleaning of the houses, especially external and internal walls, as well as furniture, to eliminate the non-parasitic phases.

Conclusion

Although parasitism inside the ears may be unusual in humans, clinicians should be aware of foreign bodies in their patients, especially in children. The timely management of both cases minimizes patient discomfort and avoids major injuries. In our cases, the parasitism of *R. sanguineus* s.l. is attributed to household pets, but other species of ticks could affect patients' hearing under other environmental conditions.

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Author Contributions

The authors confirm their contribution to the paper as follows: **Study conception and design**: Sergio Bermúdez, Carlos Daza; **data collection**: Joan Morales, Antonio Córdoba; **analysis and interpretation of results**: Sergio Bermúdez, Carlos Daza, Antonio Córdoba, Joan Morales; **draft manuscript preparation**: Sergio Bermúdez, Carlos Daza.

All authors reviewed the results and approved the final version of the manuscript. All authors agreed to be responsible for all aspects of the work to ensure the accuracy and integrity of the published manuscript.

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Conflicts of interest

All authors declare that they have no conflicts of interest.

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