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A Case of Human Infestation with the Hard Tick *Ixodes ovatus* in Okayama, Japan (Acarina : Ixodidae)

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ABSTRACT. A case of human infestation with hard tick was reported. The tick was found on skin surface of right shoulder region of 59-year-old woman, and the tick body (ideosoma) measured 5.5 mm in length and 4.5 mm in maximum width without capitulum. On acarological observations the tick was identified with an adult female of *Ixodes ovatus* Neumann, 1899 based on the morphogical characters of scutum, coxae and spiracular plate. In this case, the tick bites resulted wounds when the patient went out to mountain area. To our best knowledge this is the first case of human infestation with the hard tick in Okayama Prefecture, Japan.

Although the hard ticks (Ixodidae) are ectoparasites mainly of wild mammals, avians and reptiles, they are occasionally parasitic on humans, and suck out blood of the hosts. It is well known that the hard ticks communicate various kinds of microbiological diseases to man, such as tick encephalitis, haemorrhagic fevers, Colorado tick fever, Q fever, Rocky Mountain spotted fever, relapsing fever, tularemia, the tick's bite and others.

In Japan, the human infestation with the hard ticks have hitherto been reported in literatures accumulating over 100 cases of which about 50 cases were cutaneous diseases caused by *Ixodes ovatus* Neumann, 1899. The authors wished to report human infestation with *Ixodes ovatus* found in Okayama Prefecture together with some bibliographical considerations.

REPORT

The patient (S.O.) was a 59-year-old woman who living in Yunogo, Aida County, Okayama Prefecture, Japan. On June 5th 1981 the patient first noted the presence of urtication on skin surface of her right shoulder region with mild itching. On the following day the patient was diagnosed of melaniferous tumor by a local physician, and was recommended to have close dermatological examination. Then she visited us on June 12th.

The cutaneous findings of the patient are confined to the right shoulder

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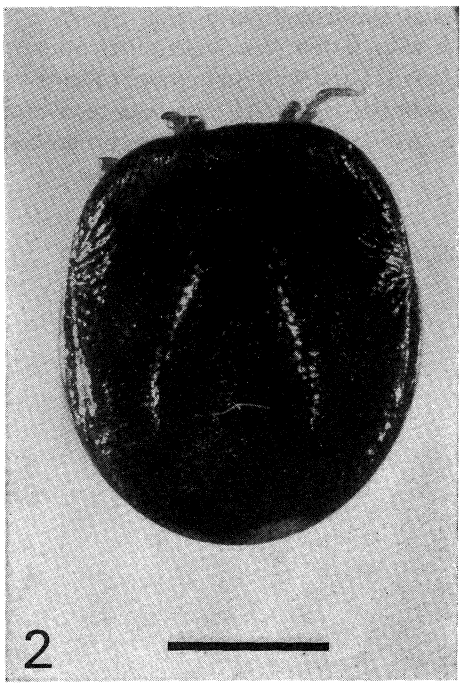
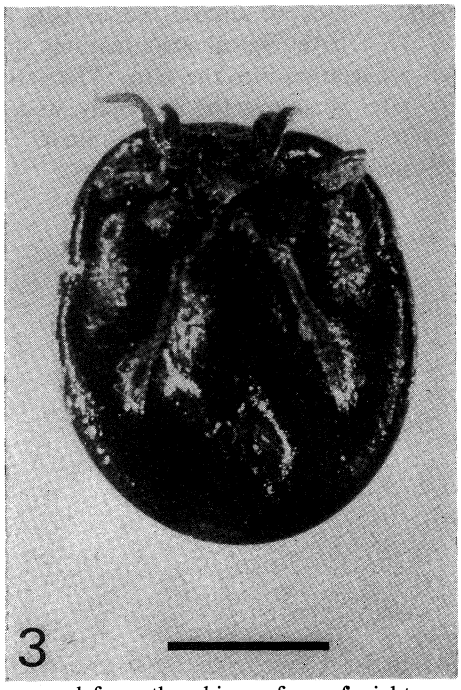
region in which were edematous erythema, size of a chicken egg. The lesion was elevated slightly from the skin surface and red thumb-sized induration was noted. A black particle (tick body) somewhat similar to a watermelon stone (Fig. 1) found on the top was removed easily from the skin surface with a forceps.

Fig. 1. Clinical picture of tick bite, right shoulder region of the patient.

The removed tick body was glossy and prussian blue in color and the body was found contaminated with the blood of the patient. The ideosoma of the tick body measured 5.5 mm in length and 4.5 mm in maximum width, and about 3.0 mm in thickness (Figs. 2 and 3). The tick body had the capitulum and lacked some part of the legs with some reason. However, the tick was identified with an adult female of *Ixodes ovatus* Neumann, 1899 from the morphological





Figs. 2–3. Adult female of *Ixodes ovatus* removed from the skin surface of right shoulder region of the patient (Scale=2mm), dorsal view (2) and ventral view (3).

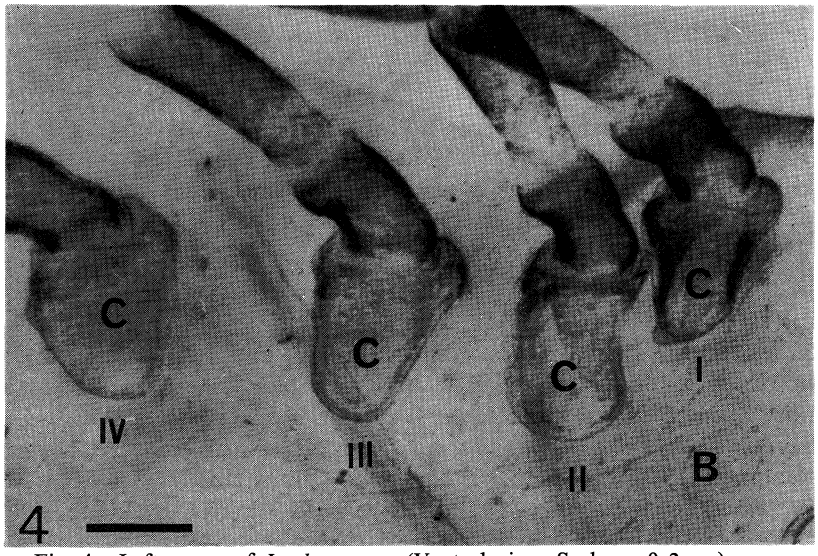


Fig. 4. Left coxae of *Ixodes ovatus* (Ventral view, Scale = 0.2mm).
I : leg I, II : leg II, III : leg III, IV : leg IV, C : coxa, B : tick body (ideosoma).

characteristics of scutum, coxae (Fig. 4) and spiracular plate (Fig. 5).

Histopathological examinations of the skin lesion revealed no indication of tick penetration into the skin. The patient was treated with an ointment Rinderon VG after removing the tick body, and the skin lesion by tick bite was recovered within a week after the treatment. The patient's condition has progressed satisfactory to complate recovery.

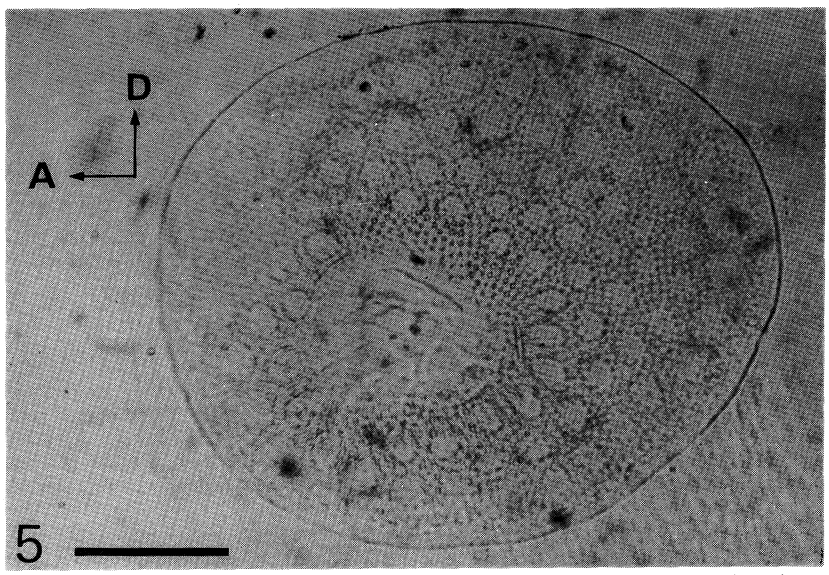


Fig. 5. Right spiracular plate (Scale=0.08mm). A : anterior, D : dorsal.

The patient on the other hand, was not able to recall an exact date of accident occurred, but the authors suspected that it must happened on June 4th, 1981. The tick body was preserved as a whole mount specimen after the external observations under the unfixed condition.

DISCUSSION

As mentioned human infestation with the hard ticks (Ixodidae) is not frequent phenomenon in Japan. The hard tick bites on human body by 10 species have been reported namely, *Argas vespertiliosus* kishida, 1927, *Amblyomma testudinarium* koch, 1844, *Boomphilus microplus* (Canestrini, 1888), *Haemaphysalis flava* Neumann, 1899, *H. longicornis* Neumann, 1901, *Ixodes acutitarsus* (Karsch, 1880), *I. monospinosus* Saito, 1967, *I. nipponensis* Kitaoka and Saito, 1967, and *I. persulcatus* Schulze, 1930 and the present case by *I. ovatus* Neumann, 1899.

Human infestation of *Ixodes ovatus* in Japan was first found by Kamimura and Kondo[1] in Ishikawa Prefecture. Since then about 50 cases have been

TABLE I. Human cases of *Ixodes ovatus* infestation reported in Japan

Case No.	Examined date	Locality (Prefecture)	Patient age	Patient sex	Lesion site	Author (year)
1.	May 1972	Akita	2	female	upper eyelid	Takada and Yamaguchi (1974)
2.	〃 〃	〃	4	male	〃 〃	
3.	Aug. 〃	Aomori	2	female	auricula	
4.	Mar. 1973	〃	3	male	upper eyelid	
5.	Jun. 〃	〃	44	female	?	
6.	? 〃	Fukushima	56	male	left cheek	Hashimoto (1974)
7.	May 1974	Toyama	12	female	ear lobe	Kondo et al. (1976)
8.	Jun. 1975	〃	14	〃	upper eyelid	
9.	Jul. 〃	Aomori	29	〃	left ear lobe	Takada et al. (1976)
10.	May 1972	Akita	2	male	right upper eyelid	Sakai et al. (1976)
11.	〃 〃	〃	3	female	right lower eyelid	
12.	Apr. 1971	Ishikawa	68	male	left upper eyelid	Kamimura and Kondo (1977)
13.	May 1975	Shizuoka	27	〃	right upper eyelid	Honda and Honda (1977)
14.	? ?	?	29	female	ear lobe	Fujita and Takada (1977)
15.	〃 〃	〃	20	male	forearm	
16.	〃 〃	〃	〃	〃	〃	
17.	〃 〃	〃	〃	〃	〃	
18.	〃 〃	〃	〃	〃	〃	
19.	〃 〃	〃	〃	〃	〃	
20.	〃 〃	〃	29	〃	〃	
21.	〃 〃	〃	〃	〃	neck	
22.	〃 〃	〃	19	female	〃	
23.	〃 〃	〃	〃	〃	chest	
24.*	Jul. 1976	Tokyo	75	〃	left upper eyelid	Ishibashi (1977)
25.	Jun. 1977	Tochigi	4	male	〃	Fukuzaki et al. (1978)
26.	Jul. 1976	Miyagi	26	〃	right scrotum	Sugiura and Maumi (1978)
27.	Aug. 1975	Mie	33	〃	upper right chest	Kumada et al. (1978)
28.	Jun. 1981	Niigata	26	female	?	Takada et al. (1978)
29.	〃 1976	Akita	27	〃	neck	
30.	Sept. 〃	〃	child		head	
31.	? ?	Miyagi	35	female	right upper eyelid	Hara et al. (1979)
32.	Aug. 1977	Saitama	60	male	right ear lobe	Tsunoda and Takino (1980)
33.	May 1975	Yamanashi	42	female	neck	Yamaguchi and Takada (1981)
34.	Jul. 〃	Hokkaido	58	male	head	
35.	Aug. 1976	Yamagata	59	〃	shoulder	
36.	〃 〃	〃	22	female	abdomen	
37.	Sept. 〃	Tokyo	24	male	shoulder	
38.	Aug. 1977	Kanagawa	17	〃	neck and chest	
39.	May 1978	Aomori	50	female	eyelid	
40.	Sept. 〃	Hokkaido	24	male	hip	
41.	May 1979	Akita	66	〃	eyelid	
42.	Jun. 〃	Gunma	76	〃	right eyelid	
43.	Aug. 〃	Aomori	?	〃	forearm	
44.	Jun. 1980	〃	?	female	shoulder	
45.	Aug. 〃	Kanagawa	8	male	left under eyelid	
46.*	Jun. 〃	Tokyo	13	female	chest	Kitamura and Iwashige (1981)
47.	Aug. 1981	Kanagawa	60	〃	left under eyelid	Ishida et al. (1981)
48.	Jun. 1981	Okayama	59	〃	right shoulder	Present authors

* Detailed data of the patient are quoted from a paper by Yamaguchi and Takada (1981).

reported as shown in Table I. Sakai et al.[2] have reported that tick bites occur mainly in secluded and inconveniently situated locations among mountain area, so that the victims may be unaware of accidents because of weak symptoms, or the patients may treat themselves and visiting no doctors. The present authors agree with this view. The authors are also anxious that the specialists should report when they confirm patients with tick bites at any time.

As shown in Table I, human cases of *I. ovatus* infestation are distributed widely in areas east of Kaoto and Tokai districts, and the highest incidence of infestation occur mainly in Aomori[3,4,5] and Akita[2,3,5,6] prefectures. On the contrary it is interested from the fact that there are only cases reported including the present case in the western Japan.[7] All of the victims were found in ages between 2 and 76 years old, and the highest incidence occurred in the age group of 20 years old. The distribution of sex of the victims is observable tendency to occur often in men than in women.

Moreover, the human cases of *I. ovatus* infestation are of frequent occurrence in the 4 month period of May to August. This fact gives additional interest that frequency of outdoor activities of humans seems to coincide with the activation period of the hard ticks.

It is well known that the ixodid ticks are concoealed oneself under brushes and leaves, and they attach themselves to the wild mammals, avians and humans wherever occasion offered. Adult females of the ixodid tick lay eggs on ground surface after full sucking of host blood. The individuals in the all developmental stages such as larva, nymph as well as adult have tendency to suck animal blood. According to Yamaguchi et al.,[8] larvae of *I. ovatus* are parasitic on the skin surface of relatively small animals such as rabbit, meadow mouse whereas adult females are parasitic to horse and dog. In case of human, the ticks generally remain on the host for a few day to a week, but Nagahana and Matsuo[9] have observed it with *Amblyomma testudinarium* for 40 days.

The infestation of *I. ovatus* on human body is limited to skin surface of the upper half of the body, especially on the forearms,[5,10] eyelid,[1,2,3,5,11,12,13,14,15,16] as well as ear lobes,[3,4,10,11,17] as showing in Table I. Thus the individuals of *I. ovatus* have a tendency to infest on the head area of the human body, and this behavior of *I. ovatus* differs entirely from that of *Amblyomma testudinarium*. The adult females of *A. testudinarium* mainly infest on the skin surface of the femoral[18] or the peri-anal[19,20] regions. It is thus clear that site of infestation depends on species of parasites. Severe diseases describe previously caused by the hard ticks may not often be observed in Japan though the utmost care must be taken in a case of tularemia as cautioned by Sasa and Ogata.[21]

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