NOTE *Internal Medicine*

Clinical Features and Rapid Plasma Reagin Antibody Titers in Spontaneous and Experimental Rabbit Syphilis

Kumiko SAITO[1,3)], Masayo TAGAWA[1)], Munehito MIMURA[2)] and Atsuhiko HASEGAWA[3)]

[1)]Saito Animal Hospital, 3–17–2 Saido, Midori-ku, Saitama, Saitama 336–0907, [2)]Saitama Prefectural Chu-o Livestock Health Station, 107–1 Bessho-Machi, Kita-ku, Saitama, Saitama 331–0821 and [3)]Department of Pathobiology, Nihon University School of Veterinary Medicine, 1866 Kameino, Fujisawa-shi, Kanagawa 252–8510, Japan

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ABSTRACT. Rapid plasma reagin (RPR) titers were periodically examined during and after treatment in three rabbits clinically diagnosed with rabbit syphilis. RPR titers remained positive after clinical recovery and then gradually declined. Of the two rabbits inoculated experimentally, one showed clinical signs of the disease, while the other did not. RPR titers were also periodically evaluated before and after inoculation in these two rabbits. The trends in RPR titers reflected the course of infection, both in the spontaneous and in the experimental cases. An inapparent case and cases without clinical signs after clinical recovery showed low titers for long period of time. Useful information for interpretation of RPR titers measured clinically was obtained by this survey.
KEY WORDS: antibody titer, rabbit syphilis, RPR test.

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Rabbit syphilis, a venereal disease caused by *Treponema paraluiscuniculi*, has been clinically diagnosed in household rabbits [7]. The rapid plasma reagin (RPR) test was found to be useful for diagnosing rabbit syphilis [1–6]. Qualitative analysis of this test was carried out in healthy virgin household rabbits, resulting in a 35% positive rate [8].

To further analyze the clinical value of the RPR test, trends in RPR antibody titers were investigated in relation to clinical signs in spontaneous and experimental cases. The experimental rabbits in this report were treated following the guidelines of the Japan Veterinary Medical Association (2003. *J. Jpn. Vet. Med. Assoc.* 56: 833–836).

Three spontaneous cases of rabbit syphilis were presented at the Saito Rabbit Clinic (Tokyo, Japan) and were followed for about 6 months. They were a 4-month-old female Netherland Dwarf rabbit (Case 1); a 6-month-old male mongrel rabbit (Case 2); and a 3.5-year-old male mongrel rabbit (Case 3). Case 1 was obtained from a pet shop in Tokyo, Case 2 from another shop in Tokyo, and Case 3 from a shop in Saitama. Skin lesions were noticed several days prior to the first visit for Case 1, three weeks prior for Case 2, and two weeks prior for Case 3. The rabbits recovered clinically after treatment with only chloramphenicol (55 mg/kg, BID po) for four weeks. Case 2 showed clinical signs again 19 weeks after initial clinical recovery, and these signs resolved after receiving the same chemotherapy for another six weeks.

Syphilis was experimentally transmitted to two rabbits (Rabbits A and B) using skin scrapings from Case 2 by rubbing them on the skin of the nose and genitalia. Rabbit A (female) was inoculated topically at three months of age and showed a lesion on its genitalia about eight weeks later. Rabbit B (male), from the same litter as rabbit A, was inoculated at the same time, but showed no clinical signs. Rabbit C (male), a littermate of Rabbit A and B, was used as a control.

The facial lesion of a spontaneous case (Case 2) is shown in Fig.1. Nose lesions were seen in all of the spontaneous cases. Cases 1 and 3 also showed lesions on their genital area. Sneezing was observed in Cases 2 and 3. Case 1 showed slight skin lesions, such as redness and edema, since it was diagnosed early. On the other hand, the facial lesions in Case 2 (Fig. 1) and the lesions on the genital area in Case 3 were very serious with ulcers and scabs.

The lesion on Rabbit A was observed only on the genital area eight weeks after inoculation. Rabbit A was treated with long-acting penicillin 14 weeks after the onset of clini-

Fig. 1. The nose and lip lesions of Case 2 on the first day of treatment. The lesion around the nostrils shows serious redness, swelling, ulceration, and conspicuous scabs. Slight redness was seen on the lips.

cal signs and recovered. Rabbit B did not show any clinical signs and was not treated.

The antibody titers in each case were periodically examined by RPR test using a commercial card test kit (RPR test Kokusai, International Reagents Corporation, Kobe, Japan). Blood was collected from the medial branch of the caudal auricular artery without anticoagulant, and the serum was obtained by centrifugation.

The changes in RPR titers during and after treatment, periods of clinical signs, and medication for the three spontaneous cases are shown in Fig. 2. In all cases, RPR titers were highest around the time of starting medication and gradually declined after chemotherapy.

In Case 1, the RPR test, performed in the incipient stage of the disease, was negative. Clinical signs in this rabbit became definite a week later, when RPR titers were elevated

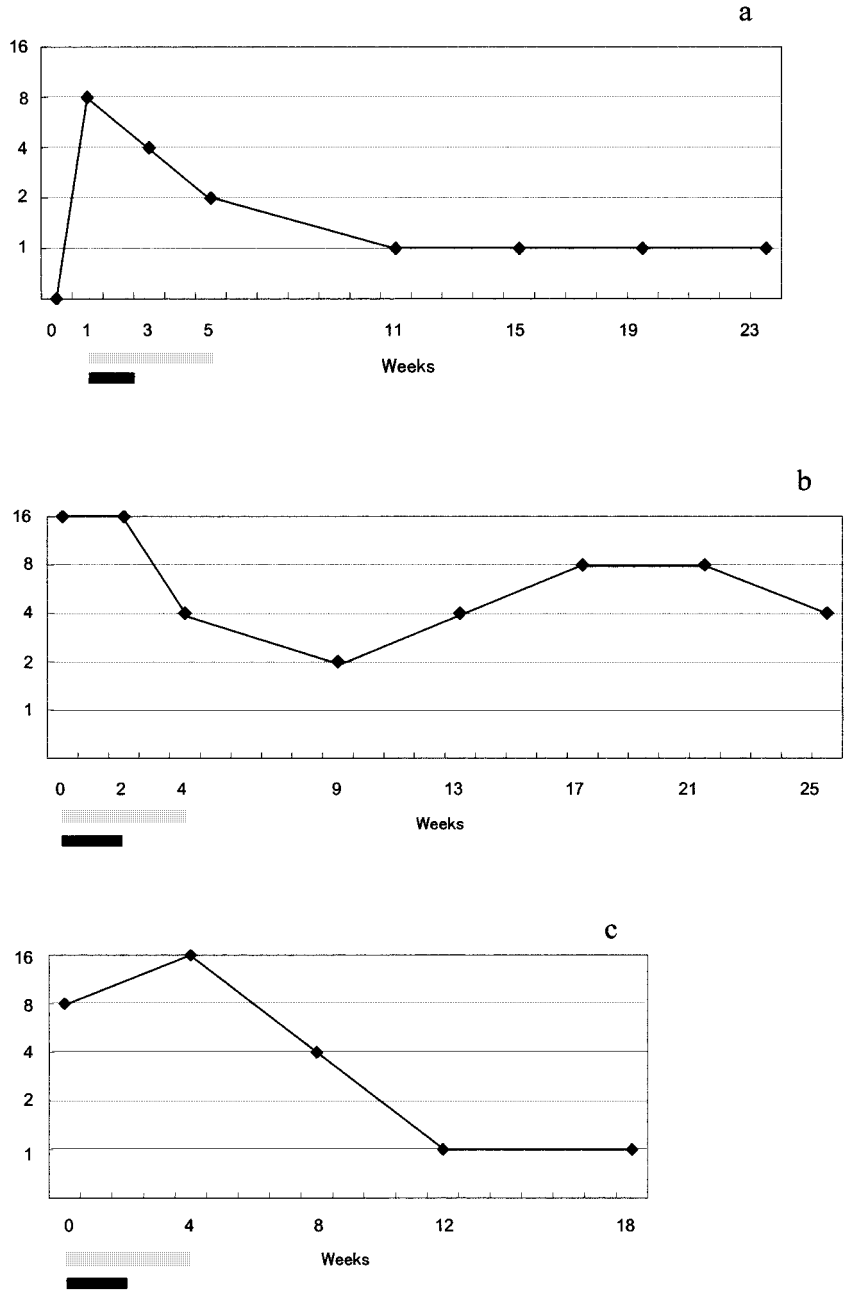

Fig. 2. Changes in RPR titers and clinical signs in Case 1(a), Case 2(b), and Case 3(c) during and after treatment. Pale bars indicate the each period of treatment, and dark bars show each period in which clinical signs were observed.

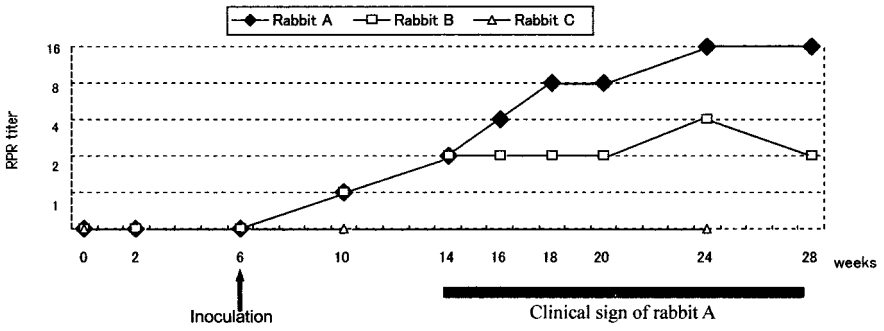

Fig. 3. Changes in RPR titers in Rabbits A and B before and after inoculation. The RPR titers rose after inoculation of these rabbits. Although the titers of Rabbit A were elevated up to 16-fold, that of Rabbit B did not rise more than 4-fold. The titers of Rabbit C, a control, remained negative.

up to 8-fold. Skin lesions in this rabbit were the slightest among the 3 cases without ulcers and scabs, since it was diagnosed early. After treatment, the titers declined with improving clinical signs (Fig. 2a).

In Case 2, RPR titers declined after the first episode of illness, but rose again before the second onset of clinical signs. The titers then declined again following the second treatment (Fig. 2b).

The RPR titers in Case 3 were remained high just after clinical signs disappeared at the end of treatment, and declined thereafter (Fig. 2c). RPR titers remained positive 20 and 16 weeks after clinical signs disappeared in Cases 1 and 3, respectively.

As shown in Fig. 3, RPR titers in Rabbit A began to rise at least four weeks prior to the onset of clinical signs, and continued to increase up to 16-fold as the clinical signs worsened 10 weeks after onset. Although no clinical signs were seen in Rabbit B, RPR titers were elevated up to 4-fold (Fig. 3). In control Rabbit C, no clinical signs were detected, and RPR titers remained negative.

Since RPR titers remained positive after clinical recovery, and then gradually declined in spontaneous cases (Fig. 2), it was revealed that the RPR titer has the property of lasting for a long term. Since Rabbit B did not show any clinical signs even though its RPR titers rose up to 4-fold (Fig. 3), it may be an inapparent case. On the other hand, RPR titers were elevated 8-fold (Case 1) and 16-fold (Cases 2 and 3 and Rabbit A) in the rabbits which showed clinical signs (Figs. 2 and 3). Treatment started three weeks after the owner noticed symptoms in Case 2, and two weeks after in Case 3, and the symptoms were more serious than Case 1 in which treatment was started earlier. Therefore, a tendency that the rabbits with serious lesions show higher titers was suggested.

Rabbit A turned out to be positive by the RPR test, at least four weeks prior to the onset of symptoms, and Case 1 was sero-negative during the early stages of the disease. Therefore, RPR titers might rise slowly or rapidly depending on the case.

Rabbit B showed a change in RPR titers typical of inapparent cases. RPR titers remained positive for a long period of time in Cases 1 and 3, even after clinical recovery. In a previous report [8], 35 of 100 healthy looking rabbits were RPR positive, suggesting that they might be infected inapparently as in Rabbit B, incompletely recovered with remaining pathogenic organisms, or might present clinical signs afterwards, as in Case 2 and Rabbit A. It was suggested that clinical recovery is not agree with etiological recovery, namely the disappearance of pathogenic organisms, in many cases of this disease, and that there are many carriers harboring pathogenic organisms latently.

Since this survey revealed a trend of RPR titers in the course of infection and recovery of rabbit syphilis, useful information for interpreting RPR titers measured clinically was obtained. The RPR card test was suggested to be useful in animal hospitals as a diagnostic test for *T. paraluiscuniculi* infection in household rabbits. Moreover, RPR positive individuals with no clinical signs should be removed from breeding colonies, since they might harbor the etiologic agent.

REFERENCES

1. Cunliffe-Beamer, T.L. and Fox, R.R. 1981. *Lab. Anim. Sci.* **31**: 366–371.
2. Cunliffe-Beamer, T.L. and Fox, R. 1981. *Lab. Anim. Sci.* **31**: 379–381.
3. DiGiacomo, R.F., Talburt, C.D. and Lukehart, S.A. 1983. *Lab. Anim. Sci.* **33**: 562–566.
4. DiGiacomo, R.F., Lukehart, S.A., Tarburt, C.D., Baker-Zander, S.A., Condon, J. and Brown, C.W. 1984. *Br. J. Vener. Dis.* **60**: 214–218.
5. Froberg, M.K., Fitzgerald, T.J., Hamilton, T.R., Hamilton, B. and Zarabi, M. 1993. *Infect. Immun.* **61**: 4743–4749.
6. Graves, S.R., Edmonds, J.W. and Shepherd, R.C. 1980. *Br. J. Vener. Dis.* **56**: 381–386.
7. Saito, K., Tagawa, M. and Hasegawa, A. 2003. *J. Vet. Med. Sci.* **65**: 637–639.
8. Saito, K., Tagawa, M. and Hasegawa, A. 2003. *J. Vet. Med. Sci.* **65**: 797–799.