

Studies on Ringworm in Military Horses

1. Clinical Observations and Therapeutic Experiments

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Introduction

In recent years there has been greater recognition of dermatophytic infections not only in small animals but also in horses.^{4,6,12,25,26)} These fungi affect only the superficial keratinized areas of the body, particularly hair, skin and hooves. In previous reports,^{2,5,9,15,27,29)} the clinical and mycological findings in horses infected by the dematophyte, *Trichophyton* spp. (*T. mentagrophytes*, *T. equinum*, *T. schoenleini*, *T. ferrugineum*, and *T. verrucosum*) were described.

Kim *et al.*^{10,11)} reported the bovine ringworm epidemic among cattle of a military pasture of Republic of Korea Army during the summer of 1971.

In the reports, clinical survey, microbiological classification and identification of causative agents, and therapeutic experiments were described.

This is the first report on ringworm of horses in Korea. The authors studied on the clinical histories and therapeutic experiments of ringworm in military horses and Korean native ponies.

Materials and Methods

1) Animal: The materials of this clinical survey

and experiments were the 25 riding horses which had been used for education of cadets in Korean Military Academy and 19 Korean native ponies which had been tested to a certain military examinations.

2. Therapeutic Drugs: The 10% Ichthammol ointment and the 5% Undecylenic acid ointment, and Hydrocortisone.

3. The basic clinical therapeutic experiments: Experimental Group 1, 6 horses (Org. No. 4, 6, 7, 13, 15 and 19), was treated with 10% Ichthammol ointment. Experimental Group 2, 6 horses (Org. No. 20, 22, 27, 28, K-5 and K-11), was treated with 5% Undecylenic acid ointment. Control Group, 2 horses (Org. No. 2 and K-20), was not treated with any therapeutics.

4. The 2nd reverse repeating clinical therapeutic experiments for resistant patients: Experimental Group 1, 4 horses (Org. No. 2, 4, 15 and 19), was treated with 5% Undecylenic acid ointment and Hydrocortisone. Experimental Group 2, 3 horses (Org. No. 27, K-5, and K-20), was treated with 10% Ichthammol ointment and Hydrocortisone.

* Hydrocortisone was injected to patient, 1-2g per day as a supportive therapeutic drug.

Results

Clinical observations: On June 11, 1972, some circular lesions were noticed on the forehead and shoulders of a horse (Original Hore's No. 15). Within a week, 5 other horses showed similar lesions on various parts of their bodies. At the first time, authors thought the lesions were general dermatitis caused by nutritional deficiency or insect bites.

After few days, many other horses showed similar lesions. The lesions resembled the bovine ringworm among cattle of a military pasture of Republic of Korea Army, in Summer, 1971.

And these dermatoses had transmitted to horse managerial soldiers as a mycotic zoonosis. Hair and skin scrapings from horses were submitted to laboratory for mycological examinations. At the laboratory, the direct microscopic examination of the sample showed both hair and skin invasion by dermatophyte. Therefore, a presumptive laboratory diagnosis of ringworm was



Fig. 1. Early ringworm lesions appearing as raised crusted areas on the head part of No. 15 Shane. The hair appears to be matted by dried exudates. (Kim et al. 1972)

performed.

Of the 44 horses, 14 heads showed multiple circular crusted lesions, with the hair protruding through the dry crusted (Fig. 1). And, in some of the areas, the hairs appeared to be matted by dry or powderish exudates. The individual lesions which were distributed over the entire body of several affected military horses, varied about 2-3 cm diameter in size (Table 1).

Table 1. Personal Records and Clinical Histories of the Military Horses Affected with Ringworm

Id. No.	Org. No.	Name	Age	Breed	Origin	Sex	Initial Date	Location of Lesions
1	2	Mejum	16(1956)	Hunter	Australia	Gelding	July, 5. 1972	Shoulder
2	4	Gray Cown	“(”)	Mongrel	“	“	June, 18.	Flank & Back
3	6	Ben	12(1960)	Hunter	“	“	“ 26.	Head & Neck
4	7	Mallirad	15(1957)	Mongrel	“	“	“ 18.	“
5	13	Mt. Paeckdu	16(1956)	“	Japan	“	July, 1.	Shoulder
6	15	Shane	11(1961)	“	Australia	“	June, 11.	Entire Body
7	19	Norfork	12(1960)	“	“	“	“ 18.	Flank
8	20	Little joe	14(1958)	“	“	“	“ 17.	Flank & Neck
9	22	Carmet	“(”)	Anglo-Arab	“	“	“ 25.	Entire Body
10	27	Golden Girl	13(1959)	Hunter	“	Mare	July, 8.	Chest
11	28	Moroco	12(1960)	Throughbred	“	Gelding	June, 21.	Head
12	K-5	Jeonjin	4(1968)	*Jorangmal	Korea	Stallion	July, 8.	Entire Body
13	K-11	Wonsullang	5(1967)	“	“	Mare	June, 17.	Head & Neck
14	K-20	Gabsoony	4(1968)	“	“	“	July, 3.	“

* Jorangmal (in Korean) is a breed name of Jeju native ponies in Korea.



Fig. 2. Close-up of flank region of No. 19 Norfolk presenting a "moth-eaten" appearance. (Kim et al. 1972)

Some of the horses showed bare circular areas where the crusts had fallen off. And they presented so-called "moth-eaten" appearances with loss or breakage of hairs (Fig. 2). And finally, the lesions showed evidence of healing and re-growth of hair.

Treatments: The results of clinical therapeutic experiments were presented as follows:

1. Results of the basic clinical therapeutic experiments (Table 2): Of 6 horses (Group1), 3 horses (Org. No. 6, 7, and 13) were showed

Table 2. Results of Therapeutic Experiments

Id. No.	Org. No.	Drug Treated	Effects according to days											Remarks
			1	2	3	4	5	6	7	8	9	10	11	
1	2	None: Control	→	→	→	→	→	→	→	→	→	→	→	Proceeding
2	4	Ichthammol	-	-	-	-	-	+	+	+	←	←	←	Reinfective
3	6	"	-	-	-	-	-	+	+	+	+	+	+	Curative
4	7	"	-	-	-	-	-	-	+	+	+	+	+	"
5	13	"	-	-	-	-	+	+	+	+	+	+	+	"
6	15	"	-	-	-	-	+	+	+	←	←	←	←	Reinfective
7	19	"	-	-	-	+	+	+	+	+	+	+	+	Curative
8	20	Undecylenic Acid	-	-	-	+	+	+	+	+	+	+	+	"
9	22	"	-	-	-	-	-	-	+	+	+	+	+	"
10	27	"	-	-	-	+	+	+	+	+	←	←	←	Reinfective
11	28	"	-	-	-	-	+	+	+	+	+	+	+	Curative
12	K-5	"	-	-	-	-	+	+	+	+	+	←	←	Reinfective
13	K-11	"	-	-	-	+	+	+	+	+	+	+	+	Curative
14	K-20	None: Control	→	→	→	→	→	→	→	→	→	→	→	Proceedings

(+): Curative (-): None-Curative (→): Proceedings (←): Reinfective

Table 3. Results of the 2nd Reverse Repeating Therapeutic Experiments for Resistant Patients

Id. No.	Org. No.	Drugs Resisted at 1st Exp.	Drugs Retreated at 2nd Exp.	Effects according to days											Remarks	
				11	12	13	14	15	16	17	18	19	20	21		
1	2	None	Undecylenic Acid + Hydrocortisone	-	-	+	+	+	+	+	+	+	+	+	+	Curative
2	4	Ichthammol	"	-	-	+	+	+	+	+	+	+	+	+	+	"
6	15	"	"	-	-	-	-	-	+	+	+	+	+	+	+	"
7	19	"	"	-	-	-	-	+	+	+	+	+	+	+	+	"
10	27	Undecylenic Acid	Ichthammol + Hydrocortisone	-	-	-	-	+	+	+	+	+	+	+	+	"
12	K-5	"	"	-	-	-	-	-	-	-	+	+	+	+	+	"
14	K-20	None	"	-	-	+	+	+	+	+	+	+	+	+	+	"

(+): Curative (-): Non-Curative

the excessive therapeutic effects (50%) treated with 10% Ichthammol ointment after 5-7 days. Two horses (Org. No. 4 and 7) were reaffected after 8-9 days, and 1 horse (Org. No. 15) was not showed visible effect with 10% Ichthammol ointment. Of other 6 horses (Group 2), 4 horses (Org. No. 20, 22, 28, K-11) were showed the excessive therapeutic effects (66.7%) after 4-7 days, and 2 horses (Org. No. 27, K-5) were reaffected after 10 days treated with 5% Undecylenic acid ointment. The control group (Org. No. 2 and K-20) was not treated, the state of symptom was proceeded continuously.

2. Results of the 2nd reverse repeating clinical therapeutic experiments for resistant patients (Table 3). They were employed 7 horses which were control group and failure patients in the basic experiments to 2nd experiment with reverse repeating methods. These experiments were performed after 11th day from initial symptom appeared. Four horses (Org. No. 2, 4, 15 and 19) were treated with 5% Undecylenic acid ointment and Hydrocortisone, 3 horses (Org. No. 27, K-5 and K-20) were treated with 10% Ichthammol ointment and Hydrocortisone. After a few days (13-18th), all infections were effectively controlled.

Discussion

Since Horn and Degener^{7,23)} performed that causative agents of foot-necrosis were fungi, mycology was developed gradually.

Some causative agents of ringworm of animals have sensitivity to human.^{3,8,10,28)} And Palsson²⁰⁾ studied on the geophills dermatophytes in soil.

Recently, Nikiforov,^{17,18,19)} Neuman and Platzner,¹⁶⁾ Viola and Stefanon,³¹⁾ Plempel and Boshagen,²¹⁾ Becker,¹⁾ Uzuev³⁰⁾ and Kim et al¹¹⁾ studied on the clinical therapeutic experiments of animal

ringworm. Particularly, immunological aspects of dermatomycoses were reported by Sharapov²⁴⁾ and Lepper.¹³⁾

In Korea, the infection rate of bovine ringworm caused by *Trichophyton verrucosum* in cattle of military pasture of ROKA was 56.4%, and 10% Ichthammol ointment¹⁴⁾ and 6% Trichlorphon were found effective.¹¹⁾

The fact that similar conditions, i.e., horses in poor condition due to nutritional deficiency and intestinal parasites or other causes, and the presence of the agent in the environment, can be found in animal and man.

Since the clinical picture of this type of ringworm is essentially the same as infections caused by dermatophytes, mycological studies would be necessary to confirm these diseases.

Conclusion

The clinical observations and therapeutic experiments of ringworm in military horses of Korean Military Academy were described.

The infection rate was 31.8% (44% in riding horses and 15.8% in Korean Native Ponies), and some of the managerial soldiers were also infected with the mycotic zoonosis.

The 10% Ichthammol ointment and the 5% Undecylenic acid ointment were found effective. For complete cure 4-18 days were required, and intramuscular injection of Hydrocortison (1g for pony, 2g for riding horse, daily) exhibited excessive effects as a supportive therapeutic drug.

References

1. Becker, W.: Further experiences with Defungit (Bensuldazic acid) in cattle. *Blauan Hefte Tierarzt.* 1969. 39 : 17.
2. Bohm, K., Bisping, W. and Funk, K.: *Mycological*

- findings in horses with skin lesions in north-Western Germany. B.M.T.W. 1968. 81 : 397.
3. Dakabashi, Y.: *Trichophyton* spp. 1955. (In Japanese).
 4. Gupta, P., Singh, R. and Singh, I.: Dermatophytes from man, dogs and pigs, with special reference to *Trichophyton simii* and *Microsporum. nanum*. Indian J. Anim. Hlth. 1968, 7 : 247.
 5. Guzyima, M. and Ashi, H.: Pathogenic dermatophytes isolated from ringworm of military Horses. Report of Vet. Corps of Japan Army. 1941, 382 : 745 (In Japanese).
 6. Hoerlein, A.: Studies on animal dermatomycosis. Cornell Vet. 1945, 35 : 287.
 7. Horn and Degener: (cited from Sasaki)
 8. Jawetz, E., Melnick, J. and Adelberg, E.: Superficial mycosis. Review of Medical Microbiology. 1966.
 9. Kaplan, W., Hopping, J. and Georg, L.: Ringworm in horses caused by the dermatophyte. J.A.V.M.A. 1957. 35 : 329.
 10. Kim, M.Y., Lee, B.S., Cho, S.H. and Kang, Y.B.: Studies on the bovine ringworm epidemic among cattle of a military pasture of ROKA. 1. Clinical survey, microbiological classification and identification of causative agent. J. of Korean Military Med. Assoc. 1973 (In print).
 11. Kim, M.Y., Lee B.S., Cho, S.H. and Kang Y.B.: Studies on the bovine ringworm epidemic among cattle of a military pasture of ROKA. 2. Clinical therapeutic experiments of bovine ringworm with some Drugs. J.K.M.A. 1973 (In print).
 12. Kral, F.: Dermatomycosis. Equine and Surgery. 1963.
 13. Lepper, A.W.D.: Immunological aspects of dermatomycosis in animals and man. Rev. med. Vet. Mycol. 1969. 6 : 435.
 14. Milks, H.: Practical veterinary pharmacology, Materia Medica and Therapeutics. 1949.
 15. Nagano, M.: Studies on the causative agents of ringworm of military horses in Tokyo, Japan. Report of Vet. Corps of Japan Army. 1941, 381 : 429 (In Japanese).
 16. Neumann M. and Platzner, N.: The treatment of bovine ringworm with Thiabenzol. Refuah Vet. 1968. 25 : 40.
 17. Nikiforov, L.I.: Antibiotics in the treatment and prophylaxis of bovine ringworm. Byull. Vses. Inst. eksp. Vet. 1967. 2 : 112 (English Summary).
 18. Nikiforov, L.I.: efficacy of trichotezin and griseofulvin in ringworm of fur animals. Byull. Vses. Inst. eksp. Vet. 1967. 2 : 116.
 19. Nikiforov, L.I.: Use of antifungal antibiotics against ringworm in animals. Roboty molodykh uchenykh. 1968. 286 (English Summary).
 20. Palsson, G.: Geophills dermatophytes in the soil in Sweden. Acta Vet. Scand. Suppl. 1968. 25 : 1.
 21. Plempel, M. and Boshagen, H.: Experiments with a new fungicidal compound "Bay Va 5387" Vet. Med. Nach. 1968. 4 : 275.
 22. Sarkhisov, A., Nikiforov, L. and Slugin, V.: Ringworm caused by *Trichophyton farviforme*. Krolikovod. Zverovod. 1968. 6 : 28 (English Summary).
 23. Sasaki, T.: *Trichophyton*. veterinary microbiology. 1964. 742 (In Japanese).
 24. Sharapov, V.: Experiments on immunity and immunoprophylaxis in trichophyton infections of sheep. Trud. Vses. Inst. Vet. Saint. 1968. 27 : 162 (English Summary).
 25. Singh, M.P. and Singh, C.M.: Trichohhyton simii infection in poultry. Vet. Record 1972. 90 : 218.
 26. Sukimura, K.: Introduction and diagnosis of dermatophytoses. Veterinary epidemic diagnostics. 1955. 114 (In Japanese).
 27. Smith, J., Jolly, R. Georg, L. and Connole, M.: *Trichophyton equinum* var *autrdphicum*. Sabouraudia 1968, 6 : 296.
 28. Spencer, M.: Some dermatologic hazards to the veterinarian. J.A.V.M.A. 1962. 40 : 1083.
 29. Stannard, A.A.: Some important dermatoses in the horse. Modern Vet. Pract. 1972. 53 : 31.
 30. Uzuev, T.M.: Prevention and treatment of ringworm in cattle by feeding sulphur and methionine. Vest. Nauki Mcsk. 1969. 6 : 106 (English Summary).
 31. Viola, C. and Stefanon, G.: Treatment of ringworm of beef calves with trichlorphon. Atti. Soc. Ital. Sci. Vet. 1968. 22 : 749.

軍馬에 發生한 輪癬에 관한 研究

I. 臨床症例報告 및 治療試驗 成績

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1972년 여름, 士官生徒 乘馬教育用으로 陸軍士官學校 軍馬隊에서 飼育하고 있는 乘馬用 馬匹(오스트레일리아 및 日本産)과, 軍用馬로서의 改發試驗에 供試中인 濟州道産 在來馬匹에 發生한 14例의 皮膚糸狀菌性 輪癬을 對象으로 그 治療試驗을 實施하였던 바, 다음과 같은 結論을 얻었다.

臨床症例 觀察 ① 初期症狀 發現은 軍馬固有番號 15番, 馬名 巨象(原名 Shane)의 이마 및 耳根部 肩部에 直徑 3 cm 程度의 圓型 病巢가 나타났으며, 곧 이어 다른 馬匹에 散發적으로 發生했다. 發生率은 31.8%(軍馬 44%, 조랑말 15.8%)로서 지난해 軍部隊 牧場에서 集團發生했던 Bovine Ringworm의 發生率(56.4%)보다 낮았다.

② 症狀은 圓型發疹 및 痒感, 痂皮形成, 皮毛脫落, 膿疱形成 및 新毛發生等の 順으로 進行했으며 患畜과 接觸하는 사람에게도 感染하는 人畜共通傳染病의 一種이었다.

③ 品種 및 性別, 연령에 따른 有意性은 認定할 수 없었다.

治療試驗 結果 ① 本病은 Ichthammol 이나 Undecylenic Acid 處理에 있어서 治療效果를 나타냈다.

② 上記한 抗糸狀菌劑 處理와 同時에 Hydrccortisone의 補助療法을 實施하였을때, 藥效가 빨리 나타나고 治療期日도 短縮되었다.

③ 本症은 早期에 發見 治療해야하며 一般的으로 完治하는데 長期間을 要하였다.