

Norwegian Scabies

— Dissemination of Mites by Medical Instruments —

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A 77-year-old woman with chronic renal failure and malnutrition had thick crusted plaques, erythematous papules and scaly patches on her entire body. The skin scraping and exfoliated skin scales showed the presence of numerous itch mites, *Sarcoptes scabiei var hominis*. 8667 mites were counted from 1g of the collected samples.

Twenty six cases a pruritic rash were reported among hospital personnel; mites were recovered from only one. Among other hospitalized patients, 2 cases of scabies were reported. One patient had pruritic papules and burrows on the left upper arm and the other had lesions in the axilla, mites were recovered from both. Subsequent evaluation suggested that they acquired scabies from a contaminated blood pressure monitoring cuff and a clinical thermometer.

The contaminated medical instruments are considered to be fomites, a mode of dissemination of mites. (*Ann Dermatol* 2:(1) 50-54, 1990)

Key Words: Fomites, Norwegian scabies, *Sarcoptes scabiei var hominis*

Norwegian scabies is a clinical variant of human infestation with *Sarcoptes scabiei*, characterized by extensive, heavily crusted skin lesions.^{1, 2} Since Boeck and Danielssen³ first described an unusual ectoparasitic infestation that produced hyperkeratotic lesions in 1848, not so rare cases are reported in the English literature. Since 1974, only 4 cases of Norwegian scabies have been reported in the Korean literatures.^{4,6}

Persons most frequently affected are the elderly, debilitated of all ages, and the immunosuppressed.^{7, 8} They have high rate of infectivity; transmission is generally by close personal contact.^{9, 10}

We report, herein, a case of Norwegian scabies and summarize the reported cases in Korea. It is believed to be the first recorded case, in Korea, with confirmation of dissemination of the mites by contaminated medical instruments. We feel that the use of medical instruments on more than one patient is an important factors of spreading the disease throughout a hospital.

REPORT OF A CASE

In March 1989, members of the nursing and medical staff complained of itching papules of the lower abdomen, inner aspects of the thighs, axillae and flexor surfaces of the upper arms but no burrows were found. They were felt to have scabies and a source was sought among the patients on the ward. A woman patient aged 77 years, who was suffering from malnutrition, urethritis, chronic renal failure and bed sores was considered. She had

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been admitted to the ward on November 12, 1988. On examination, diffuse thick crusted plaques, erythematous papules and scaly patches were present on her whole body (Fig. 1). Complete blood cell count and serum immunoglobulins were within normal limits. Skin tests with DNCB and Multitest CMIR were negative.

Examination of skin scrapings from this patient showed the presence of numerous itch mites, *Sarcoptes scabiei*. Examination of exfoliated skin scales and debris in the patient's bed linen and dust samples from the ward also showed a numerous mites. The collected samples were dissolved in the 20%



Fig. 1. Thick crusted and hyperkeratotic plaques in the interdigital webs.

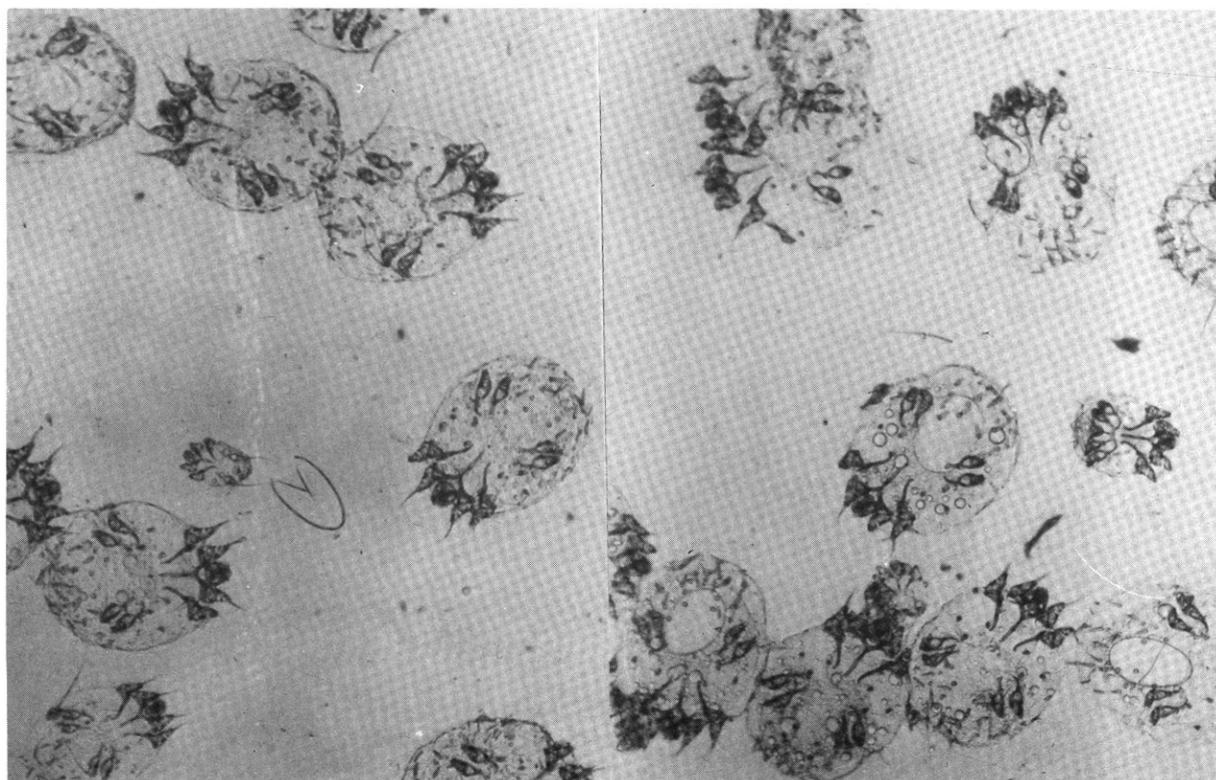


Fig. 2. Various stages of *Sarcoptes scabiei* collected from the the patient (Polyvinyl-lactophenol medium mounting, $\times 40$).

KOH for 2 hours in order to count the mite population. It showed population density of 8667 mites/g (Fig. 2). A skin biopsy specimen from the crusted lesion demonstrated the presence of numerous mites in multiple burrows in the horny layer (Fig. 3). Scanning electron microscopic study also revealed mites in the burrows (Fig. 4).

One hospitalized patient who had had his blood pressure recorded with the same monitoring cuff

used on the patient with Norwegian scabies complained of pruritic papules on his left upper arm (Fig. 5). Another patient who had shared a clinical thermometer with the Norwegian scabies patient complained of pruritic papules in the axilla (Fig. 6). Mites and scybala were found in scrapings from the lesions of these patients; they were examined using a direct smear with mineral oil.

Examination of skin scrapings from one the 26

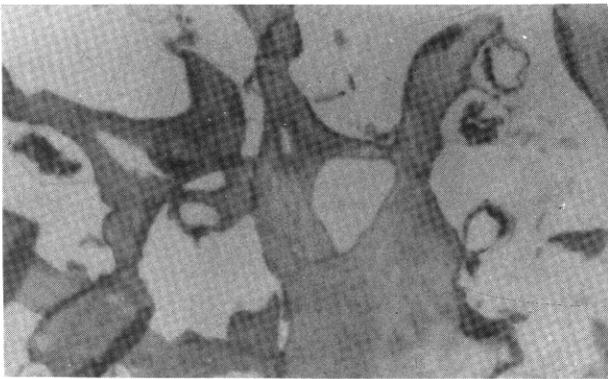


Fig. 3. Numerous mites are seen in the multi-burrowed stratum corneum (H & E stain, $\times 40$).

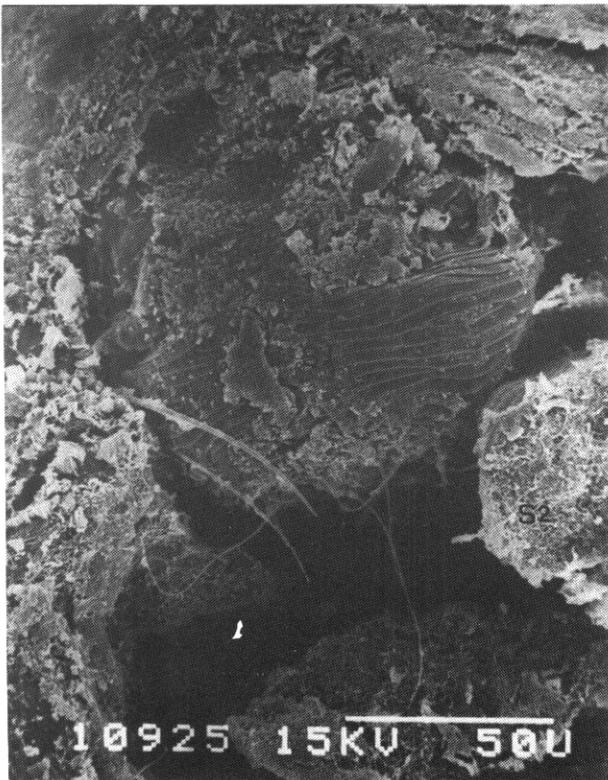


Fig. 4. Scanning electron microscopic examination reveals two itch mites (S1, S2).

symptomatic medical personnel was positive for the itch mites.

All these 26 medical personnel and 43 hospitalized patients received treatment with crotamiton lotion. They showed improvement of the eruption and pruritus within a week. All the patient's bed linens and clothes were thoroughly cleaned. The contaminated medial instruments were sterilized. The infested ward was cleaned with a vacuum



Fig. 5. Pruritic scaly papules on the left upper arm; scabietic lesion transmitted by blood pressure monitoring cuff.



Fig. 6. Pruritic papules in the axilla; scabietic lesion transmitted by clinical thermometer.

cleaner.

The patient with Norwegian scabies was isolated; she later died of septicemia.

DISCUSSION

Norwegian scabies is unquestionably caused by the same species of itch mite as ordinary scabies¹. It has been shown that the clinical expression of common form of *Sarcoptes scabiei* infestation is predominantly a result of the immune response elicited by sensitization to the itch mite.^{7, 11} Patients who are immunologically deficient, physically debilitated, or mentally retarded may show

unusual clinical presentation of this disease, such as an atypical distribution, and unusual extent of involvement.

Crusted scabies is relatively uncommon but highly transmissible during patient contact.^{7, 13} In this form of scabies, pruritus is generally absent and the crusted lesions are extensive.^{13, 14} The crusts and exfoliated skin scales contain hundreds to thousands of mites.¹³ Carslow et al⁹ reported that they harvested 6312 mites from 1g of epithelial and crusted material collected from patient's bed linen. We harvested 8667 mites from 1g of collected crusts and exfoliated skin scales of the patient.

Following the patient's admission, atypical form of scabies developed in 26 medical personnel in the hospital. They did not have typical burrows. In only one was the itch mite found. Based upon their symptom of itch and prompt response to crotamiton lotion, we made the diagnosis scabies. Two other in-patients were found to have pruritic papules and burrows on their left upper arms and axilla. Mites and scybala were found on examining scrapings from both of them. One patient who developed scabies at the site where a blood pressure monitoring cuff wrapped apparently acquired scabies from the contaminated cuff. The other patient, who showed irritating papules in the axilla apparently acquired from a contaminated clinical thermometer. The occurrence of scabies infestation

in these two hospitalized patients is considered to be due to spread from contaminated medical instruments.

We summarized the reported cases of Norwegian scabies in the Korean literatures (Table 1).

Carslaw et al⁹ reported that the immediate environment of a patient with Norwegian scabies was heavily contaminated with mites in the various stages of development and, therefore, many of the mites acquired by hospital personnel will be immature and more likely to produce an atypical eruption. According to Mellanby,¹⁵ infection by *S. scabiei* is usually accomplished by a newly fertilized female who forms burrows and may lay eggs in it at the rate of 2-3/day for nearly 2 months. The young mites leave the parental burrows, move across the skin and enter hair follicles; the follicular papules found near the burrows are probably a result of their activity. Mortality among immature mites is high and experimental attempts to produce infection with eggs and immature mites succeeded in producing only crops of papules. Therefore, it seemed probable that under normal circumstances a few of these stages would survive to produce a permanent infection.

Norwegian scabies may be difficult to diagnose clinically because it may resemble chronic eczema, psoriasis or drug eruptions.¹³ The correct diagnosis is often not made until biopsy is done or an

Table 1. Summary of the reported cases of Norwegian scabies in Korea

Source	Year	Age/Sex	Underlying disease	Infectivity (No. of transmitted)	Mode of transmission	No. of mites collected
Lee et al ⁴	1974	17/M	Cushing syndrome	NP	NP	NP
Suh et al ⁵	1982	14/M	Autoimmune hemolytic anemia Sepsis Pneumonia	Family No. : 6 Hosp. personnel : 16 Other in-patients : 2 Total : 24	Direct contact?	99
Cho et al ⁶	1985	25/M	Mental retardation	NP	NP	NP
Present case	1989	9/M	Aplastic anemia	NP	NP	NP
		77/M	Malnutrition Chronic renal failure	Hosp. personnel : 26 Other in-patients: 2 Total : 28	Direct contact; Medical instrument ^b	8667 mites/g ^a

NP: Not presented

a : Including all stages of *Sarcoptes scabiei* except eggs

b : Blood pressure monitoring cuff & clinical thermometer

epidemic of secondary scabies breaks out among contacts of the patient.¹³ Our case was diagnosed after the medical personnel and two other in-patients were infested. Because of current wide spread use of immunosuppressive medication, it is anticipated that the number of Norwegian scabies cases will increase.¹³ Delayed diagnosis or unrecognized cases of crusted scabies frequently contribute to secondary transmission especially in hospitals and institutions.^{13, 16} Therefore, crusted lesions on intertriginous area of immunosuppressed, severely debilitated or mentally retarded patient should be examined carefully.

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