

CAT SCRATCH DISEASE IN CHILDHOOD*

R. S. FOWLER, M.D. and
J. D. BAILEY, M.D., F.R.C.P.[C], Toronto

SINCE THE initial clinical description of cat scratch disease by Debré in 1950,¹ there have been many series of case reports in the literature.²⁻⁵ These have described the typical clinical course of the disease and demonstrated, as well, some of the rare manifestations.

In the usual case of cat scratch disease, regional lymphadenopathy follows the scratch of a cat in one to two weeks. An indurated, red papule forms at the site of the scratch and persists for some time. Suppuration occurs in one-third to one-half of the cases. The illness at its height is usually accompanied by a low-grade fever and some malaise. The glands subside spontaneously and gradually over the course of a few weeks. This illness is rarely severe and complications occur very infrequently.

Unusual clinical features of the disease include various rashes,⁶ erythema nodosum,^{2, 4, 6} encephalitis,² myelitis, radiculitis, osteolytic lesions,^{9, 10} Parinaud's oculoglandular fever and thrombocytopenic purpura.

The present study will summarize the findings in 55 cases of cat scratch disease in children who were diagnosed during the period 1955-1960.

SELECTION OF CASES

Patients with regional lymphadenopathy in whom the disease was suspected were skin tested.† All tests were read in 48 hours and were considered positive if induration was 4 mm. or more in diameter and erythema was 10 mm. or more in diameter (criteria stated by McGovern, Kunz and Blodgett⁵). All of the children in the series had a negative intracutaneous tuberculin test done with 1/20 mg. of Old Tuberculin.

There were 24 girls and 31 boys in the group studied.

RESULTS OF STUDY

Age at Onset of Disease

The children varied in age from 2 to 14 years. Thirty-nine of the group were between 5 and 9 years. Table I shows the age distribution.

Time of Onset

This group of children demonstrated the high incidence of the disease during the winter months (Table II). This curious seasonal incidence of cat

TABLE I.—AGE AT ONSET

| Age | Number of cases |
|---------|-----------------|
| 2 years | 2 |
| 3 " | 2 |
| 4 " | 1 |
| 5 " | 10 |
| 6 " | 9 |
| 7 " | 6 |
| 8 " | 3 |
| 9 " | 11 |
| 10 " | 3 |
| 11 " | 2 |
| 12 " | 2 |
| 13 " | 2 |
| 14 " | 2 |
| | 55 |

scratch disease has been pointed out by other authors (Spaulding and Hennessy,² Warwick and Good,³ Marshall¹¹).

TABLE II.—MONTH OF ONSET

| Month | Number of cases |
|-----------|-----------------|
| May | 0 |
| June | 0 |
| July | 3 |
| August | 3 |
| September | 2 |
| October | 9 |
| November | 7 |
| December | 11 |
| January | 9 |
| February | 8 |
| March | 2 |
| April | 1 |

Contact with Cats

In 48 of the 55 cases there were cats in the immediate environment of the patients. Two of the children had no known contact with cats and there was no information regarding cats in the environment in the remaining five cases.

In 22 cases there was a definite history of being scratched by a cat in the appropriate area previous to the onset of the adenopathy.

History of Other Primary Lesions

Thirteen patients had primary lesions in the appropriate area that did not result from cat scratches. Five of these children did not know what caused their primary lesion, but in eight cases the origin was known. These primary events were as follows:

1. A cut of the index finger with a knife.
2. A paronychia.
3. A raccoon bite.
4. Follicular conjunctivitis.
5. A swollen upper eyelid of unknown cause (in both Cases 4 and 5 the preauricular node was involved).
6. Salk vaccine administration a few days previous to the onset of axillary adenopathy (in two cases).
7. Pityriasis rosea which began two to three weeks before the onset of inguinal adenopathy.

*From the Hospital for Sick Children, Toronto, and the Department of Pediatrics, University of Toronto.

†The antigen used was prepared by the Department of Bacteriology, University of Toronto, under the direction of Dr. W. B. Spaulding and was kindly given to us for this study. The technique used to prepare the vaccine has been outlined by Dr. Spaulding² in a recent paper on the subject.

In all of the above cases the patients were in contact with cats in the home, so that the cat may well have been the vector for the disease.

Sentinal Site

Thirty of the 55 patients had a sentinal site at the time of first examination. In 12 cases this was a healed scratch only. In a further 14 cases a typical indurated, dull red papule was present in the appropriate area. The remaining four children demonstrated pityriasis rosea, follicular conjunctivitis, paronychia and a healed puncture wound of unknown origin.

Fever

In 34 children an oral temperature of over 99° F. was recorded at some time during the course of their illness. Nineteen children had temperatures between 99 and 100° F. while a further 10 had temperatures between 100 and 101° F. Only five of the group had temperatures above 101° F. during the course of their illness. Seven more children who had no recorded fever had a history of fever before they were seen. Therefore, 41 of the children had fever as part of their illness, but as a rule it was not high.

Malaise

Only 18 of the 55 patients had general complaints of illness. The rest felt perfectly normal through their whole course.

Site of the Glands

In 42 patients only one gland group was involved, while in the remaining 13 patients two gland groups were affected, usually anatomically adjacent ones. This accounted for a total of 68 gland groups involved in the series and these were distributed as shown in Table III.

TABLE IIIA.—FREQUENCY OF INVOLVEMENT AT EACH GLAND SITE

| <i>Site</i> | <i>Number of cases</i> |
|------------------------------|------------------------|
| Axillary | 23 |
| Inguinal | 9 |
| Epitrochlear | 9 |
| Anterior cervical | 9 |
| Submandibular | 8 |
| Posterior cervical | 4 |
| Preauricular | 3 |
| Supraclavicular | 2 |
| Submental | 1 |

TABLE IIIB.—FREQUENCY OF INVOLVED GLANDS FOUND IN COMBINATION

| <i>Site</i> | <i>Number of cases</i> |
|---|------------------------|
| Epitrochlear and axillary | 6 |
| Anterior cervical and submandibular | 3 |
| Both inguinal | 1 |
| Preauricular and anterior cervical | 1 |
| Submandibular and submental | 1 |
| | 13 |

Tenderness

In 43 cases the gland was tender on examination and in a further three cases there was a history of tenderness.

Suppuration

In 23 cases the involved gland became fluctuant. Pus was evacuated by needle aspiration in 12 cases. This was carried out once in seven cases, twice in three cases and three times in two cases. An initial needle aspiration in two children was followed by surgical incision and drainage. Eight cases had surgical incision and drainage only, and in one child with fluctuation, no treatment was carried out. He was sent home to use hot compresses and to return in a few days for drainage. He was not seen again.

The duration of illness in these cases is interesting. Only one of the 23 cases was followed up to complete resolution. At the time of the last visit a palpable gland was usually still present and in some, a persistent draining sinus. In the group of 12 patients treated by needle aspiration only, the duration from onset to last visit was 15 to 71 days, with a mean of 37 days. In the group of 10 treated by surgical incision and drainage, the duration was seven days to 19 months with a mean of 100 days.

The following selected case reports illustrate some of the results of various treatment routines.

CASE 36.—This child underwent a wide incision and drainage of the gland under anesthesia. One month later the incision was wide open, draining, and showed no signs of healing.

CASE 50.—The epitrochlear gland had disappeared completely after two needle aspirations.

CASE 8.—The gland in this case was aspirated on the 6th and 14th days of the illness. This boy came in again on the 19th day of his illness with a spontaneous sinus formation. He was not seen thereafter.

CASE 19.—The gland of this child was initially aspirated and 1½ weeks later was surgically drained. There was discharge for 2½ weeks before healing took place.

CASE 16.—Surgical incision and drainage of the lesion was carried out in this patient one month after the onset of illness. Twenty-six days later the incision was still open and the edges were indurated and red.

CASE 6.—A needle aspiration was performed initially. Twelve days after the onset of his illness surgical incision and drainage was carried out. The sinus thus formed drained for 2½ months.

Other Manifestations

The spleen was palpable in five of the 55 cases.

Two children had erythema nodosum during their illness. The axillary gland was involved in one, while the submandibular gland was affected in the other. One child presented with arthralgia of one elbow, wrist and shoulder which persisted for five weeks until an enlarged and very tender epitrochlear node became apparent. A barrage of laboratory investigations failed to reveal any other disease and the cat scratch skin test was strongly positive.

Another boy developed a rash typical of pityriasis rosea, a diagnosis which was confirmed by a dermatologist. Three weeks later he developed inguinal lymphadenopathy.

The submandibular and submental glands were involved in another child and these required three needle aspirations. Forty-two days after the onset of her illness, this girl presented with the complaint of itchy palms. She was found to have a vesicular rash of the palms typical of the "id" reaction seen in association with various skin disorders.

Laboratory Findings

The white blood cell count was not significantly elevated. Table IV shows that in three-quarters of the cases the leukocyte counts were under 11,000/c.mm.

TABLE IV.—WHITE BLOOD CELL COUNT

| White blood cell count (No./c.mm.) | Number of cases |
|------------------------------------|-----------------|
| 5000 - 5900..... | 2 |
| 6000 - 6900..... | 4 |
| 7000 - 7900..... | 11 |
| 8000 - 8900..... | 10 |
| 9000 - 9900..... | 5 |
| 10,000 - 10,900..... | 4 |
| 11,000 - 11,900..... | 2 |
| 12,000 - 12,900..... | 2 |
| 13,000 - 13,900..... | 4 |
| 14,000 - 14,900..... | 1 |
| 15,000 - 15,900..... | 2 |
| 16,000 - 16,900..... | 0 |
| 17,000 - 17,900..... | 1 |
| Not known..... | 7 |

Eosinophilia is often mentioned as a characteristic of the disease. The percentage of eosinophils in the peripheral smear is shown in Table V. In 19 of 47 cases it was 5% or more.

TABLE V.—PERCENTAGE OF EOSINOPHILS IN THE PERIPHERAL SMEAR

| | |
|----------------|----|
| 0%..... | 9 |
| 1 - 4%..... | 19 |
| 5 - 9%..... | 14 |
| 10 - 14%..... | 4 |
| 15 - 19%..... | 1 |
| Not known..... | 8 |

Leukocytosis and a shift to the left were not typical of this series of cases. The percentage of bands in the peripheral smear was under 5% in 40 of 47 cases.

Bacteriological Findings

Pus was cultured in 16 of 23 cases in which suppuration was present. Fourteen of these were sterile. In nine cases, tuberculosis and chromagen disease were ruled out by culture and guinea-pig inoculation. One sample of pus grew a non-pyogenic staphylococcus. Another child's gland was incised and drained two months after the onset of his illness. Culture at that time grew no organisms. Two weeks later his incision was still draining and a repeat culture grew a pyogenic staphylococcus. This was probably a contaminant acquired during his hospital stay.

The lygranum complement fixation test was performed on 10 children. In eight there was no reaction. In one the titre was 1:128. In the other, the titre of the acute phase serum was 1:160 and that of the convalescent serum was 1:80.

Treatment

The management of the suppurative cases has already been described. Except in rare instances, most patients were not treated by antibiotics once the diagnosis had been established. A variety of drugs had been used before the diagnosis was made and they did not appear to affect the course of the disease. A total of 30 patients received antibiotics or a sulfonamide and many were given combinations of these drugs. Penicillin was used in 20 patients, sulfonamides in eight, tetracycline in five, chloramphenicol in three, erythromycin in two, oxytetracycline in one and streptomycin in one.

DISCUSSION

The clinical features of the disease in childhood, as reported in this series, are typical of other reported groups of cases.

The peak incidence was in October, November, December, January and February. Most of the children were in intimate contact with cats. The disease was usually preceded by a cat scratch which often resulted in the formation of an indurated papule. This was followed in a short time by enlargement of a regional lymph gland which was usually painful. The gland progressed to suppuration in almost half of the cases. This is a higher proportion than the one-third of cases with suppuration reported by Spaulding and Hennessy.² The course was prolonged in most instances. Fever and malaise were usually present for short periods of time but were not severe. The axillary glands were the ones most commonly involved, followed in frequency by the inguinal glands. This is probably because the hands and legs are the sites most vulnerable to cat scratches.

Of interest is the case of one boy who developed bilateral inguinal node involvement. Cullen⁸ reviewed the literature, describing 463 cases in detail, and found only two besides his own in which there was bilateral inguinal gland involvement. Our case, then, would be the fourth described with involve-

ment of this distribution. This child first presented with a swollen right inguinal gland, and 10 days later a left inguinal gland became swollen and tender.

It is interesting to note that in three children in our series the epitrochlear gland alone was involved. This disease is one of the few causes of unilateral isolated epitrochlear adenopathy.

Erythema nodosum was present in two cases. In Spaulding's² series it was observed in two patients with inguinal or femoral gland involvement. Daniels and MacMurray⁴ reported one patient with erythema nodosum in whom inguinal lymph glands were involved. Greer and Keeffer⁶ also reported one case of erythema nodosum with cat scratch disease in which a cervical gland was involved. Cat scratch disease should be considered in the differential diagnosis of erythema nodosum along with the more common causes, tuberculosis and streptococcal infection.

The "id" reaction on the palms has not previously been described in association with this disease. It occurs commonly with fungal infections and more rarely in association with viral infections such as herpes simplex, vaccinia, lymphogranuloma venereum and mumps.⁷ The rash described in the case reported by Greer and Keeffer⁶ probably represented an "id" reaction localized to the extensor surfaces of the arms. Their patient also had erythema nodosum.

The boy who developed pityriasis rosea three weeks before the onset of inguinal adenopathy presented interesting features for conjecture. We presumed that the rash was the portal of entry for the causative organism of cat scratch disease. This child was in intimate contact with cats. It is, of course, possible that the rash which he had was simply a skin manifestation of cat scratch disease, as mentioned previously.

The management of the suppurative case is of importance. Needle aspiration, even if performed frequently, will result in more rapid resolution of the disease than open drainage. Many of the glands, if treated by routine surgical incision and drainage, will form a sinus which may drain for some weeks or months.

The lygranum complement fixation test was not of great help in diagnosis during the early part of our study and it was not employed frequently.

Antibiotic or chemotherapeutic drug therapy does not appear to alter the course of the disease. Application of local heat, administration of analgesics, and reassurance appear to be the only useful therapeutic measures.

The following features suggest a diagnosis of cat scratch disease:

1. Regional lymphadenopathy.
2. History of contact with a cat.
3. A dull red, indurated and crusted papule present in the area drained by the gland.
4. Absence of signs or laboratory evidence of other diseases causing lymphadenopathy.

5. A low white blood cell count.
6. An eosinophilia of 5% or more.
7. A positive skin test with a potent cat scratch antigen.

SUMMARY

Fifty-five cases of cat scratch disease in childhood are described. Most patients were between 5 and 9 years of age and acquired their disease in the winter months. Forty-eight of the children were in contact with cats. Twelve patients had a healed cat scratch in the area drained by the involved gland while 14 had a dull red papule with central crusting in the appropriate area. Eight patients had odd primary lesions other than cat scratches. About four-fifths of the patients had some fever, but it was usually low. The axillary glands were most commonly involved, followed by inguinal, epitrochlear, anterior cervical and submandibular. In 46 patients the gland was tender. Suppuration occurred in 23 of the 55 cases and its management has been discussed. The white blood cell count was low and an eosinophilia was present in one-third of the cases. The disease runs a long but benign course. There were no serious complications in this series.

We wish to acknowledge the valuable help of Miss Deck in the Outpatient Department and also wish to thank the following doctors on the staff of the Toronto Hospital for Sick Children for enabling us to follow up some of their private patients: Dr. Peter Turner, Dr. George Trusler, Dr. Margaret Hunter, Dr. Harold Edwards and Dr. Robert Farber.

This study would not have been possible without the assistance of Dr. Wm. Spaulding, Toronto General Hospital, who supplied and standardized all the skin test material.

REFERENCES

1. DEBRÉ, R. *et al.*: *Semaine hôp. Paris*, **26**: 1895, 1950.
2. SPAULDING, W. B. AND HENNESSY, J. N.: *Am. J. Med.*, **28**: 504, 1960.
3. WARWICK, W. J. AND GOOD, R. A.: *A.M.A. J. Dis. Child.*, **100**: 228, 1960.
4. DANIELS, W. B. AND MACMURRAY, F. G.: *J. A. M. A.*, **154**: 1247, 1954.
5. MCGOVERN, J. J., KUNZ, L. J. AND BLODGETT, F. M.: *New England J. Med.*, **252**: 166, 1955.
6. GREER, W. E. R. AND KEEFFER, C. S.: *Ibid.*, **244**: 545, 1951.
7. PILLSBURY, D. M., SHELLEY, W. B. AND KLIGMAN, A. M.: *Dermatology*, W. B. Saunders Company, Philadelphia, 1956, p. 147.
8. CULLEN, S. I.: *New England J. Med.*, **263**: 851, 1960.
9. COLLIPP, P. J. AND KOCH, R.: *Ibid.*, **260**: 278, 1959.
10. ADAMS, W. C. AND HINDMAN, S. M.: *J. Pediat.*, **44**: 665, 1954.
11. MARSHALL, C. E.: *Canad. M. A. J.*, **75**: 724, 1956.

PAGES OUT OF THE PAST: FROM THE JOURNAL OF FIFTY YEARS AGO

The annual report of the Medical Officer of Health for Hamilton [Ontario] shows that for the year ending October 31, 1910, the number of births registered was 1966, or about 27 per thousand of population. The rate of the previous year was 26, that of 1905, 1906 and 1907 being 22. The death rate was 13.8 per thousand, a slight increase over the previous two years. The infant mortality was high—28.5 per cent. During the year there were 152 cases of diphtheria, of which 23 proved fatal.—*Canadian Medical Association Journal*, 1: 578, June 1911.