TINEA CAPITIS (M. AUDOIN) IN A RESIDENTIAL SCHOOL

BY

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Two children suffering from tinea capitis were seen at a dermatological clinic in a small town in Northern Ireland. On tracing the source of infection it was eventually found that over 30% of the pupils in a residential school in Belfast, with about 350 children on its roll, were infected with ringworm of the scalp. The present paper emphasizes the value of tracing sources of infection when tinea capitis is discovered, and the danger of a reservoir of infection such as the residential school is described.

Ringworm of the scalp has been endemic in Northern Ireland for many years, and routine examination of Belfast schoolchildren by Wood's light (Margarot and Devèze, 1929; Lewis *et al.*, 1944) has been in progress since January, 1950 (Beare and Cheeseman, 1951a). Schools are visited by two nurses equipped with a Wood's lamp and blackout material; the homes of children found to be infected are also visited, and infected children and susceptible contacts are referred to a ringworm clinic. All children known to be infected are excluded from school until judged free from infection.

Discovery of Infection at the School

In June, 1950, two children, brother and sister, suffering from tinea capitis, who had recently been boarders at a residential school in Belfast, were seen at a dermatological out-patient session at a rural hospital. This school was at once visited by the Wood's-light team. At their first visit 354 children were examined, of whom 89 were found to be infected (Table I).

TABLE I.—Showing Children Found to be Infected at First Examination as a Proportion of All Children Seen at First Examination

Age to Nearest Year	Boys			Girls		
	No. in School	No. Infected	Per-centage Infected	No. in School	No. Infected	Per-centage Infected
1	—	—	—	3	—	—
2	8	5	62.5	11	5	45.5
3	14	11	78.6	15	9	60.0
4	10	7	70.0	12	8	66.7
5	16	8	50.0	17	7	41.2
6	19	4	21.1	14	6	42.9
7	21	5	23.8	18	9	50.0
8	14	3	21.4	9	1	11.1
9	14	—	—	15	1	6.7
10	16	—	—	11	—	—
11	13	—	—	13	—	—
12	13	—	—	18	—	—
13	14	—	—	4	—	—
14	10	—	—	9	—	—
15	3	—	—	—	—	—
Total ..	185	43	23.2	169	46	27.2

Examinations were repeated at monthly intervals over a period of five months; all children in the school on each occasion were examined. At the second visit 13 more cases were found, and at successive examinations the new cases numbered 6, 6, 2, and 0. Ultimately, therefore, the number of infected children was 116. In all, 367 children were examined (Table II).

A final examination in June, 1951, showed one child, whose tinea capitis had been treated by epilation and who

TABLE II.—Showing Infected Children as a Proportion of All Children Exposed, Irrespective of Length of Exposure

Age to Nearest Year	Boys			Girls		
	No. Exposed	No. Infected	Per-centage Infected	No. Exposed	No. Infected	Per-centage Infected
1	—	—	—	3	—	—
2	11	9	81.8	11	5	45.5
3	18	15	83.3	15	11	73.3
4	11	8	72.7	13	9	69.2
5	16	10	62.5	18	9	50.0
6	19	8	42.1	15	7	46.7
7	22	8	36.4	18	9	50.0
8	14	4	28.6	9	1	11.1
9	14	—	—	15	1	6.7
10	16	1	6.3	11	—	—
11	13	1	7.7	13	—	—
12	14	—	—	18	—	—
13	14	—	—	4	—	—
14	10	—	—	9	—	—
15	3	—	—	—	—	—
Total ..	195	64	32.8	172	52	30.2

had subsequently been found clear, to have a few fluorescent hairs in the original area. All other children in the school at this time were clear.

The clinical appearances of most of the cases suggested an old infection of over six months' duration. This is interesting, since no request for advice had been received from the school, although the standard of cleanliness was notably high.

Responsible Organism.—Specimens of hair from each child were examined, and from all but one a culture of *Microsporum audouini* was grown. The exception was *Trichophyton sulphureum*, and this infection is excluded from the analyses.

Treatment

Isolation was impossible. Each infected child was provided with a close-fitting cap, to be worn until clear of infection. Total x-ray epilation was given to 48 boys and 38 girls, and local x-ray epilation to six boys and six girls. The remaining 10 boys and 8 girls were treated by manual epilation. All were given Whitfield's ointment to prevent spread of infection, especially during x-ray epilation.

Age and Sex Incidence

This series is unusual in that infection among girls was almost as widespread as among boys. At all ages combined, 64 (32.8%) of the 195 boys exposed to risk were infected, compared with 52 (30.2%) of the 172 girls (Table II). At specific age groups the proportion of infected girls was slightly less than that of infected boys except at ages 6, 7, and 9 years; but, bearing in mind the small numbers exposed in single-year age groups, the sex differences are negligible.

In view of the similar sex incidence of infection it is important to note that the boys' and girls' departments of the school are in separate buildings about half a mile apart. No buildings or classes are common to both sexes, but boys and girls have occasional contact with each other at play in the open air, and the school has several sets of siblings, each including children of opposite sexes. These facts alone, however, will not explain the similar sex incidence.

Most reported series suggest a much higher incidence among boys than among girls (Keddie, 1947; Barlow, Chattaway, and Whewell, 1950; Beare and Cheeseman, 1951b). I have not seen any reports of outbreaks in institutions comparable to the residential school here discussed. It would be of interest to know if the sex ratio of infection found here is a feature of outbreaks in mixed institutions.

In the present series, girls aged 3 and 4 years and boys aged 2 to 4 years were most commonly attacked (Table II). The age groups usually affected are between 5 and 10 years; for example, 49% of Keddie's (1947) series of 312 boys were in the age group 5 to 11 years, only 11% below 5 years, and

40% over 11 years. However, Keddie's series, like most others, suffers from the disadvantage that little is known about the population exposed to risk. In the outbreak described by Beare and Cheeseman (1951b) the age and sex distributions of the school populations were known and a comparison of age incidence rates was possible; even so, there appeared to be little difference in the risk at age groups between 5 and 14 years, although the highest incidence rates usually occurred between the ages of 6 and 10 years.

In the hope of explaining these apparently unusual features of the age and sex incidence, the distribution of cases was examined further, but no satisfactory explanation was found.

The School as a Source of Infection

Many children at the school are orphans living there permanently, but there is also a small floating population of children lodged temporarily during a parent's illness or other emergency. It seems likely that for some time there had been here a reservoir of *M. audouini* infection from which children were released intermittently to spread the disease. This hypothesis is supported by follow-up examinations of 10 infected children who left the school without treatment or before it had been completed. It would appear that eight of these gave rise to secondary cases in the areas to which they went. Two other infected children left the school, one of whom went to Scotland, but no secondary cases are known to have arisen from either of these.

Summary

Tinea capitis in a residential school in Belfast is described. Over 30% of the school population of about 350 were found to be infected; the infection appeared to be most common at about 3 years of age, and was almost as common among girls as among boys.

The importance of examining contacts, and especially of tracing sources of infection of tinea capitis due to *M. audouini*, is exemplified.

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The 35th annual clinical At Home of the Royal Dental Hospital and London School of Dental Surgery was held on May 10. About 300 visitors attended. The programme presented various aspects of student training, together with the customary demonstration of cases and techniques of clinical interest, and a number of new or reconstructed departments were on view. In the Leicester Square building the School now has an admirable department of pathology, including a laboratory accommodating 32 students for the teaching of general pathology and bacteriology, as well as the dental aspects of those subjects. The museum, whose contents were scattered during the blitz, has been re-decorated and re-equipped. The department of clinical photography and visual education has new accommodation designed for its special requirements. A seminar room has been fitted up to accommodate 30 students, and the radiological department has been replanned and enlarged. At the Grove Hospital, Tooting, the hospital now has a specially designed unit of operating theatre and 12 beds, making possible dental treatment for in-patients and special operations of dento-maxillary surgery.

Medical Memoranda

Post-operative Brachial Plexus Paralysis

This complication was known at the end of last century, but it was not until the present decade that the condition received much notice in the medical literature. Clausen (1942) described nine cases. The *Lancet* (1950) published a leading article on this subject; it was fully reviewed by Ewing (1950), who reported five cases, and by Kiloh (1950), who described four. I anaesthetized three of Ewing's five cases and had hoped, by taking the precautions suggested in his paper, to avoid any further complications of this nature. A few months ago, however, a patient whom I had anaesthetized on three occasions during the course of a month developed a palsy after the third operation.

As this complication is occurring with increasing frequency, it is perhaps not untimely that the subject should again be reviewed and more drastic methods be suggested for its prevention. Although recovery usually takes place, it may take anything up to six months for it to be complete, during which period the patient is often seriously handicapped and sometimes unable to follow his occupation. The medico-legal aspect must also be remembered, two court cases having been reported in the Press during recent months.

CASE RECORD

A man aged 68, a fair operative risk, was suffering from carcinoma of the bladder. *Operation 1*: Transplantation of right ureter; position on table, horizontal; right arm, abducted, attached to arm board; length of anaesthesia, 2 hours 10 minutes; cystoscopy, half an hour; length of operation 1½ hours. *Operation 2*: Transplantation of left ureter; position on table, horizontal; left arm, abducted, strapped to arm board; length of anaesthesia, 1 hour 55 minutes; length of operation, 1 hour 25 minutes. *Operation 3*: Cystectomy; position on table, Trendelenburg 15 degrees, shoulder-rests in position; knees bent at right angles; left arm abducted; length of anaesthesia, 2 hours 50 minutes; length of operation, 2 hours 25 minutes.

Great care of the patient's position was taken at each operation. The arm was placed on an arm board with abduction less than 90 degrees and was internally rotated; in the third operation, when the Trendelenburg tilt was used, as much weight as possible was taken off the shoulders by breaking the table and flexing the knees.

Each operation was uneventful, though 1½ pints (850 ml.) of blood was given in the third operation to neutralize blood loss. The anaesthetic on each occasion was thiopentone induction, nitrous-oxide-oxygen and "trilene" for maintenance. Gallamine triethiodide ("flaxedil"), 100 mg., was given during the first and second operations, and 120 mg. during the third.

Convalescence was straightforward after the first two operations. But after the third the patient complained of weakness in the left arm and hand. On examination he was found to be suffering from a paralysis of those muscles supplied by nerve roots C 5 and C 6, the musculo-cutaneous and radial nerves being most seriously affected. The condition has been treated by physiotherapy and progress has been slow, but when the patient was last seen, three months after operation, there was still some extensor weakness but recovery was almost complete.

CAUSATION

There can be little doubt that the damage to the brachial plexus is due to stretching of the plexus itself or its roots. This occurs when the shoulder-girdle of an anaesthetized and fully relaxed patient is placed under abnormal strain. The longer this strain lasts the more likely is a palsy to occur.