

Clinical Study on Slight Fever

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ABSTRACT. Between May 1981 and April 1986, 1402 patients were admitted to the Department of Primary Care Medicine of Kawasaki Medical School Hospital. Of these, 452 patients had a slight fever ranging from 37.0°C to 37.9°C. We analyzed those patients clinically.

Infection ranked first as the cause of slight fever, followed by malignancy, collagen disease and others. About 50% of the cases were of unknown origin, and many cases with CRP and ESR almost within the normal range convalesced satisfactorily. The measurement of CRP and ESR in slight fever patients were useful to exclude organic slight fever.

The cases with a slight fever of unknown origin appearing for a long term also often had nonorganic diseases such as depression or neurosis. Almost all of these cases were placed in the category of habitual hyperthermia.

Key words : slight fever — CRP and ESR — habitual hyperthermia

Slight fever is among the most frequent reasons for office visits, and it sometimes is the only key in diagnosing an important hidden disease. We commonly call a slight elevation of body temperature a slight fever. But the criteria of slight fever are not unified, although various suggestions have been made by many authors. We defined a slight fever ranging from 37.0°C to 37.9°C provisionally. The slight fever of our subjects ranged from 37.0°C to 37.9°C over one day, and we carried out a clinical study of slight fever and its role in disease.

MATERIALS AND METHODS

Between May 1981 and April 1985, 1402 patients were admitted to the Department of Primary Care Medicine of Kawasaki Medical School. Of these, 452 patients experienced a slight fever ranging from 37.0°C to 37.9°C over one day. If the patient had a fever over 38.0°C, he was excluded from the investigated subjects.

RESULTS

1. Causes of slight fever

Fig. 1 shows the causes of slight fever. Our 452 cases with slight fever

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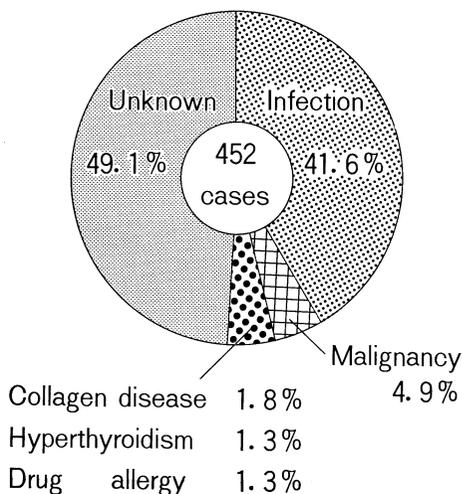


Fig. 1. Causes of slight fever.

equivalent to 32.1% of the total inpatient population and to 65.5% of patients with fevers of over 37.0°C. The causes of slight fever were infection, 41.6%; malignancy, 4.9%; collagen disease, 1.8%; hyperthyroidism, 1.3% and drug allergy, 1.3%. In the remaining 41.9% causes were unknown.

2. Slight fever due to infections

The infectious diseases which caused slight fever are shown in Table 1. The total number of cases was 188. Pneumonia, lung abscess and pleuritis ranked first, followed by upper respiratory infections. Respiratory infections occupied 53.2% of the total. Other infectious diseases included acute hepatitis, urinary tract infections, central nervous system infections, acute cholecystitis, ileus, acute colitis, etc.

TABLE 1. Slight fever due to infections.

infections	No.
pneumonia, pleuritis	77
lung abscess	
upper respiratory infection	23
urinary tract infection	18
acute hepatitis	15
central nervous infection	8
acute cholecystitis	7
ileus	7
acute colitis	5
others	28
total	188

3. Slight fever due to malignancies

The malignancies which caused slight fever are shown in Table 2. The total number of cases was 22. Gastric cancer ranked first, followed by malignant lymphoma. Other malignancies were hepatocellular carcinoma, lung cancer, colon

cancer, etc. 12 cases among 17 cases, with the exception of malignant lymphoma, had metastatic lesions. Seventeen cases were examined with regard to CRP and ESR, and the values were over 3.0 mg/dl for CRP and over 30 mm/h for ESR. Even if the patients had diseases such as malignancy and hyperthyroidism which might be the origin of fever, we defined the origin of slight fever as unknown if the relation between the diseases and slight fever was not clear.

TABLE 2. Slight fever due to malignancies.

malignancies	No. (with metastasis)
gastric cancer	7 (6)
malignant lymphoma	5
lung cancer	2 (2)
colon cancer	2 (1)
hepatocellular carcinoma	2
uterine cancer	1 (1)
prostatic cancer	1 (1)
cholecystic cancer	1
pancreatic cancer	1 (1)
total	22 (12)

4. Slight fever of unknown origin

The causes of slight fever of 222 cases were unknown. Table 3 shows the underlying diseases of the cases with slight fever of unknown origin. Among these diseases there were many nonorganic diseases, such as neurosis, depression, psychosomatic diseases such as irritable colon, migraine, etc. Psychiatric diseases ranked first among underlying diseases, and occupied 24.3% of the total. Other underlying diseases were cardiovascular disease, gastroduodenal ulcer, hepatobiliary disease, digestive disease, cerebrovascular disease, diabetes mellitus and iron deficiency anemia, etc.

TABLE 3. Underlying diseases of the cases with slight fever of unknown origin.

underlying diseases	No. (%)
neurosis, depression, PSD	54 (24.3)
cardiovascular diseases	43 (19.4)
hepatobiliary diseases	27 (12.2)
digestive diseases	23 (10.4)
cerebrovascular diseases	16 (7.2)
diabetes mellitus	12 (5.4)
malignancy	10 (4.5)
iron deficiency anemia	7 (3.1)
hyperthyroidism	6 (2.7)
others	24 (10.8)
total	222 (100.0)

PSD: psychosomatic diseases

5. The degree and duration of slight fever of unknown origin

Fig. 2 shows the degree and duration of slight fever of unknown origin.

Of all the cases with slight fever 77.9% had fevers ranging from 37.0°C to 37.4°C, while 22.1% had fevers ranging from 37.5°C to 37.9°C. The majority of cases with slight fever of unknown origin, approximately 80%, had fevers of less than 37.4 °C. In the remainder of the cases, 17.6% required 3 to 7 days for alleviation of fever, 9.0% required 8 to 14, days and 1.4% required 15 to 21 days.

Six cases (2.7%) required over 22 days for alleviation of fever. Many of the cases with slight fever of a duration of less than 2 days and of 37.4°C or below had a good prognosis clinically.

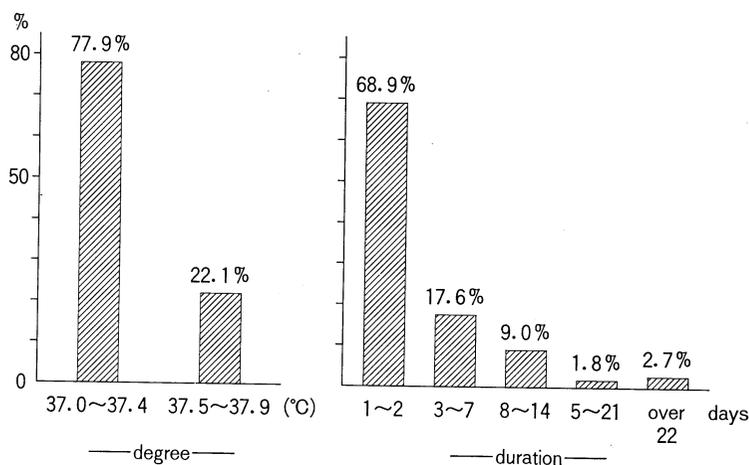


Fig. 2. Slight fever of unknown origin (222 cases).

6. The degree of CRP and ESR

Table 4 shows the degree of CRP and ESR investigated in 138 cases with slight fever of unknown origin. Cases in which the CRP was less than 1.0 mg/dl and the ESR was less than 30 mm/h convalesced satisfactorily. Those cases which had severe abnormal values had malignancy, collagen disease, cirrhosis of the liver, etc, as the underlying disease.

TABLE 4. 138 cases with slight fever of unknown origin (degree of CRP and ESR).

CRP (mg/dl) \ ESR (mm/h)		ESR (mm/h)			
		— ~ 0.5	+ 0.5 ~ 1.0	++ 1.1 ~ 2.0	+++ 2.1 ~
—	~ 15	87 (63.0%)	5 (3.6%)	1 (0.7%)	0 (0.0%)
+	16 ~ 30	21 (15.0%)	3 (2.2%)	2 (1.5%)	1 (0.7%)
++	31 ~ 50	6 (4.4%)	2 (1.5%)	1 (0.7%)	2 (1.5%)
+++	51 ~	2 (1.5%)	1 (0.7%)	2 (1.5%)	2 (1.5%)

TABLE 5. Slight fever of unknown origin over a long period of time.
6 cases

case	underlying disease	degree	period (days)	CRP (mg/dl)	ESR (mm/h)	WBC (/mm ³)
1 47F	depression	37.3°C	22	0.4	19	6400
2 47F	depression	37.4°C	25	0.2	15	5100
3 19M	neurosis	37.6°C	30	0.3	2	7700
4 50F	PSD	37.3°C	26	0.3	2	5200
5 66F	PSD	37.6°C	23	—	8	8000
6 54M	DU	37.3°C	30	—	10	5400

PSD: psychosomatic disease, DU: duodenal ulcer

TABLE 6. Differential diagnosis of slight fever.

functional diseases	organic diseases	
	infectious	noninfectious
reversible and nonorganic diseases	slight fever due to various infections	diseases which may be the causes of slight fever
habitual hyperthermia neurosis psychosomatic disease pregnancy menstruation postinfectious fever	focal infection opportunistic infection geriatric infection tuberculosis	malignancy, peptic ulcer, collagen disease, CHF, hyperthyroidism, anemia, central nervous disorder, cirrhosis of the liver, sarcoidosis

CHF: congestive heart failure

7. Cases with slight fever of unknown origin over a long period of time (Table 5)

Slight fever of unknown origin continued over 22 days in six cases. The underlying diseases of these cases were almost all nonorganic diseases such as neurosis, depression, and psychosomatic disease. The CRP, ESR and WBC of these cases were almost within the normal range.

DISCUSSION

According to Petersdorf¹⁾ a fever of unknown origin (FUO) is one of at least three weeks duration, the diagnosis of which has eluded attending clinicians for at least a week. Petersdorf and Beeson²⁾ reported that most patients with FUO do not suffer from unusual diseases. Instead they exhibit atypical manifestations of common illness.

The definition of slight fever is still unclear. In the present clinical study we included patients with fever from 37.0°C to 37.9°C over one day of hospitalization. Negligible slight fever, which we often encounter in our daily clinic, was also included. In our study, infection ranked first as the cause of slight fever, as it has in other reports.^{3,4)} It accounted for 45% all cases with slight fever. 4.9% of cases with slight fever were due to malignant tumors. Certain authors^{5,6)} have felt that the degree of tumor involvement or the site of involvement correlates well with fever. And we had many cases of slight

fever of unknown origin. A differential diagnosis of slight fever is at first indispensable to differentiate functional slight fever from organic slight fever, as shown in Table 6.⁷⁾

1. Functional slight fever

Habitual hyperthermia is the most representative cause of functional slight fever. But its diagnosis must depend on an excluding diagnosis. Its distinctive features are¹⁾ no great fluctuation,²⁾ the patient has unstable complaints due to autonomic nervous failure, and³⁾ in spite of a detailed examination, the origin of slight fever is unknown. There are many functional hyperthermias, such as habitual hyperthermia with neurosis, depression and psychosomatic disease, in the background of slight fever of unknown origin appearing over a long term. But it is important to distinguish functional slight fever from slight fever due to an organic disease such as malignancy. Postinfectious fever is a slight fever that appears during the post infectious term, although symptoms have almost disappeared. It seems to occur because the regulation center for body temperature sets up on an acute infectious phase.

2. Organic diseases

A. infectious slight fever

i) focal infection

The tonsils and dental carries have a tendency to be a focus of infectious slight fever, so that we must not forget to examine the oral cavity. Among other foci of infection with slight fever are the middle ear, the paranasal sinus, the gallbladder, the appendix vermiformis, the periproctus and the salpinx.

ii) geriatric infection

Slight fever due to infection in the aged is representative of infectious slight fever. The aged do not always experience high fever even in acute infections, but they do often have a slight fever. It is important in the aged to consider a slight fever as one of the symptoms of infection.

B. noninfectious slight fever

Diseases that may be the cause of slight fever are listed in Table 4. These diseases often have other symptoms in addition to a slight fever, so that a slight fever has little significance as a sign for diagnosis. In 1912, Moro⁸⁾ first spoke of a group of cases where fever was present after exertion. Then the term "habitual hyperthermia" was apparently introduced by Moro in describing observations made on three children with rectal temperatures varying from 37.2°C to 38.0°C.⁸⁾ Smith⁹⁾ reported that this fever was of low grade, that it persisted for months and sometimes for years without an organic cause becoming evident and that it was associated with various symptoms and findings suggestive of psychoneurosis, so that even the possibility of a psychosomatic origin of the fever had been considered. In 1940 Reiman¹⁰⁾ found low grade temperature elevations in a group of psychoneurotic patients who showed tachycardia, wide pupils, dry mouth and hyperperistalsis. It seems equivalent to the second of Wolf and Wolff's¹¹⁾ three instances of neurogenic fever under the heading of habitual low grade fever. In our study, 5 out of 6 cases who had a slight fever of unknown origin that continued over 22 days had nonorganic diseases such as neurosis and depression as underlying diseases. These cases may be thought compatible with habitual hyperthermia. The CRP, ESR and WBC of these cases were almost within the

normal range. Most of the cases of slight fever of unknown origin whose CRP, ESR and WBC were within the normal range fell into the category of habitual hyperthermia and they convalesced satisfactorily. On the other hand, advance of the CRP and ESR are findings suggestive of an organic lesion, such as a malignancy. Then careful examination is required.

CONCLUSIONS

1. Infection ranked first as the cause of slight fever, followed by malignancy, collagen diseases and others.
2. About 50% of the cases were of unknown origin, and many cases with CRP and ESR almost within the normal range convalesced satisfactorily. Patients in whom the CRP and ESR showed severe abnormal values were those suffering from malignancy, collagen disease, cirrhosis of the liver and other organic diseases which we could not ignore clinically. We believe that the CRP and ESR workup can be very useful to primary care physicians in differentiating innocent diseases from more serious in cases with slight fever of unknown origin.
3. Many cases who had a long term slight fever of unknown origin with normal CRP and ESR had been diagnosed to be suffering from neurosis, depression and psychosomatic disease. We think that many of these cases are consistent with habitual hyperthermia.

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