TABLE IV.—*Social Grade of Male Patients Aged 20–64*

Age	Site	Social Grade			
		I and II	III	IV	V
20–34	Gastric	2 (2·9)	20 (26·0)	7 (5·8)	11 (5·3)
	Duodenal	46	416	90	78
35–49	Gastric	3 (6·2)	62 (58·8)	13 (11·9)	11 (12·1)
	Duodenal	65	589	119	123
50–64	Gastric	6 (6·5)	40 (42·8)	15 (9·8)	8 (9·9)
	Duodenal	40	266	55	63

From the table are excluded 80 duodenal ulcer and 11 gastric ulcer patients whose social grade was not stated. The figures in brackets give the number of gastric ulcers expected at each age if site and social grade were independent.

that it agreed fairly closely with the proportion of unmarried women in the general population; for women aged 20–64 the 1931 Census for England and Wales gives the proportion of unmarried as 3,747,699 to 11,743,965, or 32%.

Relative Incidence of Duodenal and Gastric Ulcer in Great Britain

Nicol (1941) stated that the relative incidence of duodenal and gastric ulcers varied throughout Great Britain, and ranged from 8 to 1 in Scotland to 1 to 1 in London. He doubted whether the London figures were truly representative of the ulcer population in that area, and suggested that it was the practice in London to treat more cases of duodenal ulcer as out-patients than was usual in other cities, so producing an artificial difference in the ratio of duodenal to gastric ulcers. This was confirmed by Avery Jones and Pollak (1945), who by including out-patients found that in London duodenal ulcer was two and a half times as common as gastric ulcer. Nevertheless there is still a gross discrepancy with our finding in the West of Scotland that duodenal ulcer is about eight times as common as gastric ulcer.

Figures are not available giving the relative incidence of duodenal and gastric ulcers in the general population, but during the war many reports were made on peptic ulcer in the Services, and in these the D.U./G.U. ratio varied from 4.0 to 1 (Rook, 1943) to 8.7 to 1 (Morris, 1940). By taking only males under 45 years, and so making their series comparable with the Service patients, Avery Jones and Pollak made the ratio of duodenal to gastric ulcer 5.5 to 1. It would therefore appear that their experience with this age group may be taken as representative. However, when the same group of patients is considered in our series the D.U./G.U. ratio becomes 13.2 to 1. Consequently it must be concluded that the relative preponderance of duodenal ulcer over gastric ulcer is much greater in hospital practice in Scotland than in London. Whether this difference is due to an absolute increase in duodenal ulcer or a deficiency of gastric ulcers remains to be established.

Summary

A two-year survey of the peptic ulcer patients attending a Glasgow hospital is reported. The survey included both in-patients and out-patients. The chief findings were:

1. The overall sex ratio was 3.5 males to 1 female.

2. The overall site ratio was 7.7 duodenal ulcers to 1 gastric (9.5 to 1 for males and 4.4 to 1 for females). There was no evidence that the ratio of duodenal to gastric ulcer was influenced in males by social status or in females by marital status.

3. Patients with duodenal ulcer were notably younger than patients with gastric ulcer, and the age at onset of symptoms was also lower in duodenal ulcer.

4. The complications of ulcer which the patients had suffered were recorded. Attention is drawn to the relative rarity of perforation in duodenal ulcer in women.

5. In-patients differed from out-patients in respect of sex, age, site of ulcer, and complications. This is attributed to the fact that in-patients were a selected group comprising chiefly patients who had suffered one or more complications.

6. The ratio of duodenal to gastric ulcer appears to be much higher in Scotland than in London. This finding is discussed.

We wish to express our gratitude to Professor Illingworth, who proposed this survey, to the physicians, surgeons, and radiologists of the Western Infirmary for their ready co-operation, and to Miss S. G. Murray, Miss C. M. Atkinson, and Miss M. K. Chisholm for much secretarial help, loyally and efficiently given.

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THE DIET, HAEMOGLOBIN VALUES, AND BLOOD PRESSURES OF OLYMPIC ATHLETES

BY

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At a recent meeting of the Nutrition Society on the nutrition of athletes it was made clear that there were but few scientific data relating to the nutrition and physiology of athletes. The gathering of many athletes in London for the Olympic Games gave an opportunity for the study of certain aspects of their physiology—namely, the food consumption, haemoglobin levels, and blood pressures.

Food Consumption

Most of the athletes were housed and fed at the R.A.F. camp at Uxbridge, others being accommodated at a number of smaller centres. Different nationalities occupied different blocks, a dining-room in each block being reserved for the athletes. Food was prepared in three separate kitchens at the main camp. There was also one central cafeteria for snacks and light meals where athletes could entertain their guests. If any athletes were unable to come to camp for a meal they were provided with sandwiches; occasionally they had meals in outside restaurants. These various arrangements made the collection of food records somewhat complicated. Many of the athletes were under considerable mental tension before their contests, and it was therefore essential to exercise a good deal of tact in obtaining the food data. A further complication was that national dishes were in many cases provided and the nutrient values of these were not available in the customary tables of food composition.

The method of survey was as follows. On the Monday of each week the athletes chosen for study were interviewed and their co-operation enlisted. The study of each athlete lasted from Tuesday (breakfast) until Friday (supper)—that is, for four days. The athletes collected their food on the cafeteria system; a dietitian followed and was served with duplicates of the meal. At the end

of each meal the food left by the athletes was collected. The duplicate meals and the left-overs thus obtained were put separately into Kilner jars for eventual chemical analysis. At each meal the athlete told the dietitian what extras had been eaten since the previous meal, replicas of which were then obtained either from the cafeteria or from the teams' supplies. The Kilner jars were kept in cold storage, and at the end of four days were sent to the Laboratory of the Government Chemist for chemical analysis. The collection of the food samples was done by three of us (J.B.B., A.K.C., B.M.N.). In addition, Miss Lowden, of the Ministry of Food, collected four sets of diets by the same method from a smaller centre, the results of which have been included here.

Chemical Analysis of the Diets

The chemical analyses were made in the Department of the Government Chemist under the direction of one of us (C.G.D.). The mixtures of foods received for analysis consisted of duplicates, as near as could be judged, of the diets of the athletes as served at the camp canteens over a period of (usually) four days, together with the actual "leavings" of meals.

To secure a representative sample each Kilner jar was weighed as received, the contents tipped into a large aluminium container, and the jar weighed empty. Any bone, stones, and similar material of no food value were removed and weighed to obtain the amount of the edible material supplied and of the leavings. These leavings were analysed separately. The whole of the food was then introduced in portions into a large hand-operated mincer to produce a finely ground product. After thorough mixing an aliquot was transferred to a Waring blender to produce a homogenized product for analysis. If the liquid in the mixed food was not sufficient for the blender to operate properly a known weight of water was added to bring the mixture to a suitable consistency.

The determination of moisture, ash, fat, and nitrogen was carried out as described by Bransby *et al.* (1948). The carbohydrate values were obtained "by difference"—that is, the amount remaining after subtraction of the moisture, fat, protein, and ash. The factor 6.25 was used to calculate the protein content from the nitrogen values found by analysis. The factors 4, 9, and 4 were employed to calculate the calorie value of the diets from the respective protein, fat, and carbohydrate contents. The food tables of McCance and Widdowson (1946) and of Chatfield and Adams (1940) were used to calculate the nutrient values of any foods not obtainable for chemical analysis.

Results of Diet Studies

The results are shown in Table I. The protein intakes ranged from 65 to 231 g. a day, averaging 139 g. daily. Only three athletes had less than 100 g. daily. The high intakes were in the main due to large consumptions of meat, eggs, and milk. The intake of fat ranged from 92 to 223 g. a day, and averaged 137 g. daily. The carbohydrate intakes were from 128 to 572 g. a day, with an average of 390 g. daily. The proportions of glucose, sucrose, and starch eaten varied widely, some athletes taking liberal helpings of sugar in their tea, others taking glucose, while others took but small amounts of sugar and no glucose. The calorie intakes ranged from 2,113 to 4,739 daily, with an average of 3,350 daily. There was no consistent difference in the calorie intakes of different types of athletes—e.g., sprinter or long-distance runner. This aspect was further examined by considering the energy available for the normal everyday activities and athletic exercise, after making allowance for the basal metabolism. Thus for each athlete the requirement for basal metabolism and the allowance for specific dynamic action—namely, 10% of the calories provided by the food—were deducted from the total calorie intakes. The remainder, called for brevity "spare" calories, were compared according to the type of athlete. Again, there was no consistent variation of these "spare" calories with the type of event. The "spare" calories per kg. of body weight were then calculated for each athlete (last column, Table I). The results for four nationalities are set out, according to event, in Table II. The data for the Canadians and Chinese suggest that more "spare" calories per kg. of body weight were required for long-distance than for short-

TABLE I.—*Average Daily Intakes of Nutrients by Olympic Athletes*

Nationality	Age in Years	Civil Occupation	Height (cm.)	Weight (kg.)	Event	Protein (g.)	Fat (g.)	Carbohydrate (g.)	Calories	Basal Metabolism	"Spare" Calories	
											Per Day	Per kg.
British	29	Policeman	183	79	100 m.	136	161	413	3,645	1,915	1,366	17
Canadian	23	Student	181	80	100 m.	137	92	443	3,148	1,938	895	11
Belgian	18	,,	177	70	200 m.	192	125	459	3,729	1,905	1,451	21
Mexican	23	,,	168	57	200 m.	95	112	267	2,456	1,614	596	10
British	28	Clerk	190	75	400 m.	180	209	524	4,697	1,924	2,303	31
Jamaican	—	Student	186	72	200 m., 400 m.	124	109	490	3,437	1,866	1,227	17
Chinese	23	In bank	172	59	400 m.	99	105	338	2,693	1,653	771	13
,,	25	Clerk	174	61	400 m.	103	111	299	2,607	1,663	683	11
British	30	,,	176	69	800 m.	158	200	481	4,356	1,748	2,172	31
Jamaican	—	Student	196	84	400 m., 800 m.	136	116	572	3,876	2,069	1,419	17
Belgian	25	Clerk	175	69	800 m., 1,500 m.	187	110	439	3,494	1,770	1,375	20
British	27	Regular Army soldier	181	64	800 m., 1,500 m.	129	185	369	3,657	1,741	1,550	24
Canadian	22	Salesman	182	65	800 m., 1,500 m.	136	115	418	3,251	1,791	1,135	17
,,	20	Student	190	88	800 m., 1,500 m.	143	153	531	4,073	2,106	1,560	18
Belgian	25	Clerk	169	63	3,000 m., 10,000 m.	169	104	322	2,900	1,663	947	15
British	41	In food factory	165	67	Marathon	231	164	367	3,868	1,590	1,891	28
Canadian	32	In aircraft factory	169	62	,,	139	149	400	3,497	1,623	1,524	25
Chinese	—	—	173	59	,,	146	126	326	3,022	1,604	1,116	19
,,	—	—	167	55	,,	118	108	351	2,848	1,574	989	18
Luxemburger	18	Student	181	78	120 miles cycle	172	223	511	4,739	2,039	2,226	29
,,	22	—	168	67	120 miles cycle	137	146	411	3,506	1,732	1,423	21
Nigerian	25	Student	187	76	Jumping	114	114	310	2,722	1,924	528	7
Luxemburger	28	—	178	75	Gymnast	169	172	413	3,876	1,857	1,631	22
,,	25	Printer	165	53	,,	128	158	214	2,790	1,528	983	19
Mexican	26	Lawyer	170	72	Wrestler	117	128	429	3,336	1,760	1,242	17
,,	26	Student	180	82	Basket ball	134	104	397	3,060	1,934	820	10
,,	31	Business man	175	96	Hammer-throwing	65	149	128	2,113	2,005	103	—
Chinese	17	Student	—	—	Swimmer	101	93	309	2,477	—	—	—

TABLE II.—"*Spare*"* *Calories per kg. of Body Weight per Day*

Event	100 M.	200 M.	400 M.	800 M.	1,500 M.	10,000 M.	Marathon	120 Miles Cycle
British	17		31	31	24		28	
Canadian	11				17, 18		25	
Chinese			11, 13				18, 19	
Belgian and Luxemburger		21			20	15		21, 29

* Total calories less the sum of the basal metabolism and specific dynamic action.

distance events, but this was not substantiated by the data for the Belgians, British, and Luxemburgers.

Ascorbic Acid.—Estimations of the ascorbic acid intakes were made for seven athletes. Duplicate portions of all foods containing ascorbic acid were collected from the kitchens and were analysed by Dr. C. W. Herd. The intakes (mg.) per day were: British, 71, 80; Luxemburger, 45; Belgian, 81; Canadian, 41; Chinese, 43; Jamaican, 98. Orange juice contributed largely to the last value.

Food Habits

Twenty athletes were interviewed concerning their normal food habits and their food habits during training and on the day of the race or event. Most of them stated that they were always in training and that consequently their diet underwent little change when they were getting ready for a race. The majority stressed the value of generous helpings of meat, eggs, and milk. Thus one marathon runner normally has two or three eggs and 1–1½ lb. (453–680 g.) of steak daily, and a sprinter two eggs and 1 lb. of steak daily. There were, however, a number of interesting variations as the day of the race approached. Two short-distance runners tend to eat less, a marathon runner to cut down on milk, and a javelin-thrower to cut out afternoon snacks and drink more milk. A middle-distance runner has the same food but larger helpings, and a short-distance runner tries to have more eggs, milk, and meat. Another middle-distance runner has a normal diet throughout training, but on the day preceding the race eats more than usual. The athletes thus did not behave uniformly, but appeared to fall into three groups: those who did not vary their normal habits throughout training, those who tended to eat less, and those who tended to eat more.

On the day of the race food habits often changed considerably. The majority have a normal breakfast, but again there are interesting variations. One short-distance runner has additional eggs and bacon; two others omit breakfast, and another has a broiled steak the night before the race and poached eggs for breakfast. A middle-distance runner and a marathon runner have no breakfast. In practically all cases a lightly cooked meal is eaten three to four hours before the event. Most short- or middle-distance runners have a light snack, the favourite appearing to be poached eggs on toast; but two short-distance runners each have 2 lb. (900 g.) of steak, one additionally having milk, the other chocolate, three-quarters of an hour before the race. Each of the three marathon runners interviewed has a good meal of steak or eggs and bacon about four hours before the race; a 10,000-metre runner has a normal breakfast and nothing within four hours of the race; a wrestler has nothing between 6 o'clock the previous evening and the weigh-in in the morning, but about three hours before the event has a hearty meal of steak, potatoes, and cakes. A javelin-thrower has a normal breakfast and a light snack four hours before the event, and a high-jumper makes no variations at all from his normal diet.

Some athletes specially mentioned sugar, glucose, and salt. Two short-distance runners and a javelin-thrower make a point of taking a lot of sugar in their drinks before the race; a short-distance runner and a marathon runner have glucose every morning; and middle- and long-distance runners have glucose on the day of the race. Three short-distance runners make a point of taking plenty of salt in their food, and two middle-distance runners take salt regularly when in strict training. Two short-distance runners take synthetic vitamin B_1 tablets daily, and a jumper takes preparations containing vitamins A, B, C, and D. Most of the athletes avoid taking much fat or fatty foods before the event, as it is considered indigestible.

Haemoglobin Levels

Blood samples were obtained from 147 men from 18 countries. Their ages ranged from 16 to 47 years, and they competed in a wide variety of events. Blood was taken from the finger, the subject sitting after normal non-strenuous activity. The alkaline haematin method was used with a Medical Research Council Grey Wedge photometer, calibrated against Gibson Harrison standard. The same person (W.T.C.B.) examined all the bloods. Pipettes were tested and corrections made, where necessary, beforehand.

The mean haemoglobin level of the 147 men was 16 g. per 100 ml., with a range of from 13.7 to 18.6 g. and standard deviation of 1.01 g. The mean level for 93 men from temperate countries was identical with that of 54 men from warm or tropical countries—namely, 16 g.

The haemoglobin levels of 35 men competing in events involving a high oxygen debt—short-distance runners, swimmers, cyclists, and oarsmen—averaged 15.9 g., which is not significantly different from the grand average. Subdivisions into events demanding great strength, great endurance, and skill rather than endurance gave averages of 15.9 g., 15.7 g., and 16.2 g. respectively. None of the differences between these is significant.

Blood Pressures

Readings were taken with the subject seated, after normal non-strenuous occupation. An ordinary mercury column-and-cuff sphygmomanometer was used. The diastolic pressure was read at the beginning of the fourth phase. Readings were taken either by one of us (H.S.T.) or in six instances by the doctor to the team.

Values for the whole group, and for men from temperate and warm countries, are shown in Table III. The group from temperate countries had a significantly higher systolic and lower diastolic pressure than the group from warm countries.

TABLE III.—*Blood Pressures of Olympic Athletes According to Climate*

Group	No. of Subjects	Mean Systolic mm. Hg	S.D.	Range	Mean Diastolic mm. Hg	S.D.	Range
Temperate countries	111	121·2	13·2	100–160	76·0	8·2	60–100
Warm countries ..	90	116·6	13·1	90–150	79·1	7·7	65–100
Whole	201	119·1	13·1	90–154	77·4	8·1	60–100

TABLE IV.—*Blood Pressures of Olympic Athletes According to Body Weight*

Group	No.	Systolic Pressure mm. Hg	Diastolic Pressure mm. Hg
Temperate countries:			
Less than 140 lb. (63·6 kg.) ..	11	112·8	68·1
140–164 lb. (63·6–74·5 kg.) ..	52	120·1	75·6
165–189 lb. (75·0–85·9 kg.) ..	33	121·2	76·8
190 lb. (86·3 kg.) or more ..	15	130·8	81·2
Warm countries:			
Less than 140 lb. (63·6 kg.) ..	23	114·1	77·1
140–164 lb. (63·6–74·5 kg.) ..	44	116·2	79·1
165–189 lb. (75·0–85·9 kg.) ..	16	117·4	80·1
190 lb. (86·3 kg.) or more ..	7	126·3	84·0

TABLE V.—*Blood Pressures of Olympic Athletes According to Age*

Group	No.	Average Age	Systolic Pressure mm. Hg	Diastolic Pressure mm. Hg
Temperate countries:				
Under 25 years ..	49	21·5	120·0	75·8
25–29 years ..	31	26·6	124·2	74·9
30 years or more ..	31	33·7	119·9	77·3
Warm countries:				
Under 25 years ..	37	21·7	117·0	78·2
25–29 years ..	29	26·6	116·2	79·0
30 years or more ..	24	33·4	116·6	80·8

The average systolic and diastolic pressures showed a trend of increase with increasing weight (Table IV). Table V shows mean pressures according to age. While systolic pressure shows no consistent trend, diastolic pressure tends to increase with increasing age. Classification according to type of athletic event did not reveal any significant differences in blood pressures.

Discussion

Food.—From a study of the diets of Olympic athletes in Berlin in 1936 Schenk (1936) reported that the average calorie intake of the competitors was 7,300 a day—that is, an amount vastly in excess of the highest value found in this study. The difference between them was probably due to the difference in the method of survey, the Berlin investigation relating to the foods entering the camps, the present investigation to the foods actually eaten. The average calorie intake of the 28 athletes (3,350) is about the average need of a man engaged on light work, and thus confirms the view put forward by Abrahams at the meeting of the Nutrition Society that the energy requirement of athletes is not as great as is commonly supposed. There is, however, the possibility that the food eaten during the survey period was less than that normally eaten, as the members of some teams may have been unaccustomed to the foods and meals provided. Moreover, the period of survey—namely, four days—was short, though the results are fairly consistent.

There is a good deal of variation in food habits during training, but athletes in general seem to attach importance to liberal amounts of the animal protein foods in their diets. It is not possible, however, to say whether this preference is due to special value being attached to protein *per se* or to the foods themselves which contain animal protein—namely, milk, eggs, and meat. Some athletes take liberal amounts of the easily assimilated carbohydrates—namely, glucose and sucrose—but fat did not seem to be popular, especially near the time of the event, as it is considered to be indigestible. On the day of the race the short- and middle-distance runners mostly favour a snack or light meal a few hours before the race, but the marathon runners prefer a more substantial meal. There were, however, a number of notable exceptions. Vegetables are generally avoided near the race because they cause flatulence.

Haemoglobin Levels.—A wide range of mean haemoglobin values has been reported for different groups of healthy men. In 71 studies available to us from many countries 8 average values of 16 g. or over were reported, and 11 of 15 g. or less. The remaining 52 means lay between 15 and 16 g. Differences must have existed between one group and another in respect of food habits, indulgence in tobacco, and in the amount of exercise taken, and these may account for some of the differences found for these variations, which occur even between different groups in the same country. Most of the subjects of the present study lived on a diet which provided an abundance of the factors needed for blood formation ; on the other hand they smoked but little, so that the increase in haemoglobin level associated with tobacco-smoking (Wintrobe, 1942) would presumably not occur. The effect, if any, of exercise upon haemoglobin level is not known for certain. Adcock *et al.* (1949) have shown that, in comparable groups of men, those engaged in active occupations had lower average haemoglobin values than sedentary workers, and the Medical Research Council's (1945) survey also gives lower values for the more active occupations. It will be noted, however, that the most active group of all the subjects of the present investigation, the short-distance competitors and oarsmen, had a mean level which was not significantly different from the grand average

The subjects of the present study represent man at his optimum, and it is of interest that the mean of 16 g. was found in men from temperate and warm climates alike. The standard deviation of 1 g. and the wide range which we found show, however, that wide variations from this mean are compatible with physical perfection, for obviously none of our subjects would have represented his country had his performance been physiologically impaired.

Blood Pressures.—Treadgold (1933), in reporting on the pressures of healthy R.A.F. personnel, gives systolic means from 122 to 125 mm. in healthy men of the age range in this study, and diastolic means of from 75 to 79 mm. Symonds (1923), in America, gives systolic means of from 123.5 to 126.4 and diastolic means of 79.5 to 83.3. Robinson and Brucer's (1939) life-assurance figures for Americans show an average of 121 mm. systolic and 74 mm. diastolic, but the systolic pressure is between 118 and 119.25 for the ages with which we deal. The mean pressures of the group from temperate countries are therefore within the range of average values reported in health, a point of interest in view of the tension which prevails at the time of a world athletic contest. It may be noted that the bounding pulse, popularly held to be typical of the athlete, was not common.

Published figures (Donnison, 1929 ; Chamberlain, 1911 ; Kilborn, 1926) for the mean systolic and diastolic pressures for different peoples living in warm climates differ markedly, some being well above and some well below European means. The group of men in this study are of several races, and the number from any one nation is too small for a comparison with the European means.

Symonds (1923) showed that both systolic and diastolic pressures rose as the weight-height ratio increased. In the present study the subjects were grouped according to weight, and both systolic and diastolic pressures tended to increase with increasing body weight. There is nothing noteworthy about the relation between age and blood pressures shown in this study, especially in view of the fact that subjects with high pressures may tend to drop out or be weeded out of world athletics as they grow older.

Summary

A study was made of the food consumption, haemoglobin levels, and blood pressures of a number of competitors in the Olympic Games held in London in the summer of 1948.

The average daily intakes of 28 male competitors were 139 g. protein, 137 g. fat, 390 g. carbohydrate, and 3,350 calories. Neither the total calorie intake nor the "spare" calories—that is, the total calories less those required for basal metabolism and specific dynamic action—per kg. of body weight varied consistently with the type of event.

The food habits of the athletes varied considerably during training. The majority stressed the value of generous helpings of meat, eggs, and milk. Some took glucose or vitamin preparations or large helpings of salt. On the day of the race the usual practice among short- and middle-distance runners was to take a light meal, and the marathon runners a more substantial meal, three to four hours before the event.

Haemoglobin values were obtained for 147 men, the average being 16 g. per 100 ml. There was no difference between the average values for men from temperate and tropical countries, or according to the type of event.

Systolic and diastolic blood pressures were taken on 201 men, the average values being 119.1 and 77.4 mm. Hg respectively. Men from temperate countries had a higher average systolic and a lower average diastolic pressure than men from warm or tropical countries. Both diastolic and systolic pressures tended to increase with increasing body weight, and there was a tendency for diastolic pressure to increase with age.

We wish to express our appreciation of the facilities placed at our disposal by Messrs. John Gardner (London), Ltd., the caterers at the Olympic Camp at Uxbridge, and other help received from members of their staff, and particularly Miss Blundell. We are grateful to the doctors and managers of the teams for their co-operation and assistance, and particularly to Dr. A. Istamboul for his help and for the data he provided. The study could not have been made without the good will of the athletes, and we wish to express our thanks to them for their co-operation.

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SJÖGREN'S DISEASE, WITH DRYNESS OF THE BRONCHIAL MUCOSA AND UNCERTAIN LUNG LESION

BY

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Henrik Sjögren (1933, 1935, 1938, 1943), of Jönköping, by the careful study of cases of kerato-conjunctivitis sicca, has succeeded in establishing the existence of a syndrome, or rather a disease, which in its complete form includes kerato-conjunctivitis sicca, xerostomia, rhinitis sicca, pharyngitis sicca, and laryngitis sicca, but the disease is far more often incomplete. The eye lesion need not be the presenting condition, and patients may first seek medical advice because of enlargement of salivary glands or because of xerostomia.

The chronic inflammatory changes in the parotid glands, usually without suppuration but with recurrent exacerbations, tend to produce permanent enlargement, sclerosis, or atrophy in irregular combination. Analogous changes occur in the other salivary glands and in the oral mucosal glands; and also in the lacrimal glands, though usually without obvious clinical enlargement. It seems certain that many cases have been labelled as Mikulicz's disease or Mikulicz's syndrome. The skin, especially the sweat glands, and the stomach (acid-producing glands) may be involved in some cases. The clinical onset, often more pronounced on one side than the other, is intermittent and insidious. The patients are mostly middle-aged women. Clinical accompaniments may include accelerated blood-sedimentation rate, alterations in the blood count, in the body temperature, and in the blood-sugar curve, and not rarely arthritic symptoms (rheumatoid arthritis).

In regard to the eye condition Sjögren concluded: "The morbid changes appear to find their simplest explanation in the fact that, owing to intense diminution or complete abolition of the lacrimal secretion, the conjunctiva itself is obliged to provide for the entire secretion of fluid. As the result of this a chronic oedema arises, which gradually leads to degeneration and atrophy of the epithelium." One may suggest an analogous explanation for the secondary changes in the oral mucosa when they arise in cases of chronic xerostomia of any nature. According to Sjögren's investigations it seems clear that the dryness of the mouth and eyes is preceded by changes (microscopical) in the salivary and lacrimal glands.

Non-ocular features of the disease (Weber, 1945), in addition to the changes in the salivary glands and mouth, may include dryness in the nose, pharynx, and larynx; secondary dysphagia (Plummer-Vinson syndrome); secondary cough (from dryness of mouth and pharynx); achlorhydria; dryness of skin; dryness and atrophic change in the vagina; almost complete alopecia; accelerated blood-sedimentation rate; hypochromic anaemia; low blood pressure; low blood sugar; low blood calcium; Raynaud-like blueness of hands and feet; telangiectasis on lips and tips of fingers; telangiectatic and pigmentary sclerodermia-like changes in the legs (Sheldon, 1938–9); and delusional mental symptoms and occasional epileptic fits (Sheldon, 1938–9). But some of these features may possibly be regarded as superadded conditions, not directly connected with Sjögren's disease. However, in regard to the curious pigmentary sclerodermia-like dermatosis in Sheldon's case, one of us (Weber, 1945) has heard of another case of Sjögren's disease with similar leg pigmentation.

In the present case the unusual feature is the occurrence of dryness of the bronchial mucosa with some radiological basal pulmonary shadowing of uncertain nature, which may perhaps be interpreted as an infected (granulomatous) atelectasis due to breakdown of the natural defence owing to the dry bronchial mucosa.

Case Report

The patient is a delicately built woman of medium height, aged 34 on Nov. 13, 1948, thin, but apparently not losing weight. Her father died at 57 of heart failure; he suffered from bronchitis. Her mother died at 69 of "sugar diabetes." The parents had eight children, of which the patient is the seventh; all the others are said to be living and healthy. The patient herself has always been thin and delicate-looking, and since the age of 13 has been subject to short Raynaud-like attacks in the fingers—the tips turn white and then blue—relieved by putting the hands into hot water. She had measles at 17 and scarlet fever at 21. While still in the fever hospital after the scarlet fever she developed temporary swellings on both sides of the face, which were considered possibly mumps. About 1940 she noticed a peculiar dryness of the lips and mouth, which she did not get rid of. In January, 1942, painless cherry-sized parotid swellings developed, one on each side, and were diagnosed as Mikulicz's disease. For these she received deep *x*-ray treatment at the Cancer Hospital (six séances) and they disappeared, but not the dryness of the mouth.

Menstruation, which began at 12 years of age, has remained normal. She married in February, 1939, and in December, 1943, a child (boy) was delivered by caesarean section owing to the presence of a uterine fibroid, which was removed at the same time. The boy was normal at birth and has remained healthy. After suckling him for 8½ months she developed two small painless lumps (September, 1944), one on each side, under the lower jaw. With deep *x*-ray treatment (six séances) they disappeared. She received further deep *x*-ray treatment in February, 1946, but for the past eighteen months she has had a small painless swelling in the right sublingual region. About September, 1944, her eyes felt hot, dry, and irritable, and a doctor told her she had conjunctivitis. It cleared up, but has returned on and off ever since.

In April, 1946, she suffered from "dry pleurisy," first on one side and then on the other. For this she was in bed for three weeks only, but never got rid of the dry cough and since then