MASS MINIATURE RADIOGRAPHY OF FACTORY GROUPS IN MIDDLESEX

BY

W. POINTON DICK, M.R.C.S., L.R.C.P.

Physician to the M.C.C. Mass X-ray Unit

The Middlesex County Council Mass Radiography Unit took x-ray films of its first volunteer on Oct. 11, 1943, and to July, 1945, had examined over 70,000 persons, their ages ranging from 12 to 76 years. This report is confined to a survey of the work of the unit during the year 1944, with the exception of the age groupings of examinees and significant lesions, which are for the period Oct., 1943, to June, 1944. During 1944 ten factories were visited, their population ranging from 1,050 to 4,608. Neighbouring factories were invited to attend at most of these centres, so that the actual number of examinees varied between 706 and 9,640. Using the present set-up and the routine to be described below, it has been found to be uneconomic, from the point of view of time, to visit groups of fewer than 3,000. The response varied between 73 and 93% for inside groups, but fell to as low as 36% for some of the visiting factories. This was readily accounted for by the extra loss of working time when any considerable journey had to be made. The average period away from the work for an "inside" examinee was 15 minutes, and the unit has received letters from several firms stating that there was no appreciable loss in production time during its visit to their factory.

In a normal working week miniature films are taken on Monday, Tuesday, and Wednesday, and large films on Thursday. Friday is devoted to viewing miniatures, reporting on large films, and general clerical work. An average of 450 to 500 miniature films are taken daily, and as 500 is the maximum that can be satisfactorily viewed at any one sitting it is necessary to hold three viewing sessions weekly. During the first week of a visit there are four full days for miniatures, making a weekly total of 1,800 to 2,000, and the viewing sessions are correspondingly increased.

On Friday is completed the list of those persons required to attend for large films on the following Thursday. At one time it was the practice to send out the recall letters to their home addresses. In order to be sure of their receiving them in time it was necessary to post the letters a few days before the examinees were required to attend. We found that this period of waiting caused considerable anxiety and the development of not a few symptoms. To obviate this, examinees are now notified, where possible, by a note handed to them at their work an hour or so before their large film is due to be taken. Finally all persons who have a large film have a medical interview, including a discussion on their wet film, shortly after it is taken. In this way, by the time they return home from their work the whole procedure is completed.

Analysis of Results

The total number of examinees during 1944 was 34,227, comprising 19,609 males and 14,618 females. It has been impossible to date to set these out in age groups, but this has been done for the 20,982 persons examined by the unit during the period Oct., 1943, to June, 1944, and these are shown in Table I.

TABLE I.—Age Groups of Examinees

Age:	14-24	25-34	35-44	45-54	55+	Total All Ages
M ..	1,758* (14.6%)	3,658 (30.4%)	4,262 (35.5%)	1,610 (13.4%)	722 (6.0%)	12,010
F ..	3,680 (41.0%)	2,711 (30.2%)	1,718 (19.1%)	695 (7.7%)	168 (1.9%)	8,972

* It may be noted in regard to the small number in this group that in a paper by Trail *et al.* (1944) reporting a survey in the Royal Air Force 70% of the male examinees were in the 17-24 age group and that the incidence of active pulmonary tuberculosis among them was 0.3%.

Refusals.—It was possible to analyse the refusals by 682 persons from two factories with a total available population of 5,930. The result is given in Table II.

TABLE II.—Analysis of Refusals by 682 Persons

Age	Men		Women	
	Available	Refusals	Available	Refusals
14-34 ..	1,177	67 (5.7%)	2,167	165 (7.6%)
35+ ..	1,469	260 (17.7%)	1,117	190 (17.0%)

A further factory (Factory A of the Medical Research Council Report on Mass Radiography of Civilians) has been visited at yearly intervals, first by the M.R.C. and subsequently by this unit. It is of interest that out of 148 persons at this factory who refused in 1943 but who were x-rayed in 1944, and a further 214 who while refusing in 1944 attended for examination in 1945, there was not one who showed any evidence of pulmonary tuberculosis.

There were 1,909 examinees recalled for a large film in 1944, giving a recall figure of 5.6%. Of these, 50—that is, 2.6% of those recalled—did not attend for their large film. As would be expected, the number of defaulters was always higher in the outside groups, averaging 3.7%, compared with 1.6% for the main factories. There were a further 36 who, having had a large film and on interview been recommended to attend a chest clinic, failed to do so. Of those who attended a chest clinic 1.5% were reported as requiring no further action.

Abnormalities Found

The abnormalities discovered among the 34,227 persons examined by the unit during 1944 are listed below. They are divided into tuberculous and non-tuberculous groupings. Cardiovascular lesions predominated in the latter, and it is of considerable interest that the great majority of these patients were already aware of their disability.

A. Non-tuberculous Pathological Conditions

Cardiovascular	157 (0.5%)
Congenital 12; acquired 145 (86% already knew of their condition)	
Tumours	15
Bronchiectasis	31
Lung abscess	2
Pneumoconiosis	33
Pneumonitis	10
Bronchitis and emphysema	104
Pleural thickening	569*
Miscellaneous	158

* Some of these were almost certainly of tuberculous origin.

B. With Evidence of Pulmonary Tuberculosis, including Healed Lesions (1,435 Cases)

(1) Known cases (Improved or no change, 130; relapsed, 10) ..	140
(2) Newly discovered:	
(a) Requiring no further action	861 (2.5%)
(Including 537 healed primaries)	
(b) Showing significant lesions	434 (1.3%)

C. Analysis of Significant Lesions

(a) Extent of disease:	
Unilateral	275 (63.4%)
Bilateral	159 (36.6%)
(b) Disposal:	
Observation	346 (1.0%)
10.8% of these were put on modified work	
Treatment	88 (0.3%)
(c) Presence of symptoms (Table III):	

TABLE III

Disposal	With Symptoms	Symptom-free	Total
Observation	105 (32.0%)	241 (68.0%)	346
Treatment	46 (52.3%)	42 (47.7%)	88

- (d) Sputum results in the 88 treatment cases:
None	34
Negative	32
Positive	22
- (e) Age groups of significant lesions found in first 20,982 examinees (Oct. 1943-June 12, 1944) (Table IV):

TABLE IV

Age:	14-24	25-34	35-44	45-54	55+	Total All Ages
M ..	14 (0.8%)	40 (1.1%)	59 (1.4%)	27 (1.7%)	8 (1.1%)	148 (1.2%)
F ..	42 (1.1%)	38 (1.4%)	20 (1.2%)	6 (0.9%)	1 (0.6%)	107 (1.2%)

Comments

If the population of Middlesex be taken as 2,000,000 it can be calculated that there are approximately 1,200,000 persons in the 14-55 age group. Allowing that the age distribution of the females in the above survey is very skew, being excessively overweighted at ages 14-24, it appears that there are probably some 3,000 undiagnosed cases of pulmonary tuberculosis in the county in need of treatment, and that half of these cases are without symptoms.

REFERENCES

- "Mass Miniature Radiography of Civilians" (1945). Med. Res. Cncl. Sp. Rep. Ser. No. 251, London.
 Trail, R. R., *et al.* (1944). *Brit. J. Tuberc.*, 38, 116.

A CASE OF LEFT-SIDED APPENDICITIS

BY

J. W. L. HADDON, M.B., Ch.B.

Resident Surgical Officer, Beckett Hospital, Barnsley

Although left-sided appendix is by no means rare, the following case is interesting in that a full examination was possible later in the post-mortem room and an unusual condition found.

Case Report

A soldier aged 19, three months convalescent from a subtotal thyroidectomy for Graves's disease, was admitted to hospital on March 21, 1945. He was in a very nervous and toxic state, and gave a history of severe abdominal pain, which had started suddenly 36 hours previously and become progressively worse. The pain was continuous in character, and was at first generalized and was accompanied by nausea, but had since become localized to the hypogastrium and medial side of the right iliac fossa; he had vomited twice just before admission. There was no history of dysuria, and the bowel actions had been normal. Previous history did not give any indication of gastro-intestinal disease.

Diagram showing the abnormal position of the abdominal viscera, with the restrictive band.

Abdominal examination showed slight distension, with rigidity over the whole lower half of the abdomen; and acute tenderness localized to the hypogastrium and right iliac region. Auscultation revealed a "silent abdomen." Per rectum, he was tender anteriorly, high up. His general state was poor, with dehydration and a rapid pulse which showed occasional extrasystoles. A diagnosis of early diffuse peritonitis, secondary to a perforated inflamed appendix, was made, and operation arranged accordingly.

Operation.—The abdomen was opened through a right gridiron incision as there was no clinical indication of an abnormal situation of the appendix, and purulent fluid escaped. On inspection neither the appendix nor the caecum could be seen, and their absence was confirmed by finger exploration—the right iliac fossa being apparently filled with distended coils of small gut only. The incision was closed and replaced by a right lower paramedian incision; this revealed a long gangrenous appendix lying obliquely across the left lower abdomen, from left to right, with the tip reaching the recto-vesical pouch. The caecum was occupying the left iliac fossa, together with the sigmoid colon, and it was ascertained that the liver was in its normal situation; but, apart from this, no further exploration was attempted, in view of the patient's critical state, and appendectomy with suprapubic pelvic drainage was carried out. Intravenous infusion was started, and an attempt was made to institute continuous duodenal suction; but the man proved most intractable and refused to tolerate either form of treatment, repeatedly pulling out both Ryle's tube and intravenous cannulae.

He became progressively worse, developing paralytic ileus and dying on the fifth day. Permission for a "limited" necropsy was granted.

Post-mortem Findings.—On opening the abdomen the small bowel was found to be entirely confined to the right side, with the caecum and ascending and descending colons occupying the left. The ascending colon passed obliquely upwards and to the right to join the transverse colon at a normally situated hepatic flexure, the ascending colon being maintained in its abnormal site by a thick band, 2½ in. broad, between its middle third on the left side and the transverse mesocolon. The appendix arose from the right side of the caecum, and the ileum entered it towards the right side on its postero-lateral aspect. The jejunum started at its junction with a vertically descending third part of the duodenum, on the right-hand side of the superior mesenteric artery. No other congenital abnormalities were found. (See Diagram.)

Commentary

I could not find any evidence of inflammatory adhesions, and there were no enlarged or calcified mesenteric glands, so it must be presumed that the band from the ascending colon was of congenital origin; further close inspection of the band showed fairly large vessels coursing in its substance, derived from the right colic artery and distributed to the colon, suggesting that it was a contracted right mesocolon.

A so-called "wandering caecum," due to excessive rotation of an unduly mobile caecum, was excluded by the position of the appendix and ileo-caecal valve on its right side; and further proof of the congenital origin of the condition was supplied by the abnormal site of the duodeno-jejunal flexure to the right of the superior mesenteric artery.

From these findings it is suggested that the case described is a failure of rotation of the mid-gut loop, which normally takes place at the beginning of the tenth week of foetal life during the process of reduction of the "physiological umbilical hernia"; the colon and caecum, with the attached post-arterial mesentery, being allowed to enter the abdominal cavity first, instead of the normal mid-gut and pre-arterial mesentery—probably as a result of a lax umbilical ring. As a result of this mechanism, the later return of the mid-gut loop tends to displace the vitelline artery and hind-gut, with its post-arterial mesentery, to the left and dorsally, thus accounting for the left-sided position of the large bowel. Some attempt at normal fixation of the mesenteries had taken place, as is shown by the hepatic flexure occupying its normal position, in contradistinction to the more usual U-shaped transverse colon of non-rotation of the mid-gut loop, and this partial fixation probably prevented the marked tendency to volvulus around the superior mesenteric pedicle in early infancy, of which Dott describes two cases (*Brit. J. Surg.*, 1923, 11, 251).

An unusual feature of the clinical findings was the presence of signs and symptoms in the right iliac fossa, at a point remote from the actual position of the appendix; but its deep pelvic situation might have accounted for this.

I am indebted to Dr. Ponder, county medical officer for Kent, and Mr. J. W. D. Buttery, medical superintendent of the Royal Victoria Hospital, Folkestone, for permission to publish this case.

A. Louis (*Thèse Paris*, 1945, No. 98), who records an illustrative case in a girl aged 19 months, came to the conclusion that the best treatment of Still's disease at the present time consists in intramuscular injection of gold salts.