

was made to establish the exact extent of the disease. It was obvious that the descending colon, sigmoid colon, and upper rectum were maximally affected. The rest of the colon appeared to be quite normal. There was no evidence that a small perforation had occurred in the past. The left third of the transverse colon was included in the resection, and this was carried down to the rectum to within 2 cm. above the peritoneal reflexion. An end-to-end anastomosis was performed, the mesenteric opening closed, and the abdomen sutured without drainage.

Micropathology.—There was intense subacute inflammation of the submucosa with areas of ulceration, and mucosal regeneration at the edges of the desquamated areas. Exudate consisted mainly of eosinophil and plasma-cell type. Lymph nodes were the seat of hypertrophy.

Post-operatively the child received 150 ml. of blood and repeated subcutaneous infusions. On the third day he passed two blood-stained motions and his general condition was very satisfactory. Laboratory investigations: Hb, 84%; serum electrolytes normal.

Progress.—Despite slight vomiting, small oral feeds—1 oz. (28 ml.) of milk and 1 oz. (28 ml.) of water—were persisted with; and on the fourth day there was no vomiting, and the feeds were increased to 4 oz. (114 ml.) of milk, 1 oz. (28 ml.) of water, 1 dr. (4 g.) of glucose, and one tablet of sodium citrate four-hourly. By the sixth day the child was on full normal feeds and was having four to six motions a day. No blood or mucus was present. On the twelfth day the wound was well healed, and four days later the child was allowed home. The number of stools has gradually decreased to two a day, with an occasional streak of blood but no mucus. He gained approximately 1 lb. (450 g.) a week for the first two months, and since then the gain has continued steadily. His weight was 29 lb. (13.2 kg.) at the age of 2 years.

Sigmoidoscopy six months after operation showed a red rectal mucosa but no evidence of ulceration; six months later it still showed a congested mucosa but no evidence of ulceration. There has been no blood or mucus in the stool for the past few months.

At the time of writing the patient was very well and able to take all types of food; no restriction has been made in his diet.

Summary

This report deals with a child who at the age of 3 weeks first showed symptoms of ulcerative colitis. Medical treatment proved of no avail. Laparotomy was performed three weeks after admission and a definitive diagnosis of ulcerative colitis involving descending colon, sigmoid colon, and proximal rectum was made. No further operative procedure was undertaken, and a course of cortisone was suggested as a preliminary measure, with the proviso that if this therapy was not effective resection would have to be undertaken.

Three months after cortisone therapy there was no marked improvement, and on the cessation of the cortisone the child's health began to deteriorate rapidly. A resection of the left third of the transverse colon, descending colon, and sigmoid colon, with an end-to-end anastomosis, was performed. The child made an uneventful recovery, and 16 months after operation had gained over 14 lb. (6.4 kg.) in weight and was having two motions a day without any blood or mucus.

We thank Dr. E. Hinden, paediatric consultant, for permission to publish this case.

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CARCINOMA OF THE THYROID FOLLOWING IRRADIATION

BY

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There is now evidence from several sources that irradiation of the thyroid gland in infancy or childhood increases the incidence of cancer of the thyroid in later life. Duffy and Fitzgerald (1950) found that a high proportion of children and adolescents with thyroid carcinoma had been subjected to thymic irradiation in infancy or childhood, and suggested that irradiation might have played a part in the aetiology of these tumours. Simpson *et al.* (1955) reported the results of a survey of 1,400 of 1,722 children who had been treated with x rays for thymic enlargement in infancy, and found that the incidence of malignant disease, in particular leukaemia and thyroid carcinoma, was significantly higher in the irradiated children than in their untreated siblings or in the general population. Clark (1955) observed that in 15 cases of thyroid carcinoma in children of 15 years of age or younger there was a history of x-ray therapy for benign conditions of the head, neck, or thorax in infancy or childhood. Simpson and Hempelmann (1957) in a later report confirmed their original observations, and suggested that there might be a correlation between the type of irradiation given and the subsequent development of tumours.

In this country Kilpatrick *et al.* (1957) found that three out of eight patients who developed thyroid carcinoma before the age of 35 years had been given ionizing radiation to the neck in childhood. In a later review Wilson *et al.* (1958) report seven patients who developed thyroid carcinoma following irradiation of the neck region. In six of these patients irradiation was given during infancy or childhood. Only one patient developed carcinoma of the thyroid following irradiation of the gland in adult life: this patient, who was treated for thyrotoxicosis by x-irradiation at the age of 26, developed an anaplastic carcinoma of the thyroid 37 years later.

It is generally considered that the adult thyroid is not susceptible to radiation cancer. Such a belief has been fostered by an absence in the literature of cases of thyroid carcinoma which might have been attributable to previous irradiation. Negative evidence of an association between radiation and cancer may, however, be misleading. At New End Hospital between 1954 and 1956 three patients who developed carcinoma of the thyroid following irradiation of the neck have been seen: in two of these irradiation was given during adult life.

Case 1

A woman aged 36 was seen in 1955 and found to have a mass in the left lobe of the thyroid gland. In 1937, at the age of 18, she had been treated with x rays for thyrotoxicosis. Ten treatments had been given. There were no appreciable radiation changes in the skin or subcutaneous tissues of the neck. Though there was no obvious evidence of hypothyroidism the improvement in her general health when she was subsequently given thyroxine suggested that she had probably been mildly hypothyroid in the first instance. The tumour was removed surgically, and proved on section to be a follicular carcinoma. The interval between irradiation and the diagnosis of cancer was 18 years.

Case 2

A woman aged 49 was seen in 1954. She complained of a goitre which had first been noticed in 1942. In 1916, at the age

of 11, she had been given x-ray therapy to the right side of the neck for tuberculous lymphadenitis. She subsequently developed severe radiation dermatitis, and in 1930 an area of skin was excised from the right side of the neck and a skin graft was performed. On examination she was found to have a bilateral nodular goitre which was thought to be non-toxic. There was a skin graft on the right side of the neck extending from the tip of the mastoid process to the clavicle. The incisional scar was keloidal, and the right sternomastoid muscle had become converted into a fibrous cord. A partial thyroidectomy was carried out. Section showed a follicular carcinoma in the right lobe of the thyroid. The interval between irradiation and the diagnosis of cancer was 38 years.

Case 3

A woman aged 69 was seen in 1956 and found to have a firm nodule in the right lobe of the thyroid. In 1915, at the age of 28, she had been given x-ray therapy for exophthalmic goitre. Treatment had been given weekly over a period of three years. At the end of this time a remission had occurred. On examination there was slight telangiectasis and atrophy of the skin over the anterior surface of the neck and over the upper part of the sternum. There was no evidence of radiation damage to the subcutaneous tissues. A total thyroidectomy was carried out. Section showed the nodule in the thyroid to be a follicular carcinoma. The interval between irradiation and the diagnosis of cancer was 41 years.

Discussion

X-ray therapy was for many years widely used for the treatment of thyrotoxicosis; it was also often used for treating tuberculous cervical lymphadenitis. As a result a large population has received radiotherapy to the neck for benign conditions. A number of radiation tumours in the deep tissues of the neck have now been reported in the literature. Most of these have occurred in the pharynx (Goolden, 1957), while the thyroid seems to be relatively free from this complication. In addition to the case of Wilson *et al.*, already mentioned, one other instance of radiation cancer of the thyroid after irradiation of the gland in adult life has so far been reported (Kindler, 1943): this occurred in a man of 54 who developed an adenocarcinoma in the left lobe of the thyroid 24 years after x-ray treatment for tuberculous glands in the neck.

It is often difficult to decide whether there is a causal relationship between the development of a tumour and previous irradiation. Any tumour which arises in previously irradiated tissue after a suitable latent interval may be suspect, and when several such tumours arise in similar circumstances there is further reason to believe that they may be attributable to irradiation. Further evidence is desirable, however, in order to establish with any certainty a diagnosis of radiation cancer. Although proof is lacking it seems likely that there is an association between radiation and the development of thyroid carcinoma in the cases described above.

It has hitherto been generally accepted that radiation tumours appear only in tissues which have suffered appreciable radiation damage, but there is no real evidence of a threshold dose below which carcinogenesis does not occur. On the contrary, there is evidence from the children who developed malignant disease after irradiation of the thymus that cancer can occur in tissues which have not suffered gross radiation damage. The patients with thyroid carcinoma reported here had varying degrees of damage to the skin and subcutaneous tissues and therefore presumably to the thyroid gland.

The increased incidence of thyroid cancer and leukaemia in children following irradiation, and the increased incidence of leukaemia in patients irradiated for ankylosing spondylitis (Court-Brown and Doll, 1957), were confirmed only after large-scale surveys had been carried out. It would require a survey on similar lines to prove whether or not irradiation of the thyroid gland in adult life increased the incidence of thyroid cancer. In the absence of such a survey it cannot be assumed that the adult thyroid gland is immune to radiation cancer. In the meantime reports of thyroid carcinoma following irradiation would be of interest and

might give some indication of whether the adult gland is susceptible to radiation carcinogenesis.

Summary

The literature referring to the increased evidence of thyroid cancer after irradiation of the neck in infancy or childhood is briefly reviewed.

There is at present little evidence to suggest that the adult thyroid is susceptible to radiation cancer.

The development of carcinoma of the thyroid in three patients following irradiation of the neck is reported. Two of the patients received irradiation during adult life. It is considered probable that the tumours in these three patients were induced by radiation, but it is pointed out that it would be necessary to carry out a large-scale survey to find out whether irradiation of the thyroid gland in adult life increased the incidence of thyroid cancer.

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Medical Memoranda

Fatal Haematemesis Due to Foreign Body in Stomach

The great majority of swallowed foreign bodies, once having traversed the oesophagus, are passed safely per rectum. Penetration of the stomach wall is a rare event, and the following case report records an instance in which fatal gastric haemorrhage followed ingestion of a piece of chicken bone.

CASE REPORT

A man aged 62 was admitted to the Nuffield Orthopaedic Centre on February 21, 1957, complaining of pain and stiffness of the left hip. He was in excellent health apart from a mild chronic dyspepsia, relieved by antacids, and he had had no previous illnesses. The left hip was found to be severely osteoarthritic. He had a symptomless hypertension of 180/90 and carious teeth, but no other abnormalities were noted on clinical examination.

After dental extraction had been carried out with penicillin cover, he was considered fit for operation on his hip, and a week later a Girdlestone pseudarthrosis was performed on the affected joint.

His immediate post-operative progress was satisfactory, but 24 hours later, shortly after a meal, he vomited food, followed by some altered blood. He improved after a blood transfusion of 2 pints (1,140 ml.), but continued to vomit small amounts of "coffee-ground" fluid. A diagnosis of acute gastric erosion was made.

On the third post-operative day he developed the signs of a very severe bronchopneumonia, which was treated with penicillin and streptomycin. His haematemeses recurred, his general condition deteriorated in spite of continued blood transfusions, and he died on the eighth day.

At necropsy, a chicken-bone 3 cm. long was found impacted at the pylorus. It had penetrated all the coats of the stomach, apart from the serosa, and had eroded a small gastric artery. The stomach and intestine were full of altered blood. There was also a severe inhalation bronchopneumonia.