Maclea and Ogilvie (1959) on the pancreases of diabetics dying within eight weeks of the onset of the disease. In such individuals these workers showed that islet tissue might be normal or hyperplastic, in contrast to that obtained from subjects dying many months or years after onset, in whom islet-cell volume was diminished.

The results presented in this paper also support the view that in diabetic ketosis there is present a circulating insulin antagonist. Many other workers have presented evidence for the presence of such antagonists in the blood of uncontrolled human diabetics (Vallance-Owen, Hurlock, and Please, 1955; Baird and Bornstein, 1957; Vallance-Owen, Dennes, and Campbell, 1958; Field, Tietze, and Stetten, 1957), though the precise identity of such substances is at present uncertain. In this connexion the small degree of inhibition of glucose uptake due to the α_2 -globulins of this patient is of interest. Similar effects due to the α_2 -globulins of normal human serum, whether these were prepared by cold ethanol fractionation (Taylor, Vargas, and Randle, 1959) or by column electrophoresis of serum proteins (Randle and Taylor, 1958a), have also been reported. Though it is at present uncertain to what extent this last factor is of importance in human diabetes, evidence is accumulating that it may be pituitary-dependent (Taylor, Randle, and Vargas, 1960). If this is so, then growth hormone may well be implicated in some way in the genesis of human diabetes in giving rise to such a substance which opposes the action of insulin, as Young (1951) has suggested. Similar considerations would also apply to the albumin antagonist of Vallance-Owen, Dennes, and Campbell (1958), which it has also been shown is pituitary-dependent. A further point of some practical significance emerges in that if insulin is still being secreted in the early stages of acute diabetes, what active steps should be taken to conserve actively functioning islet tissue before irreversible damage takes place. To answer this question satisfactorily there is clearly an urgent need for extensive studies on this type of patient.

Summary

A case of severe diabetes in a young adult is described, presenting with ketosis, in whom apparent clinical remission took place.

Serum insulin studies have suggested that in the initial ketotic phase insulin was present, though its effect was masked by the presence of an antagonist. With remission of the diabetes the insulin antagonism disappeared.

The possible bearing of these findings on some aspects of the aetiology of human diabetes is discussed briefly.

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ADDENDUM.—While this paper was in preparation, observations became available on circulating insulin in the serum of an insulin-resistant patient who also showed

remission (Joslin, Root, White, and Marble, 1959). In this patient, who was maintained on a very small dose of injected insulin, whole serum, taken in remission, exhibited considerable insulin-like activity, as measured by effects on $^{14}\text{CO}_2$ production in the rat epididymal fat pad. These observations are in keeping with results presented in this paper.

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HYPOTHERMIC COMA IN MYXOEDEMA

BY

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Though coma in myxoedema has been described with increasing frequency during the past six years, the condition has received only grudging recognition in the standard textbooks. The 1959 edition of Cecil and Loeb's *Textbook of Medicine* makes no reference to it, while the 1956 edition of Price's *Textbook of the Practice of Medicine* mentions it only in passing. This paper describes three further cases. Two of the patients died during their first episode of coma; the third recovered from quite a deep coma on two separate occasions.

Case 1

A housewife aged 56 was admitted to hospital on January 16, 1959, complaining of progressive swelling of the feet for the previous six weeks. On further questioning, she admitted to some shortness of breath and to abdominal discomfort and distension. She had not suffered from angina of effort and had been able to carry out her normal household duties. For a year before her admission she had noticed that her voice was becoming gruff and that her hair was falling out.

On examination she was jovial and co-operative, though slow. Her eyebrows were absent, the scalp hair was coarse, and axillary and pubic hair was scanty. Her eyes were puffy; the skin was dry and coarse in texture, and cold. Her heart was fibrillating at 60 a minute; the heart sounds

were faint; and blood-pressure was 190/120. She was in congestive cardiac failure with a raised jugular venous pressure, ascites, and oedema of the legs and feet. The tendon reflexes were diminished and the plantar responses equivocal.

Investigations.—Haemoglobin, 83%; W.B.C., 5,400; serum cholesterol, 145 mg./100 ml.; basal metabolic rate, -42 and -50%. Electrocardiogram showed atrial fibrillation at a slow rate (varying from 40 to 60 a minute). Chest radiograph showed generalized cardiac enlargement. Temperature taken on an ordinary clinical thermometer did not register more than 96° (35.6° C.) at any time.

Myxoedema and congestive cardiac failure were diagnosed and digoxin and mercurial diuretics given. Treatment with thyroid extract $\frac{1}{2}$ gr. (32 mg.) b.d. was started on January 23, when the investigations were complete. Two days later the patient complained of severe burning sensations throughout her body: these were associated with some disorientation. She had been constipated before admission, but her bowels became regular when thyroid treatment was given.

On January 29 she became drowsy for the first time. Her temperature had not responded to treatment, a low-reading thermometer showing 85° F. (29.5° C.). It was thought that she was slipping into coma; therefore 5 µg. of triiodothyronine intramuscularly was given each day, and the bed warmed with an electric blanket. By February 2 she was comatose. She was given gr. 5 (0.32 g.) of thyroid extract intramuscularly, followed by gr. 2½ (0.16 g.) 12-hourly. Prednisolone, 5 mg. b.d., was added in an effort to counter any concurrent adrenal insufficiency. None of these measures was of any avail. On February 3 she was given two 25-µg. doses of triiodothyronine intravenously, but she died later that evening. Permission for necropsy was not granted.

Case 2

A housewife aged 78 was admitted to hospital on January 27, 1959. She was reluctant to walk or speak, and a history was obtained from her daughter-in-law. She had been deaf for many years and had become increasingly apathetic during the past few years. Severe constipation had been a troublesome feature. She had become very intolerant of cold, was losing her hair, and her speech had become slow and slurring. She had recently developed weakness of the right side of the body.

On examination she appeared pale and completely passive. Her speech was very slow, slurred, and unintelligible. Her skin was cold; her facial appearance greatly resembled that of Case 1. The pulse rate was 36 and B.P. 150/80. There was no evidence of congestive failure or any cardiac lesion. There was evidence of right hemiparesis, and the right plantar reflex was extensor.

Investigations.—The temperature, taken by an ordinary clinical thermometer, never rose above 95° F. (35° C.). A low-reading thermometer showed it to be 85° F. (29.5° C.). Hb, 87%; W.B.C., 16,600; blood urea, 26 mg./100 ml.; serum cholesterol, 293 mg./100 ml. The urine showed considerable proteinuria. Moderate cardiac enlargement was seen on the chest radiograph. Electrocardiogram showed atrial fibrillation at a very slow rate, varying from 25 to 40 per minute.

Treatment was immediately started with thyroid $\frac{1}{4}$ gr. (16 mg.) b.d., increasing to 1 gr. (65 mg.) daily on January 30. On this day her condition deteriorated and she became semiconscious. Triiodothyronine, 100 µg. six-hourly, was given by mouth and she was warmed by means of an electric blanket, but without avail. On January 31 thyroid extract, 0.5 ml. intramuscularly 12-hourly, was given, but she died late that evening. Permission for necropsy was not granted.

Case 3

A woman aged 82 was admitted to hospital on March 21, 1958, because of recent melaena. She appeared very pale. Her hair was dry, her skin coarse, her tongue thick and protruding, and her voice croaky.

A diagnosis of gastro-intestinal bleeding and probable myxoedema was made; since the haemoglobin had fallen to 18% it was decided to give a transfusion before carrying out any further investigations. She received 4 pints (2.3 litres) of packed cells over the next 24 hours and the haemoglobin rose to 79%. On March 23 she was drowsy. Next day this was more pronounced and her response to questions or other other stimuli was very slow. The rectal temperature was 95° F. (35° C.); serum cholesterol, 134 mg./100 ml. She was thought to be in incipient myxoedematous coma and was given 50 µg. of triiodothyronine intravenously. On the next two days she was given further intravenous injections of 100 µg. of triiodothyronine. By March 26 she was much livelier and was maintained on an oral dose of 20 µg. of triiodothyronine daily. Serial electrocardiograms showed an increase in the rate and in the amplitude of the complexes. She was discharged home on April 16.

Nine days later (April 25) she was readmitted because she had become semi-stuporous at home. Her pulse rate was 52, rectal temperature 96.2° F. (35.7° C.). The E.C.G. showed very low voltage curves once more. It was found that she had taken only a few of the triiodothyronine tablets given to her when discharged from hospital. She was therefore treated again as a case of myxoedematous coma and given triiodothyronine, 100 µg. intravenously. She became more active after this and was put on a maintenance dose of 20 µg. daily. Further intravenous injections of 100 µg. were given on April 28 and May 5. Treatment was later changed to thyroid extract, and she was sent home on May 23 on 1½ gr. (0.1 g.) b.d. The electrocardiographic complexes were of normal amplitude by the time she was discharged for the second time.

Apart from short admissions to hospital occasioned by fractures of her ribs in December, 1958, and by a Colles fracture of her right wrist in January, 1959, she remained well during the next few months. But after a time she gave up taking her thyroid tablets and on May 25, 1959, she was readmitted to hospital, having greatly deteriorated both mentally and physically. Treatment with thyroid, $\frac{1}{4}$ gr. (32 mg.) daily, resulted in a remarkable improvement. She died quite suddenly on June 26.

Necropsy (Dr. A. B. Bratton).—The body was that of a wasted, frail old woman. There were numerous pigmented warts on the skin of the abdomen. Thoracic kyphosis was marked. The myocardium showed oedema and brown atrophy. There was moderate atheroma of the coronary arteries, with a thick button almost blocking the anterior descending branch. In the remainder of the arterial tree was a more severe degree of atheroma. The lungs showed atrophic emphysema. In the pyloric portion of the stomach an ulcerated carcinomatous plaque was found, 5 cm. in diameter: its base was continuous with a mass of glands 1.5 cm. in diameter. The intestines were slightly oedematous. The liver showed oedema and brown atrophy and contained deposits of secondary carcinoma up to 4 cm. in diameter. Both lobes of the thyroid were fibrotic. The suprarenal cortex was well developed. There was atrophy of the ovaries and uterus, the latter containing a few fibromyomata up to 1.25 cm. in diameter. Oedema and atrophy of the spleen, kidney, and pancreas were found.

Histology.—The thyroid gland showed extreme fibrosis and slight lymphoid infiltration. A columnar-cell carcinoma infiltrated all coats of the stomach, with an abscess beneath the peritoneum and secondary deposits in the liver.

Discussion

By the end of 1958 22 cases of myxoedematous coma had been described in the literature. Most of these were associated with hypothermia. In order to recognize a hypothermic state a low-reading thermometer must be used, since the standard clinical thermometer records to only 95° F. (35° C.) (Sheehan and Summers, 1952). In only one case (Karhausen and Zylberszac, 1955) has the temperature in terminal myxoedema coma been

Details of Recent Cases

Author	Case	Age and Sex	Temperature		Serum Cholesterol (mg./100 ml.)	Treatment					
			°F.	°C.		Rewarming	Thyroid	Thyroxine	Triiodothyronine	A.C.T.H. or Cortisone	Result
Le Marquand et al. (1953)	1	61 F	95-97	35-36.1	390	No	—	—	—	Adrenal cortical extract 10 ml. 4-hourly	Died in 4 days
	2	50 F	95	35	495	"	—	10 mg.	—	—	" "21 "
	3	70 F	74	23.3	560	Yes	—	0.5 mg. i.v.	—	25 mg. i.m. 4-hourly	" "2 "
Summers (1953)	4	59 M	83	28.3	—	No	1 gr. (65 mg.) t.d.s.	1 mg. s.c. 6-hourly	—	—	" "4 "
	5	65 F	75	23.9	—	Yes	—	2 mg. s.c. 6-hourly	—	—	" "24 hours
	6	63 M	91.4	33	—	"	1 gr. (65 mg.) t.d.s.	2 mg. 6-hourly	—	D.C.A. 10 mg. and cortisone 100 mg. by i.v. drip	" "2 days
	7a	59 M	96-98	35.6-36.7	—	No	—	1 mg. 6-hourly	—	—	Recovered
	7b	59 M	83.5	28.6	—	"	—	1 mg. 6-hourly	—	Cortisone 100 mg. 6-hourly	Died in 2 days
Malden (1955)	8	60 F	95-97	35-36.1	242	"	2½ gr. (0.14g.) in all	—	—	—	" "36 hours
	9	64 F	78	25.6	388	Yes	½ gr. (16 mg.) b.d.	—	—	D.C.A. 10 mg. Adrenal cortical extract 30 ml.	" "20 "
	10	62 F	Unrecordable on clinical thermometer	—	538	"	—	0.025 mg. i.v. 0.3 mg. daily 0.6 mg. "	—	A.C.T.H. 10 mg. i.v., then 25 mg. i.m. b.d.	Recovered
	11	67 F	80	26.7	—	Not necessary	—	—	—	—	Died
Karhausen and Zylberszac (1955)	12	63 F	100.4	38	336	Not necessary	—	1 mg. i.v.	—	Cortisone 100 mg. orally	"
Reid (1955)	13	63 F	96-97.4	35.6-36.3	660	Yes	½ gr. (16 mg.) b.d.	0.1 mg. b.d.	—	"Eucortone" 20 ml. i.v., D.C.A. 20 mg.	Died in 3 days
Levin and Daughaday	14	41 F	97.8	36.6	450	?	—	DL-Thyroxine 0.2 mg. i.v. 1 gm. i.v.	—	Hydrocortisone. Cortisone	" "48 hours
Marshall and McCaughey (1956)	15	70 F	74	23.3	293	Yes	No thyroid at all given			Delta-cortisone 60 mg. Cortisone 100 mg. daily by mouth	" "7 days
Dyson and Wood (1956)	16	70 F	82	27.8	393	"	—	0.1 mg. orally 0.025 mg. i.v.	1.2 mg. i.v. 1 mg. i.v. 0.5 mg. i.v. 0.5 mg. i.v.	Hydrocortisone intravenously for first 3 days	" "5 "
Anderson and Hausmann (1956)	17	49 M	84	28.9	—	?	—	0.2 mg. orally	—	—	" "3 " (? coronary thrombosis)
Curtis (1956)	18	60 F	Not stated		483	—	1/10 gr. (6.5 mg.) Jan. 22 ½ gr. (16 mg.) Jan. 23	—	—	A.C.T.H. 25 units i.v. for 2 days. 160 units Jan. 21	Died in 2 days
Macdonald (1958)	19	19 M	82	27.8	200	Yes	—	0.02 mg. 4-hourly sub-lingually	—	Hydrocortisone 100 mg. i.v. for 12 hours. Cortisone 50 mg. i.m.	" "3 "
	20	80 F	97	36.1	—	"	—	0.05 mg. 4-hourly sub-lingually	—	Cortisone 50 mg. 4-hourly i.m.	" "12 hours
	21	79 F	91	32.8	200	No	—	—	0.08 mg. i.v. 0.02 mg. sub-lingually 4-hourly 0.08 i.v. next day and on 3rd day	Cortisone 50 mg. i.m. 4-hourly	Recovered. Later treated with oral thyroxine and thyroid
Surtees and Ginsberg (1958)	22	69 F	87	30.6	645	Yes	—	—	0.1 mg. intra-gastric 0.04 mg. b.d. 0.02 mg. daily	—	Recovered (but died 3 weeks later of myocardial infarction)
Nieman (1959)	23	62 F	76	24.4	440	"	—	—	0.1 mg. intra-gastric drip	Hydrocortisone 100 mg. i.v.	Died in 24 hours
	24	49 F	96	35.6	140	No	Given by Ryle tube. Dose not stated	—	—	—	Recovered
Present series	Case 1 25	56 F	85	29.5	145	Yes	2½ gr. (0.16 g.) 12-hourly i.m.	—	0.005 mg. i.m. 0.025 mg. i.v.	Prednisone 5 mgm. b.d.	Died in 5 days
	" 2 26	78 F	85	29.5	293	"	" "	—	0.1 mg. 6-hourly by mouth	—	" "2 "
	" 3 27a	82 F	95	35	134	No	1½ gr. (0.1 g.) b.d. after recovery	—	0.05 mg. i.v. 2 doses of 0.1 mg. i.v. then orally 0.02 mg. daily	—	Recovered
	27b	82 F	96.2	35.7	168	"	1½ gr. (0.1 g.) b.d. full recovery	—	0.1 mg. i.v. daily	—	"

raised. Clinical details of the cases described in the past few years and of their treatment are given in the Table.

Since myxoedematous coma is caused directly by lack of thyroid hormone, and since its most striking clinical manifestation is the corpse-like coldness of the body, it would appear logical to treat patients by administering the most rapidly effective thyroid hormone and rewarming them. In spite of the application of these measures to a greater or less extent, all but 6 of the 27 patients described in the literature have died while still in coma. The purpose of this publication is to analyse more closely the factors which have resulted in the recovery of the five successfully treated cases.

Differing opinions have been offered on the value of rewarming the patient. Macdonald (1958), for example, has stated that it is illogical and probably dangerous. The methods employed for the purpose have included immersion in a warm bath, the use of heat cradles, and the use of electric blankets. Of the six patients who recovered from myxoedematous coma, only two were rewarmed (Malden, 1955—Case 3; Surtees and Ginsberg, 1958), the first by electric blankets and the second by means of a heat cradle.

Experiments in rats have shown that the requirements of the organism for thyroid hormone increase as the environmental temperature falls (Dempsey and Astwood, 1943). Similarly, exposure of rats to a high temperature reduces the requirement for thyroid hormone. There are good grounds for keeping the dose of thyroid hormone administered to patients in myxoedematous coma as low as possible. Most cases occur during the winter months, usually at a time when the temperature even of hospital wards has fallen below the optimal. With these factors in mind, we feel that rewarming is advisable. It should, however, be gradual, otherwise cutaneous vasodilatation will defeat its whole purpose. Rewarming in itself will not bring the patient out of coma.

Thyroid Hormones

Thyroxine.—L-Thyroxine occurs naturally in the thyroid gland. A single intravenous dose given to patients with myxoedema produces some effect on the basal metabolic rate in six to eight hours, but the maximal effect is not reached until 8 to 10 days (Blackburn *et al.*, 1953). When treatment with thyroxine is discontinued in established cases of myxoedema the basal metabolic rate does not return to its original level for several weeks. L-Thyroxine is 8 to 10 times as active as the D-thyroxine. Chemists still occasionally supply D-thyroxine; this may explain the occasional failure of treatment of myxoedematous patients with thyroxine (Goolden and Burrell, 1957) and possibly the failure to recover from coma (Levin and Daughaday, 1955).

Triiodothyronine.—This hormone was first shown to be useful in the treatment of myxoedema by Gross *et al.* (1952). Its action is more rapid and less prolonged than that of thyroxine. Oral administration increases the basal metabolic rate of myxoedematous patients within a few hours, maximal at the eighth to twelfth hours (Ibbertson *et al.*, 1959). A similar rapid action has been demonstrated after an intravenous dose. If the hormone is withdrawn from hypothyroid patients the basal metabolic rate returns to its pre-treatment level in seven to nine days (Lerman, 1953). The daily replacement dosage for myxoedematous patients has been estimated at 0.07–0.1 mg. (Selenkow and Asper, 1955).

Triiodothyroacetic Acid (Triac).—This is a synthetic hormone which appears to act a little more rapidly than triiodothyronine. In patients with a past history of angina even small doses may precipitate cardiac pain; its use should therefore be avoided in such cases. However, in the treatment of myxoedematous coma in patients known not to have suffered previously from anginal pain triac has been held to be the drug of choice (Ibbertson *et al.*, 1959). The daily replacement dosage is 4–6 mg. The drug is not generally available.

The rate of response to these rapidly acting thyroid hormones appears to depend on the duration of the previous hypothyroidism. The two patients in Ibbertson's series showing the slowest response to oral triiodothyronine and to triac were both previously untreated. One was a case of primary myxoedema, the other of hypopituitarism with complete thyroid failure, and both were of long standing. Since myxoedematous coma mostly occurs in previously undiagnosed cases, the response to the first dose of hormone will be delayed. This suggests that the initial dose should be larger than the usual replacement dose, and favours the use of the more rapidly acting triac.

Of the six successfully treated patients, one was treated with thyroid extract via a Ryle tube, two were given thyroxine, either intravenously or orally (Malden, 1955, Case 3; Summers, 1953, Case 4), and three received triiodothyronine. Surtees and Ginsberg (1958) gave their patient 0.1 mg. of triiodothyronine by intragastric drip, followed by 0.04 mg. twice daily. Macdonald's patient received 0.08 mg. intravenously, followed by another intravenous dose of 0.08 mg. 12 hours later. She relapsed into coma 48 hours after admission and received a further dose of 0.08 mg. intravenously; from then on she made an uninterrupted recovery. Our own patient was treated with an initial intravenous dose of 0.05 mg., followed by 0.1 mg. intravenously on each of the two subsequent days. When she relapsed she again received 0.1 mg. intravenously.

Though most writers now agree that triiodothyronine is the most effective hormone in the treatment of myxoedematous coma, there is much disagreement about the dosage and the method of administration. This stems from the very powerful effect upon the heart exerted by thyroid hormones. Several of the patients referred to in this review have died of myocardial infarction shortly after administration of a thyroid hormone. Indeed, Goolden and Burrell (1957) have gone so far as to state that the majority of patients in myxoedematous coma treated with thyroid hormone have deteriorated further. On these grounds they have advocated very cautious dosage (0.01 mg. every 12 hours by intravenous injection, the dose later to be modified according to the response). Martin (1958) suggests 0.02 mg. six-hourly by intramuscular injection. At the other end of the scale, Spence (1959) considers the correct dose to be of the order of 0.1 to 0.25 mg. 12-hourly by intravenous injection. Dyson and Wood (1956) gave 1.2 and 1 mg. intravenously, but their patient died.

In order to chart a course between the Scylla of under-treatment and the Charybdis of myocardial infarction and acute heart failure, we would suggest that, for patients known not to have suffered from angina previously, an initial dose of 0.08 mg. of triiodothyronine intravenously be given, and that it should be given as soon as any drowsiness becomes manifest. A maintenance dose of 0.05–0.1 mg. intravenously at 12-hourly

intervals should be given until consciousness returns, after which the hormone may be administered by mouth (0.02 mg. four- to six-hourly). In patients with a past history of angina, the initial dosage must be more cautious (0.01–0.02 mg. intravenously); the later dose will be governed by the response and by the presence or absence of anginal pain.

Macdonald (1958) has suggested that hypothermia in itself is an indication to start treatment even if coma does not appear imminent. He also considers that the dose of triiodothyronine should be proportional to the degree of hypothermia. We feel that the fate of our first two patients bears out these suggestions and that we should have instituted more vigorous treatment at an earlier stage of their stay in hospital. Both were conscious on admission; Case 1 was quite lively and jovial. Yet in both the body temperature was well below normal. Both lapsed into coma though treatment with a slow-acting thyroid preparation had already been started. Case 1, for example, had received a total of 6 gr. (0.4 g.) of thyroid extract over a period of six days at the time that she became comatose. It seems to us that the use of triiodothyronine by mouth after admission to hospital might well have saved the life of both these patients.

The fate of these two patients also suggests that one should not spend too long carrying out investigations on myxoedematous patients, especially during the winter months.

Corticosteroids

Many patients with myxoedema show an impairment of adrenocortical function which is reflected in their lowered urinary 17-hydroxycorticoid output. The treatment of hypopituitarism associated with complete thyroid failure ("hypopituitary myxoedema") by thyroid extract has in the past led to a sudden adrenal crisis. For these reasons many physicians have advocated the use of corticotrophin or of corticosteroid hormones in the initial treatment of severe cases of myxoedema, whether primary or secondary.

Steroid therapy was employed in only two of the six successfully treated cases of myxoedematous coma. Corticotrophin was given by intravenous infusion in Malden's case, and cortisone was administered four-hourly in a dosage of 50 mg. intravenously by Macdonald.

It would appear that corticosteroid therapy is not essential to recovery in myxoedematous coma. However, no harm appears to have resulted from its use in the unsuccessfully treated cases. In a seriously ill patient, many will feel that no form of therapy that may possibly do good should be withheld, and will administer steroids on these grounds alone. If there is obvious evidence of electrolyte disturbance or of hypoglycaemia, then the indications for steroid therapy will be clear-cut.

Other Measures

Antibiotic Cover.—Patients in coma are always liable to develop a fatal pneumonia. Antibiotic cover should therefore always be given.

Artificial Ventilation.—The respiratory rate in patients in myxoedematous coma often becomes very slow. This may lead to carbon-dioxide retention and a severe respiratory acidosis. Nordqvist *et al.* (1959) described two such cases whose serum pCO_2 rose to 86 and 109 mm. Hg respectively. They treated their patients by tracheal intubation and artificial ventilation with mask

and bag; this proved insufficient, and the patients were put into a respirator for two weeks until the carbon-dioxide tension could be maintained at a normal level.

It has been shown that acute carbon-dioxide retention with an increase of carbon-dioxide tension to values over 70 mm. Hg may exert a considerable depressant effect on the myocardium. If the presence of carbon-dioxide retention in myxoedematous coma is confirmed by other workers, its prevention and treatment will obviously play an important part in the treatment of the coma.

Summary

Three further cases of myxoedematous coma are described; one of them is the sixth case reported to have survived the acute episode. The treatment of the condition in previously published cases is reviewed and discussed.

It is suggested that patients with myxoedema should not undergo investigations for overlong periods, especially during the winter months. Cases of severe myxoedema may lapse into coma even after treatment with thyroid extract has started. We would agree with a previous suggestion that hypothermia, in itself, is an indication for immediate treatment with a rapidly acting thyroid hormone.

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Practical Dietetics is a collection of articles published in *The Practitioner* throughout 1959. The aim of the series was to provide the general practitioner with authoritative, yet practical, guides to the planning and supervision of those diets which may be necessary for his patients. The kinds of diet included are low-salt, low-fat, and low-residue diets, and the conditions for which special diets are listed include renal disease, diabetes, obesity, peptic ulcer, toxæmia of pregnancy, weaning, gastro-enteritis in children and infants, old age, and canteen diets. The booklet is edited by Dr. W. A. R. Thomson, and published by *The Practitioner* at 4s. 6d.