A CASE OF MYXOEDEMA COMA SUCCESSFULLY TREATED WITH TRI-IODO-THYRONINE

By S. J. Surtees, M.B.(L'pool)
and S. Ginsberg, M.B.(Birm.)
Medical Registrars, Walton Hospital, Liverpool

Introduction
The termination of myxoedema in coma was described in the Report of the Clinical Society of London (1888) and had been noted even before this (St. Thomas's Hospital Report, 1879). It is an uncommon complication occurring in long-standing untreated cases and hitherto was fatal, with the possible exception of one patient (Malden, 1955), and here the cerebro-spinal fluid protein was markedly raised and on recovery there was a unilateral hyperreflexia suggesting a cerebro-vascular accident complicating myxoedema.

This article reports the successful treatment of an undoubted case of myxoedema coma with oral tri-iodo-thyronine.

Case Report
Mrs. E. A., aged 69, was admitted to Walton Hospital at 8.30 p.m. on January 22, 1957, as a case of 'apoplexy.' The casualty officer noted that she was unconscious.

The relatives said that she had felt the cold excessively for many years and her face had become puffy over the last 12 months. For six months she had restricted her activities and been troubled with deafness. During the previous week she was drowsy, had taken to sleeping during the afternoon, and on the day of admission was found to be unrousable in her chair.

The patient had had three normal deliveries, the last 25 years ago, and had menstruated again after the last pregnancy.

On examination the patient was comatose. She had a typical myxoedematous facies. The skin was cold and dry, the axillae were dry and hairless, the vulval hair was puffy and there was no spontaneous movements. She could not talk, but was capable of making croaking noises on painful stimulation.

The pulse rate was 52 per minute and regular, the blood pressure 180/100, and the heart sounds very distant. There was no evidence of neurological abnormality apart from absent ankle jerks, but the ocular fundi could not be adequately visualized due to bilateral lenticular opacities. The rectal temperature was 87°F. (after ten minutes' insertion of a laboratory thermometer).

The investigations performed on admission are tabulated.

Treatment
The patient was put in a heat cradle and at midnight 100μg. of 3-5-3' -l-tri-iodo-thyronine was given intragastrically by means of a Ryles tube.

On the morning of January 23 her conscious level was higher in that spontaneous movements were more frequent, but she was still not talking although the rectal temperature had risen (see graph). She was given 40 μg. of tri-iodo-thyronine by the same route at 10 a.m. During the day she became more active, the pulse rate rose to 68 per minute and the rectal temperature to 95°F. She was given a further 40 μg. of tri-
iodo-thyronine administered in a milk drip commencing at 6 p.m.

The next day (January 24) she could just speak a few words and she was slowly returning to a normal conscious level. The pulse rate was 88 per minute and the rectal temperature 99° F. She was put on 40 µg. of tri-iodo-thyronine daily by mouth.

At 11.30 p.m. on January 25 she had become very restless and was singing in the ward. It was considered that she had become mentally hyperactive following tri-iodo-thyronine therapy and she was sedated with paraldehyde 5 ml. I.M. and the tri-iodo-thyronine suspended until January 27 (when she was started on 20 µg. daily), by which time although still slightly confused and noisy she was more rational.

Over the next two days she made a remarkable recovery, becoming quite rational and able to walk about the ward. Now that she was cooperative a B.M.R. was performed (February 2) and gave a result of minus 25 per cent. An E.E.G. (February 6) was reported by Dr. E. A. Nieman as 'there is a well-developed regular 8 per second alpha rhythm and some slow activity within the theta range,' a picture found in cases of myxoedema. Chest X-ray showed no pulmonary pathology and the heart size was within normal limits.

On February 13 she complained of vomiting and admitted to having not felt well the previous day, but she denied any chest pain. Examination showed her to be in mild congestive heart failure. She was put to bed, digitalized, given mercurial diuretics, a salt-free diet and the tri-iodo-thyronine was discontinued. By February 16 her vomiting had settled, the heart failure improved and she was given cortisone 25 mg. twice daily (because the possibility of a hypopituitary state was entertained) and the tri-iodo-thyronine in a dose of 20 µg. daily recommenced.

On February 18 she complained of palpitations and breathlessness, the pulse rose to 110 per minute, the blood pressure fell to 110/60 (the rectal temperature was 97.4° F.), and she was found to be in severe congestive heart failure. She collapsed shortly afterwards and died.

**Post Mortem**

There was oedema of the ankles and about 200 ml. of clear fluid was found in both pleural cavities. The lungs, liver and spleen were congested, but otherwise of normal appearance. There was severe atheroma of the coronary arteries and the right coronary artery contained atheromatous debris on which was superimposed a recent (still red) thrombus for a distance of 2 cm. The myocardium of the posterior wall of the left ventricle and of part of the septum showed a diffuse extensive infarction. There was very advanced atheroma of the aorta and the mesenteric arteries. The uterus and ovaries appeared normal for her age.

On histological examination the thyroid was very small and weighed 3.8 g. It consisted practically entirely of fibrous tissue in which only occasional tiny islets of atrophic thyroid tissue were found.

The adrenals were of normal size (5.8 and 6.2 g.). The cortex contained only a moderate amount of lipid. The zona reticulata appeared slightly atrophic; there were a number of small hyperplastic nodules in the zona glomerulosa. The adrenal medulla contained numerous large Russel bodies and some of the medullary cells in the vicinity had very large nuclei.

The pituitary weighed 1 g. The general structure was normal, but many of the basophil cells contained small vacuoles. The proportion of the different types of cells was normal. The pancreas appeared normal and healthy on naked-eye and microscopic examination. Both ovaries showed senile atrophy with no trace of ova. Only one parathyroid was found. This showed normal histological appearances and had the usual islets of eosinophil cells.

**Discussion**

This was a case of primary myxoedema which
had progressed to the stage of hypothermic coma and the post-mortem coma findings were in accord with the clinical diagnosis, showing no evidence of preceding adrenal or pituitary abnormality.

The depression of adreno-cortical function as demonstrated by the 17-ketosteroids and 17-keto-genic steroids estimation on January 25 was a secondary effect (Statland and Lerman, 1950). It is generally accepted that adrenal cortex failure follows thyroid function failure (Hill, Reiss, Forsham and Thorn, 1950; Hubble, 1955) and the rapid elevation to normal levels of this patient's corticoid excretion after substitution therapy would tend to confirm this view and might also suggest that tri-iodo-thyronine is more active than thyroid iodic in restoring adrenal function. The normal serum electrolytes and blood glucose in this case emphasizes that the adrenal hypofunction was minimal; although electrolyte imbalance has been recorded in some cases of myxoedema coma (Summers, 1953; Le Marquand, Hausmann and Hemsted, 1953; Curtis, 1956), treatment with cortisone, thyroxine and heat did not produce a satisfactory response.

The many features of similarity in the clinical pictures of hypopituitary and myxoedema coma may lead to some difficulty in differentiation. In hypopituitary coma there is often a history of severe post-partum haemorrhage followed by amenorrhoea and loss of libido and the ictus is generally preceded by infection or trauma (Caughey and Garrod, 1954). It can also be classified into several relatively well-defined types, namely, hypoglycaemic, hypothermic or electrolyte imbalance/water retaining (Sheehan and Summers, 1952), and the treatment is to correct the pertinent abnormality.

The almost constant finding of hypothermia in myxoedema coma would suggest the application of heat to the patient. A heat cradle was used in this instance, but it has been shown that the elevation of body temperature in itself is insufficient to produce recovery, in contradistinction to its successful use in hypothermic hypopituitary coma (Sheehan and Summers, 1952). It is interesting to note that a case of myxoedema coma has been described in which the patient was febrile (Kar-hausen and Zylberszac, 1955).

Experience with 3-5-3'-I-tri-iodo-thyronine has demonstrated its potency in myxoedema (Gross, Pitt-Rivers and Trotter, 1952; Asper, Selenkow and Plamondon, 1953; Deltour and Bekker, 1953; Lerman, 1954) and shown that whereas its short duration of action precludes routine use in hypothyroid patients (Frawley, McClintock, Beebe and Marthy, 1956), its rapidity of action makes it the logical therapy in myxoedema coma. 1000 μg. of tri-iodo-thyronine given intravenously to a case of myxoedema (Rawson et al., 1953) was shown to raise the B.M.R. appreciably in seven hours and to exert its maximal effect in 24 hours, whereas l-thyroxine in a dose of 3 mg. I.V. produced a slight rise in the B.M.R. in 24 hours and a maximal effect in 11 days. A comparable rapidity in action has been noted with oral administration (Zondek, Leszynsky and Zondek, 1955).

Two reports of its use in myxoedema coma have appeared in this country and in both cases, despite some improvement, the patient died before attaining a euthyroid state (Dyson and Wood, 1956; Anderson and Hausmann, 1956). However, the efficacy of tri-iodo-thyronine in this condition has been amply shown by the response in this case. It is quite possible that either larger dosages or the use of the intravenous route may produce serious cardiac complications (Frawley et al., 1956), such as auricular fibrillation, angina and congestive heart failure. In this case the cause of death was due to a coronary thrombosis and tri-iodo-thyronine therapy was not considered a contributory factor as the patient had been euthyroid on a maintenance dose of 20 μg. daily for a period of two weeks and post mortem demonstrated a recent thrombosis and infarct. E.C.G.s performed on January 23 and 24 showed a tendency to low complexes although by no means displaying a typical myxoedema record (but the patient had been on treatment for 12 and 36 hours respectively). A repeat record on February 14 showed changes suggestive of lateral infarction and sub-endocardial ischaemia.

In conclusion, it is suggested that cases of myxoedema coma be given tri-iodo-thyronine intragastrically and in relatively small doses. The use of heat may be beneficial. On the rare occasions when there is severe associated endocrine hypofunction as evidenced by electrolyte disturbance or hypoglycaemia the use of cortisone and intravenous glucose and saline would appear to be logical.

Summary

1. A case of myxoedema coma successfully treated with oral tri-iodo-thyronine is described.
2. The question of associated endocrine disturbance is discussed.
3. A regime of treatment for future cases is suggested.

Acknowledgments

We wish to thank Dr. M. J. J. Wodziniski who performed the post mortem, Prof. H. L. Sheehan for the histological report, and Dr. V. K. Summers for his helpful advice and criticism.

Bibliography continued on page 449.
Spontaneous Intra-Gastric Rupture of a Pseudocyst of Pancreas—E. T. Murray, F.R.C.S.

BIBLIOGRAPHY


Manufacturers Notes

Pharmaceutical Specialties (May & Baker) Ltd. announce the introduction of two new presentations of ‘Stemetil’ brand prochlorperazine for use in psychotic illnesses. These are tablets of 25 mg. of the dimaleate, and 2 c.c. ampoules of 1.25% w/v solution of the methanesulphonate.

Clinical trials of prochlorperazine in psychoses have been in progress in mental hospitals in the United Kingdom and abroad for more than two years. Evidence from these widespread studies, some of which are still in progress, has indicated that prochlorperazine is a valuable addition to those drugs already available for the management of psychotic illnesses.

The primary indication of ‘Stemetil’ is in the management of schizophrenia. In many cases ‘Stemetil’ may make withdrawn, autistic, catatonic cases amenable to psychotherapy at a relatively early stage in treatment. It may be employed successfully in the management of excitement whether associated with schizophrenia, the manic-depressive psychosis, or other psychiatric conditions wherein agitation and excitement are notable features. Although the drug has been used on a very large number of patients, no case of jaundice or blood dyscrasia attributable to its use has been reported.

‘DISTAQUAINE’ V-K 125
Bottle of 1,000 tablets

The Distillers Company (Biochemicals) Limited announces the availability of a new pack of ‘Distaqueine’ V-K 125 tablets of potassium penicillin V. Each tablet contains the equivalent of 125 mg. penicillin V free acid (as potassium salt).

Retail: 575 s. d. Trade: 383 4 s. d.

DQV-K 250

The Distillers Company (Biochemicals) Limited announces the availability of ‘Distaquaine’ V-K 250 tablets. Each scored tablet contains the equivalent of 250 mg. penicillin V free acid (as potassium salt). Packs and prices are as follows:

Retail:

<table>
<thead>
<tr>
<th>12 mg.</th>
<th>11 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>573 6</td>
</tr>
</tbody>
</table>

| 500 | 382 4 |

Bibliography continued from page 445—S. J. Supplee, M.B., and S. Ginsberg, M.B.

BIBLIOGRAPHY


LE MARQUAND, H. S., HAUSMANN, W., and HEMSTED, E. H. (1953), Ibid., i, 704.


A Case of Myxoedema Coma Successfully Treated with Tri-iodo-Thyronine
S. J. Surtees and S. Ginsberg

Postgrad Med J 1958 34: 443-449
doi: 10.1136/pgmj.34.394.443

Updated information and services can be found at:
http://pmj.bmj.com/content/34/394/443.citation

These include:

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/