Hypothyroidism in the elderly: heralding myxoedema coma

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Certain physical health problems in the elderly population often result in impairment of cognitive abilities and acute behavioural issues, so pose a challenge to the treating team. The authors describe a case of hypothyroidism with psychological symptoms of general blunting of personality, mental lethargy and memory impairment from the early stages of the disease, with difficulty in recording events and happenings of day-to-day activities. They further describe how these resolve upon correction of the underlying physical health issues.

She was noted to have medical comorbidities of ischaemic heart disease, hypertension, hypothyroidism, osteoarthritis and chronic kidney failure. She also had a history of recurrent infections of the urinary tract and lungs. Despite these comorbidities, she was able to attend to her personal hygiene and dressing needs without any help.

**Presentation**
Two months prior to our contact in the geriatric psychiatry ward, the patient gradually started developing low mood, paranoia, self-neglect and agitation. She was noted to interact less with her fellow residential care housemates. It was reported by her residential home managers that she neglected her personal hygiene, diet and self-care. She would express paranoid ideas that somebody was keeping an eye on her and may steal things from her. These paranoid ideas were not fixed. She acted on these thoughts by keeping herself awake and frequently checking through the window for the presence of any person.

She was assessed by her GP and started on risperidone 2mg once daily at night and citalopram 20mg once daily in the morning. Her

**Figure 1.** A timeline of the patient’s medical and psychiatric treatment history

<table>
<thead>
<tr>
<th>Year</th>
<th>Condition</th>
<th>Treatment</th>
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</thead>
<tbody>
<tr>
<td>1960</td>
<td>Postnatal depression</td>
<td>Treated with ECT</td>
</tr>
<tr>
<td>1980</td>
<td>Thyrotoxicosis followed by hypothyroidism</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>Viral fever, Low mood paranoia, Confusional state</td>
<td>Full recovery in a few months</td>
</tr>
<tr>
<td>2014</td>
<td>Low mood paranoia, Confusional state, Hyponatraemia, Hypothyroid state</td>
<td></td>
</tr>
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**Background**
The patient was a 79-year-old lady living in a residential care home since the death of her husband in 2010. She had supportive children, a son aged 58 years and a daughter aged 54 years. Her children had increasingly infrequent contact with the patient. Occasionally her children and grandchildren visited her at her care home. The patient worked as a cleaner before her retirement.
residential care home staff supported her with day-to-day activities, diet and medication. However, her adherence to medication was inconsistent despite the best efforts of the care home staff.

About eight weeks after starting these medications, she started developing confusion and she had difficulties in recollecting where she was. On one occasion she wandered out of her residential care home and had to be brought back in.

She also developed fever, which was not relieved by paracetamol tablets and required general hospital admission. Here she was diagnosed as having hyponatraemia and a urinary tract infection. She underwent electrolyte correction and was treated with IV antibiotics. A CT scan of her brain revealed no acute change, haemorrhage or space-occupying lesions.

Her antidepressant was changed to sertraline 50mg, as citalopram was predicted to be contributing to hyponatraemia. Her infection subsided and she made a good recovery within two weeks of hospital admission. However, she remained confused, with disorientation to place and person. She was discharged to an old-age psychiatric unit for further assessment and management.

Course in psychiatric inpatient care
Collateral history from the family revealed that in the past two months she had become very agitated and irritable. She had been threatening and intimidating whomever she met by saying, ‘I will cut off your head’ or ‘get lost from here’. She used these phrases repeatedly, irrespective of the questions asked. This was indicative of ideational perseveration.

During the first few days of her care in the psychiatric unit she was noted to have electrolyte abnormalities, mainly hyponatraemia, despite repeated corrective interventions and the stopping of potentially causative agents like citalopram. She was also noted to have renal failure, secondary to poor fluid intake and dehydration, which was corrected by intravenous fluid replacement.

In the initial five days of her admission, she was also noted to have two episodes of unresponsiveness. Each episode lasted for approximately five minutes, during which she became blank, non-reactive to external stimuli, and floppy in muscle tone. These episodes were preceded by her making snorting and gurgling noises. She recovered quickly and completely from these episodes. Her MRI showed atrophy with focal ischaemic changes.

During the course of her stay in the psychiatric unit, the patient continued to exhibit a low mood, associated with significant apathy. She was noted to have poor oral intake and disturbed sleep. Most of the time, she appeared agitated and angry in her interactions. She was also noted to have issues with her memory and concentration, as she could not retain information given to her, hinting at short-term memory issues. For example, she could not recall the last time her children visited her or what she had for breakfast in the morning. She would reply to such questions by saying: ‘I don’t want to speak to you’; ‘leave me alone’, or ‘go away’. Her orientation towards time, place and person fluctuated. On certain days and at certain times, she would recognise the time, place and person, and at other times she would not. Because of the level of agitation and irritability she presented with, it was difficult to complete a comprehensive bedside cognitive examination.

The patient’s physical examination revealed mild bilateral pitting pedal oedema.

Medical history
The patient had a history of postnatal depression. After the birth of her daughter in 1960 (aged 24 years) she received ECT treatment. After that episode, she was stable and had no contact with mental health services. In February 2007 (aged 71 years), she presented with low mood and confusional state, developing over a few days, which was precipitated by viral fever. Her presentation was characterised predominantly by paranoid thoughts where she thought that people were trying to kill her, and in response she tried to break windows in the general hospital. She was then detained in a psychiatric hospital under the Mental Health Act. Within a few weeks she was noted to be better, without any paranoia or confusion. However, her mood continued to be low for the next few months. Her mood improved with use of citalopram 20mg for about six months.

The patient was diagnosed with thyrotoxicosis in 1980, which subsided within a few months and carried a possible viral aetiology. She subsequently continued to have hypothyroidism.

Medications
The patient was prescribed the following medications during the course of admission: lansoprazole 30mg once daily, bisoprolol 10mg once daily, aripiprazole 5mg once daily, sertraline 100mg once daily, levothyroxine 50µg once daily, ferrous fumarate 210mg twice daily and paracetamol 1g four times daily.

The risperidone was stopped gradually following admission and aripiprazole was initiated. Her sertraline was increased from 50mg to 100mg. Her adherence to these medications was inconsistent given her mental state.

Further management
Given the continued deterioration in her nutritional intake,
emergency electrolytes were prescribed. Her blood results revealed elevated TSH 91.34 mU/L (reference range 0.4–4.5 mU/L) and reduced free T4 1.8 pmol/L (reference range 12.0–22.0 pmol/L).

Endocrinologist opinion was sought. Her symptoms of change in mental state and atypical presentation of depression were attributed to a hypothyroid state. Her levothyroxine was increased to 125 μg per day and her TSH was monitored weekly. These reverted to normal values by the third week of increased dose of levothyroxine. Her mental state improved further over the next four weeks with improved cognitive function, especially short-term memory. Addenbrooke’s Cognitive Examination revealed a score of 70/100. Her mood was noted to be brighter without any paranoia. Her dietary intake improved and she was able to attend to her personal hygiene needs.

Clinical summary
The elderly lady in question showed the following symptoms:
• Gradual course of development of physical and neuropsychiatric symptoms
• Mood ranging from low, apathetic to agitated and angry
• Ideational perseveration
• Cognitive deficits and apraxia
• Phases of confusional state depicting a picture akin to delirium
• Refractory hyponatraemia
• Two episodes of unresponsiveness – seizure events?

There was significant improvement of the above symptoms with thyroid replacement.

Discussion
Hypothyroidism is depicted as a syndrome with distinctive physical changes of constipation, easy fatigability, cold intolerance, hair loss and dry skin. The usual signs noted in hypothyroidism include: psychomotor retardation; weight gain; change in voice, which becomes hoarse; non-pitting oedema in legs (myxoedema); bradycardia, and delayed tendon reflexes (Table 1).

The most common psychological symptoms found in patients with hypothyroidism are: general blunting of personality; mental lethargy, and memory impairment affected from the early stages of the disease, with difficulty in recording events and happenings of the day-to-day. There is inability to sustain mental exercise and increased slowness of understanding and mastery. The profound loss of interest and initiative leads to a delay in seeking medical care. A typical change of mood is to apathy rather than depression, but this differentiation is difficult to establish. It is concluded that psychiatric manifestations in hypothyroidism have diverse presentations associated with atypical depression, psychotic symptoms and mild cognitive dysfunction escalating up to delirium. There are case reports describing acute delirium states associated with hypothyroidism, which subsided with prompt replacement of thyroid hormone. Perhaps the course of these signs and symptoms is complex and unpredictable, especially in elderly patients.

Hyponatraemia is reported in up to 10% of hypothyroid patients, although it is usually mild and rarely causes symptoms. However, hyponatraemia is seen in approximately 50% of patients with myxoedema coma. It is hypothesised that, with decreased metabolic function, patients often have decreased free water clearance because of impaired renal function or vasopressin secretion, which causes dilutional hyponatraemia. Patients may be confused and lethargic or, rarely, comatose. Seizures related to severe hypothyroidism have been described in case reports. Myxoedema coma is rare, and establishing this diagnosis requires a high index of suspicion. Myxoedema coma represents the severest form of hypothyroidism and has an associated mortality rate of 30%–40%.

Reflections and analyses
The authors have considered literature from EMBASE, MEDLINE and a web literature search. Hypothyroidism, dementia, cognitive functions, depression, psychosis, myxoedema madness and myxoedema coma were the search terms used in the literature search and the search was focused on age group above 65 years old.

Reflecting on the presentation, it was difficult to ascertain whether the patient developed depression first and then a hypothyroid state (due to poor adherence to her thyroid replacement medications) or whether it was the hypothyroid state that led to low mood, apathy and poor compliance with medication.

Hyponatraemia and cognitive deficits appeared to be consistent with hypothyroid state, which improved remarkably on thyroid replacement. However, it was noted that the patient might have had some deficits that were not completely reversible even after thyroid replacement. This suggested that the residual cognitive impairment and MRI changes might have been secondary to an underlying dementia that would require further investigation. It has been noted that hypothyroidism-related dementia...
is considered as partially reversible dementia.\textsuperscript{12,13} Therefore, this emphasises the importance of assessment of cognitive functions in follow-ups.

Having noted two episodes of unresponsiveness without any long lasting neurological deficits, the authors hypothesise that these may have been seizure events. Given the associated features of perseveration and altered mental state, myxoedema coma is a potential diagnosis. According to further literature,\textsuperscript{14} the cardinal manifestation of myxoedema coma is a deterioration of the patient’s mental status, irrespective of whether the patient is in a coma. This further establishes the diagnosis of myxoedema coma and highlights the importance of a thorough physical health examination in patients who present with psychiatric symptoms.

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Declaration of interest
No conflicts of interest were declared.

References