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## Abstract

Although TIH is a well-established complication of this drug class, the extent of this problem and the serious morbidity that can result is often not appreciated. At our centre, we became aware of 3 serious cases of TIH over a 2 week period during the 'heat wave' in July 2013. In at least 1 of these cases excessive water drinking was a clear precipitant. We therefore aimed to determine the incidence of TIH at our hospital and in particular whether there was a seasonal effect on admission rates.

We retrospectively reviewed records of all admissions to our hospital containing a discharge diagnosis code of hypo-osmolality / hyponatraemia over a 14 month period. The medical discharge summary of each case was reviewed to identify cases where TIH was implicated as the predominant cause. Patients with a co-morbidity of heart failure, malignancy or liver disease were excluded from the analysis. Average monthly temperature data were obtained from public records (Met Office).

443 patients were admitted with a coding diagnosis of hypo-osmolality / hyponatraemia between June 2012 and August 2013. Amongst these there were 73 cases of TIH. Cases of TIH were sorted chronologically by month of admission. The monthly average temperature was then compared with the monthly TIH admission rate. Our data demonstrate a background monthly admission rate of 3-4 cases of TIH but with evidence of seasonal peaks in the hotter months with 9 and 7 cases admitted in July and August 2012 respectively and 10 cases in July 2013.

TIH is common cause for acute medical admission in the UK. Our data suggest evidence of seasonal variation in the incidence of the problem with patients being at greater risk of developing this complication during the hotter months of the year. An increase in fluid intake during hotter weather may underlie this association.

## Background

Thiazides exert their diuretic effect in several ways. They primarily work on the cortical diluting sites inhibiting sodium transport in the distal tubule. They prevent the re-absorption of about 3-5% of filtered sodium (1). They also reduce the ability to dilute urine and impair water excretion to some extent which, in combination with sodium excretion, enhances the hyponatraemia with a diluting effect. Thiazides impair urine dilution by stimulating ADH release, reducing glomerular filtration and promoting water re-absorption (2).

Thiazide-induced hyponatraemia (TIH) is also known to be exacerbated by people drinking excessive amounts of fluids because this adds a dilutional element to the problem (3). If patients taking thiazides are encouraged to increase fluid intake during hot weather, the risk of hyponatraemia would theoretically be increased. However, there is little evidence in the literature to support this hypothesis. A retrospective study undertaken in Hong Kong suggested that there was no seasonal variation and that temperature showed a positive correlation with sodium levels (4).

## Aim

To determine whether there was a seasonal variation in the number of admissions due to thiazide induced hyponatraemia in Torbay hospital.

## Method

We carried out a retrospective audit of patients admitted with thiazide induced hyponatraemia from June 2012 to August 2013. We reviewed the care-planning summaries for all patients admitted with discharge diagnosis code of hypo-osmolality / hyponatraemia over the period June 2012 to August 2013. From these patients, we included all the patients for whom treatment with thiazide diuretic was thought to be the main cause of the hyponatraemia.

## Exclusion criteria:

- Patients with chronic conditions
  - 1.Cancer
  - 2.Liver disease
  - 3.CCF
- Patients not on thiazide diuretics

From the patients left in the cohort, their date of admission was recorded and the number of patients admitted per month was then calculated. This was compared with the average temperatures of each month throughout the period.

## Results

Of the 443 patients admitted with hyponatraemia to our hospital between June 2012 and August 2013, 73 (16.5%) were caused by thiazide induced hyponatraemia. Between September 2012 and March 2013, there were 4 patients admitted per month with TIH. In the late spring and summer months, however, there was a general trend to higher numbers, with a peak in July 2013 associated with the heat wave that we experienced in the UK at that time. However, this did not continue into August when the number of admissions returned to baseline of 4 patients.

## Discussion

The results suggest that there may be a seasonal variation in the incidence of TIH. It appears that with the increases in temperature that we experienced over the summer, the admissions with TIH increased. It highlights the potential harm that can be caused by excessive fluid intake in patients receiving thiazide diuretics. This is especially the case for elderly patients who are at increased risk of TIH with ensuing consequences including confusion and falls requiring admission.

Thiazide diuretics are commonly used as front-line agents in the management of hypertension, particularly in the elderly. We would recommend that patients and carers are educated about the risks of excessive fluid intake in association with thiazide diuretics and clinicians should ensure appropriate monitoring of biochemical and fluid status following initiation of these agents and during times of intercurrent illness.

| Month  | Number of patients with BIH |
|--------|-----------------------------|
| Jul-12 | 9                           |
| Aug-12 | 7                           |
| Sep-12 | 4                           |
| Oct-12 | 4                           |
| Nov-12 | 4                           |
| Dec-12 | 4                           |
| Jan-13 | 4                           |
| Feb-13 | 4                           |
| Mar-13 | 4                           |
| Apr-13 | 7                           |
| May-13 | 5                           |
| Jun-13 | 3                           |
| Jul-13 | 10                          |
| Aug-13 | 4                           |

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