Use of antidiuretic hormone antagonists results in lower hospital resource usage: a retrospective cohort study

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Introduction

• Hyponatraemia is the electrolyte disturbance most commonly encountered in clinical practice (affecting 10–30% of hospitalised patients) and can be a marker of morbidity in many contexts, increasing mortality rates regardless of cause.1

• The syndrome of inappropriate antidiuretic hormone secretion (SIADH) is the most common cause of hypotonic hyponatraemia,2 responsible for approximately 30% of all patients with hyponatraemia.

• Data from the US suggest that patients with hyponatraemia have a greater overall consumption of healthcare resources, and that hyponatraemia is associated with an increased length of hospital stay,3,4 and increased direct medical costs.6

• The overall annual cost of hyponatraemia in the US alone has been estimated at $1.6–3.6 billion2 – there are no comparable cost data for the UK.

• The UK Consensus Statement recommends pharmacological therapy (demeclocycline or tolvaptan) for patients with mild/moderate hyponatraemia secondary to SIADH without severe symptoms, after fluid restriction has been attempted or deemed inappropriate.8

• The aim of this study was to understand how hyponatraemia secondary to SIADH is currently treated in England, and to understand the associated resource use.

Methods

• A retrospective analysis of a patient cohort identified in IMS Hospital Treatment Insights (HTI) through hospital admission diagnosis codes from 1 January 2010 through to 31 October 2013 was conducted.

• The HTI database, comprising details of all admissions and outpatient appointments to NHS hospitals in England, contains records on 3.3 million English patients from a source population of 13 million.

• Adult patients were included if they had a new World Health Organization (WHO) ICD-10 diagnostic code for ‘Hypo-osmolality and hyponatraemia’ (E87.1) and/or a diagnostic code for SIADH (E22.2) during the study period.

• Exclusion criteria were patients <18 years of age or with no age recorded, or co-morbid conditions associated with hyponatraemia: liver cirrhosis; liver disease with ascites; heart failure; unspecified adrenocortical insufficiency; hypothyroidism; and type 1 diabetes.

• Study outcomes were captured through relevant WHO ICD-10 codes and comprised hospital admissions, outpatient visits, length of hospital stay, and in-hospital mortality.

Results

• In total, 37,425 patients were given a clinical code for SIADH or hyponatraemia (Figure 1); >60% of patients were ≥68 years of age.

• Of the patients with a diagnosis of hyponatraemia and/or SIADH, 1.8% were given demeclocycline, 0.3% were given tolvaptan, and 97.9% were not given any recorded pharmacological treatment. When pharmacological treatment was given, it was usually as monotherapy.

• Mean time from diagnosis to initiation of therapy was similar for both demeclocycline and tolvaptan (10.2 days).

• Patients receiving tolvaptan had a shorter mean (11.1 vs 19.3 days) and median (10 vs 14 days) length of hospital stay than those given demeclocycline.

• Time to readmission and readmission rates at 30 and 60 days appeared similar between the two treatment groups (Table 1).

Conclusions

• Hyponatraemia and SIADH represent a substantial healthcare burden, and there are considerable variations in assessment and treatment.

• Under-reporting of hyponatraemia secondary to SIADH presents potentially serious implications for hospital remuneration.

• Pharmacological treatment results in considerably fewer A&E attendances than with no treatment; effective control of hyponatraemia may result in lower resource usage.

• Management of SIADH with tolvaptan may result in lower resource usage for hospitals and the wider health economy versus treatment with demeclocycline.

References


Table 1. Patient population

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<th>Time to re-admission, days</th>
<th>Demeclocycline</th>
<th>Tolvaptan</th>
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<tbody>
<tr>
<td>N (hospitalisations)</td>
<td>437</td>
<td>61</td>
</tr>
<tr>
<td>Mean</td>
<td>45.6</td>
<td>26.5</td>
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<tr>
<td>Median</td>
<td>5</td>
<td>14</td>
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<tr>
<td>Range</td>
<td>0–1041</td>
<td>0–176</td>
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<table>
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<tr>
<th>Re-admission at 30 days, % (n)</th>
<th>Demeclocycline</th>
<th>Tolvaptan</th>
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<tbody>
<tr>
<td>74.6 (25.4)</td>
<td>72.1 (44)</td>
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<tr>
<th>Re-admission at 60 days, % (n)</th>
<th>Demeclocycline</th>
<th>Tolvaptan</th>
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<tr>
<td>82.8 (362)</td>
<td>85.2 (52)</td>
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SIADH, syndrome of inappropriate antidiuretic hormone secretion

• Tolvaptan treatment was associated with a 29% fewer accident and emergency (A&E) attendances per patient than demeclocycline (p=0.041).

– Number of A&E attendances was significantly reduced across both treatments compared with patients not receiving any pharmacological treatment (p<0.0005).

• Receiving pharmacological treatment was associated with significant reductions in the number of outpatient appointments per patient

– There were 0.788, 0.693 and 0.540 appointments/patient for demeclocycline, tolvaptan and no pharmacological treatment, respectively (p<0.05)