



ORIGINAL ARTICLE

Association between moderate–severe bronchiolitis and syndrome of inappropriate antidiuretic hormone secretion in emergency departments[☆]



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KEYWORDS

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Respiratory syncytial
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Children

Abstract

Objectives: To identify clinical characteristics that may lead to the early identification of patients hospitalised for moderate-to-severe bronchiolitis with urine results associated with the syndrome of inappropriate antidiuretic hormone secretion (SIADH).

Patients and methods: A prospective observational study was conducted, spanning the bronchiolitis epidemic season (October 2012–March 2013), including all children who were hospitalised with a diagnosis of moderate-to-severe bronchiolitis. The following criteria were used to establish a diagnosis of SIADH: urine sodium level of 40 mmol/L or greater, urine osmolarity above 500 mosm/kg, and urine density of 1020 g/L or greater. Demographic characteristics, ventilation mode and clinical outcome were also analysed. A comparison was made between patients that met urine SIADH criteria and those that did not.

Results: A total of 126 children were included, 23 (18.6%) with urine SIADH criteria. Patients in this group had a higher incidence of pneumonia and/or atelectasis on chest X-ray (21.7% vs. 1.9%, $p = .002$), worse response to bronchodilator treatment with nebulised adrenaline (69.5% vs. 28.1%, $p = .016$), more need for respiratory assistance (high flow oxygen therapy (17.4% vs. 7.7%, $p = .016$)), or non-invasive mechanical ventilation (13% vs. 5.8%, $p = .034$), and more admissions to the PICU (26.1% vs. 6.8%, $p = .007$).

Conclusions: Patients older than 1 month with acute moderate bronchiolitis and urine SIADH criteria present poorer progress and greater need for non-invasive mechanical ventilation, PICU

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PALABRAS CLAVE

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admission, and a higher incidence of pneumonia on chest X-ray. For this reason, urine samples should be collected from these patients for early diagnosis of SIADH, and thus early treatment of fluid and electrolyte abnormalities.

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Asociación entre bronquiolitis moderada-grave y síndrome de secreción inadecuada de hormona antidiurética en urgencias

Resumen

Objetivos: Identificar precozmente y analizar las características de pacientes que precisan ingreso por bronquiolitis moderada o grave que cumplen criterios urinarios de SIADH.

Pacientes y métodos: Estudio prospectivo observacional, realizado entre octubre de 2012-marzo de 2013 en urgencias pediátricas. Se incluyen menores de 12 meses con bronquiolitis moderada o grave que requieren ingreso. Se consideran criterios urinarios de SIADH: sodio urinario ≥ 40 mmol/l, osmolaridad urinaria > 500 mOsm/kg y densidad urinaria > 1.020 g/l. Se recogen variables epidemiológicas y clínicas y se comparan 2 grupos definidos por cumplir o no criterios urinarios de SIADH.

Resultados: Se incluyen 126 pacientes con bronquiolitis moderada, 23 (18,6%) cumplen criterios urinarios de SIADH, ninguno grave ni menor de un mes. Los pacientes con criterios urinarios de SIADH tienen mayor incidencia de neumonía y/o atelectasia en la radiografía de tórax (21,7% vs. 1,9%; $p=0,002$), peor respuesta al tratamiento con adrenalina (69,5% vs. 28,1%; $p=0,016$), mayor asistencia respiratoria: oxigenoterapia de alto flujo (17,4% vs. 7,7%; $p=0,016$) y ventilación mecánica no invasiva (13% vs. 5,8%; $p=0,034$). Requieren más días oxigenoterapia ($p=0,02$) y tratamiento broncodilatador ($p=0,04$) y mayor ingreso en cuidados intensivos pediátricos (26,1% vs. 6,8%; $p=0,007$).

Conclusiones: Los pacientes mayores de 1 mes con bronquiolitis moderada y con criterios urinarios de SIADH tienen peor evolución respiratoria, mayor necesidad de soporte respiratorio, ingreso en UCIP y más alteraciones radiográficas. Por ello recomendamos realizar determinaciones de orina a estos pacientes para detectar precozmente el desarrollo de SIADH y cuidar el manejo hidroelectrolítico, previniendo el desarrollo de complicaciones potencialmente graves.

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Introduction

Bronchiolitis is a disease of viral aetiology that is characterised by small and medium-calibre airway obstructions. Diagnosis is based on clinical criteria.¹ It is defined as the first episode of respiratory distress, with wheezing in infants under the age of 12 months within the context of upper airway infection during epidemic seasons.²

Incidence of this disease is seasonal, and varies according to country. It affects up to 35.7% of the population during the epidemic season in Spain, with a frequency of hospital admissions of between 1% and 3.5%. Hospitalisation rates are even higher in patients with risk factors.^{3–5}

Fluid and electrolyte imbalance is an added difficulty when treating children with bronchiolitis. This imbalance is not always detected in the early stages, and diagnosis is sometimes delayed until severe complications typical of hyponatraemia develop, such as seizures or apnoea.^{5–8}

The syndrome of inappropriate antidiuretic hormone secretion (SIADH) is characterised by the sustained release

of antidiuretic hormone in the absence of usual stimuli (hyperosmolarity, hypotension and hypovolaemia).⁶

Studies analysing plasma ADH in children have found elevated levels in bronchiolitis, pneumonia, pneumothorax and asthma crises.^{7–9}

The theory that is proposed within the context of bronchiolitis is that, due to pulmonary hyperinflation and hypoxia, the intrathoracic osmoreceptors that activate ADH secretion centrally receive false volume depletion signals. ADH acts in the renal collecting tubule, where the incorporation of aquaporins in the tubule's wall stimulates water absorption, forming very concentrated, high density urine with high concentrations of sodium. The ultimate result of these physiopathological changes is a reduction in plasma osmolarity and dilutional hyponatraemia.^{7–9} Hyponatraemia is not diagnostic, since there are studies in which there are no differences in sodium plasma concentrations between the groups with high levels of ADH and normal levels of ADH.⁸

Therefore, the analysis of urine samples obtained by non-invasive methods can be useful in selecting patients with SIADH.

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