

The Effect of Intravenous Conivaptan on Intraocular Pressure

Saritha Valsala Krishnankutty¹, MS; Sunil Rajan², DNB

¹Department of Ophthalmology, Government Medical College, Kottayam, Kerala, India

²Department of Anesthesiology and Critical Care, Amrita Institute of Medical Sciences, Kochi, Kerala, India

J Ophthalmic Vis Res 2016; 11 (1): 126-127.

Sir,

Hyperosmotic and loop diuretics are commonly administered for acute reduction of intraocular pressure (IOP); however, their use is often associated with electrolyte abnormalities. Vaptans, a new group of vasopressin receptor antagonists, induce electrolyte-free water excretion through the kidneys (aquaresis) with minimal alteration in serum potassium levels and tend to restore sodium levels towards normal levels.

In the current study, we evaluated the effect of conivaptan, an injectable preparation of vaptans, on IOP, fluid balance and serum levels of sodium and potassium. Seventeen patients admitted to the postoperative intensive care unit (ICU) who were hyponatremic (serum sodium level of ≤ 130 [milliequivalent per liter] mEq/L) and symptomatic (headache, nausea, vomiting, lethargy, confusion, disorientation) received a single dose of intravenous (IV) conivaptan 20 mg over 30 minutes. No other diuretics were concurrently administered and there was no fluid restriction. IOP was measured with a Schiotz tonometer before drug administration and 12, 24, 48 and 72 hours after initiation of the treatment. We observed a significant reduction of IOP from pre-treatment levels which persisted for 72 hours [Figure 1] along with a negative fluid balance. There was no significant change in potassium levels and sodium levels showed a trend towards being normal [Table 1].

Vaptans are now projected as an effective alternative to hypertonic saline for management of the syndrome of inappropriate secretion of antidiuretic hormone (SIADH), which is associated with intravascular fluid expansion and hyponatremia. Conivaptan is the most popular vaptan used for this condition in the ICU. It

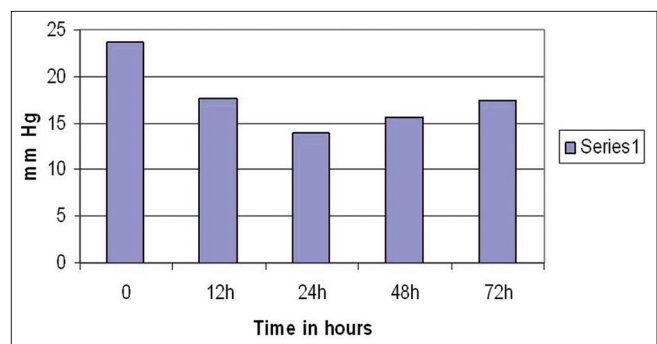


Figure 1. Changes in IOP following intravenous administration of conivaptan.

acts by inhibiting the antidiuretic hormone (ADH), also known as arginine vasopressin (AVP). It competitively and reversibly binds to AVP receptors and inhibits its actions. Antagonism of V2 receptors present in renal collecting ducts results in aquaresis.^[1] V2 receptor antagonists (V2RA) are now indicated selectively for treatment of hyponatremia caused by congestive cardiac failure.^[2] Tolvaptan or other V2RA may be of benefit in severe congestive heart failure.^[3] Conivaptan is usually started at a dose of 20 mg IV over 30 minutes, followed by 20mg infusion over the next 24 hours, to a maximum of 4 days. In non-hyponatremic patients with severe traumatic brain injury, a single dose of conivaptan is safe and reduces intracranial pressure.^[4] A single bolus of 20 or 40 mg has also been found to be effective for treatment of acute hyponatremia in neurologically injured patients with an effect lasting up to 72 hours.^[5]

Hyponatremia is usually secondary to volume expansion. The reduction in IOP following conivaptan is a reflection of reduction in total body water. However, in normovolemic patients, conivaptan may also induce aquaresis, but not as effectively as in subjects fluid overload. Expansion of intravascular volume, seen with mannitol or hypertonic saline which may lead to pulmonary edema, is not observed following administration of conivaptan. Further studies on more

Correspondence to:

Sunil Rajan, DNB. Department of Anesthesiology and Critical Care, Amrita Institute of Medical Sciences, Kochi - 682 041, Kerala, India.

E-mail: sunilrajan@aims.amrita.edu

Received: 25-04-2015

Accepted: 05-08-2015

Table 1. Changes in intraocular pressure, electrolytes and fluid balance following intravenous administration of conivaptan

Variables	Baseline	12 h	24 h	48 h	72 h
IOP (mm Hg)	23.73±1.79	17.7±1.70	13.85±1.37	15.59±0.94	17.4±1.72
Serum sodium (mEq/L)	125.5±2.4	129.4±2.8	131.5±2.1	130.5±2.6	129.4±2.5
Serum potassium (mEq/L)	4.2±0.5	4.2±0.3	4.1±0.3	4.3±0.2	4.4±0.2
Daily fluid balance (mL)			-1094.3±286.7	-1579.0±375.8	-1370.0±219.9

IOP, intraocular pressure; mmHg, millimeter of mercury; mEq/L, milliequivalent per liter; mL, milliliter; h, hours

patients are required to confirm the safety and efficacy of conivaptan for reducing IOP and this effect needs to be compared with conventional drugs. If proved useful, tolvaptan, an oral vaptan, might find a place for management of glaucoma with less concerns regarding electrolyte imbalance.

Financial Support and Sponsorship

Nil.

Conflicts of Interest

There are no conflicts of interest.

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DOI:

10.4103/2008-322X.180714

How to cite this article: Krishnankutty SV, Rajan S. The effect of intravenous conivaptan on intraocular pressure. *J Ophthalmic Vis Res* 2016;11:126-7.