Postoperative delayed hyponatremia

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Postoperative delayed hyponatremia refers to a condition where there is a decrease in the concentration of sodium in the blood (hyponatremia) that occurs after a surgical procedure, but not immediately. Instead, it develops some time after the surgery has been performed.

In the postoperative setting, delayed hyponatremia can occur due to various factors, including fluid and electrolyte imbalances, hormonal disturbances, and the effects of certain medications.

One of the common causes of postoperative delayed hyponatremia is the syndrome of inappropriate antidiuretic hormone secretion (SIADH). SIADH occurs when the body releases excessive amounts of antidiuretic hormone (ADH or vasopressin), leading to increased water reabsorption in the kidneys and dilution of sodium in the blood.

Other potential causes of delayed hyponatremia after surgery include excessive fluid administration, inappropriate administration of hypotonic intravenous fluids, certain medications, pain management techniques, and surgical stress response.

Symptoms of hyponatremia can range from mild and nonspecific, such as nausea, headache, and confusion, to more severe, including seizures and coma, especially in cases of severe and acute hyponatremia.

Management of postoperative delayed hyponatremia involves identifying and treating the underlying cause, adjusting fluid and electrolyte balance, and monitoring sodium levels closely to avoid complications.

It is essential for healthcare providers to be aware of the risk factors and potential causes of postoperative delayed hyponatremia to promptly recognize and manage this condition to ensure the best possible outcomes for the patient.

It is a major cause of readmission after endoscopic transsphenoidal surgery (eTSS) for pituitary adenomas (PAs). However, the risk factors associated with PDH have not been well established, and the development of a dynamic online nomogram for predicting PDH is yet to be realized. Cai et al. aimed to investigate the predictive factors for PDH and construct a dynamic online nomogram to aid in its prediction.

They analyzed the data of 226 consecutive patients who underwent eTSS for PAs at the Department of Neurosurgery in Jinling Hospital between January 2018 and October 2020. An additional 97 external patients were included for external validation. PDH was defined as a serum sodium level below 137 mmol/L, occurring on the third postoperative day (POD) or later.

Hyponatremia on POD 1-2 (OR = 2.64, P = 0.033), prothrombin time (PT) (OR = 1.78, P = 0.008), and percentage of monocytes (OR = 1.22, P = 0.047) were identified as predictive factors for PDH via multivariable logistic regression analysis. Based on these predictors, a nomogram was constructed with great discrimination in internal validation (adjusted AUC: 0.613-0.688) and external validation (AUC: 0.594-0.617). Furthermore, the nomogram demonstrated good performance in calibration plot, Brier Score, and decision curve analysis. Subgroup analysis revealed robust predictive performance in patients with various clinical subtypes and mild to moderate PDH.

Preoperative PT and the percentage of monocytes were, for the first time, identified as predictive factors for PDH. The dynamic nomogram proved to be a valuable tool for predicting PDH after eTSS for PAs and demonstrated good generalizability. Patients could benefit from early identification of PDH and optimized treatment decisions [1].

Early post-operative diabetes insipidus(EPDI)., intra-operative CSF leak and peri-operative steroid use were significant predictors of DH. EPDI predicts moderate to severe hyponatraemia with 80% specificity but has low sensitivity(47%). As most patients have asymptomatic hyponatraemia, serum sodium measurement on POD 7 to 10 would be helpful to identify DH in patients at increased risk [2]

Fuse et al. proposed machine learning models with pre- and post-resection features predicted DHN after the resection of PitNETs [3].

Findings suggested that lower preoperative weight and a postoperative transient gain in body weight are associated with an increased risk of DPH in acromegaly patients undergoing transsphenoidal surgery [4].

A low BMI was the only clear predictor of which patients will develop DPH. Alterations in immediate postoperative sodium levels did not predict DPH. Therefore, an appropriate index of suspicion and close postoperative monitoring of serum sodium concentration should be maintained for these patients, and an appropriate treatment should be undertaken when hyponatremia is identified [5].

Prevention

A multidisciplinary POC pathway incorporating endocrinologist in conjunction with postdischarge weight-based fluid restriction and postoperative serum sodium levels can safely be used to reduce 30-day readmissions following ETPS [6]

Restricting fluid to 1 L/day on discharge decreases rates of delayed hyponatremia and readmissions by 50%. Standardized patient education and POD 7 sodium testing decreases severity of hyponatremia but does not impact readmission rates. These protocols should be considered standard practice for patients undergoing transsphenoidal surgery [7]

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