Management of Intraoperative Diabetes Insipidus during Resection of Craniopharyngioma

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INTRODUCTION

- Although DI is more commonly seen postoperatively, DI can manifest during initial resection even if no symptoms are present preoperatively .
- Pituitary dysfunction during and after craniopharyngioma resection is complex, requiring a collaborative effort between the anesthesiologist, endocrinologist, and surgeon.

CASE HISTORY

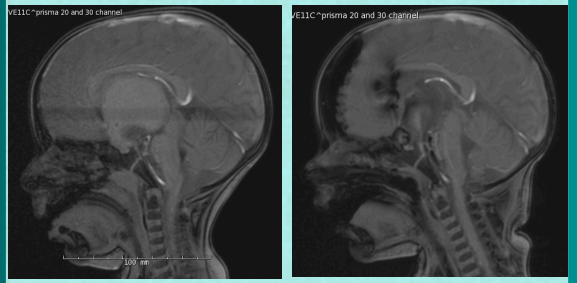
Presentation:

- Healthy 21 month old female (9 kg)
- LEFT upper extremity weakness, feeding intolerance, loss of weight
- Found to have 7x5x6cm sellar mass
- Serum electrolytes including serum and urine osmolality were within normal limits

Intraoperative Course:

- Standard IV induction with IV stress dose hydrocortisone
- One hour into tumor resection, polyuria was noticed (6-10 cc/kg/hr).
- Na levels slowly increased 134→144, yet serum osmolality remained normal.
- Vasopressin infusion was started at 0.5 milliunits/hr and titrated up to 1.5 milliunits/hr based on urine output.
- Extubated without difficulty and monitored in PICU.

IMAGES



Pre-resection Post-resection

Postop Course:

Postop Day 0-1: Vasopressin titrated up to 4.0 milliunits/hr. Re-intubated secondary to seizure activity. Appeared volume overloaded with hyponatremia, polyuria, and urine osmolality that was more elevated than would be expected with her degree of hyponatremia→ Cerebral salt wasting (CSW) with SIADH component. Vasopressin was stopped.

Postop Day 2: Quickly developed hypernatremia as seen intraoperatively with urine output increasing to 12 cc/kg/hr. Vasopressin infusion was restarted in the PICU.

Postop Day 3: Tolerating PO diet and euvolemic. Na levels again began decreasing with increasing urine osmolality. Vasopressin infusion was continued.

Postop Day 5+: Continued polyuria with now rising Na levels, high serum osmolality (Sosm > 300), and low urine osmolality (Uosm < 300) now consistent with a diagnosis of DI, likely to be permanent. Oral DDAVP was started.

DISCUSSION

This patient's trend of DI followed by hyponatremia in the first few days after a pituitary operation has been described in literature as a triphasic pattern of endogenous vasopressin secretion.

Triphasic Response:

- The initial phase of symptomatic diabetes insipidus occurs typically 24 hours after surgery although we saw this during resection.
- A second phase of inappropriate ADH secretion can occur causing hyponatremia.
- The third phase includes a return to DI occurring up to 2 weeks after initial resection. This third phase can often be complicated by cerebral salt wasting and thirst disorders.

CONCLUSIONS

- DI is usually a transient phenomenon following transsphenoidal surgery and typically patients are able to maintain neutral fluid balance by drinking to satiety by postop day 1 and discharged by post op day 2-3, This is challenging in pediatrics.
- Increased awareness of this triphasic response among anesthesiologists can help guide intraop and postop management to avoid severe life threatening electrolyte disturbances.

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