Diabetes insipidus (DI) is an unusual case in patients who underwent open heart surgery. In this article, we aimed to present our experience of performing an atrial septal defect operation in a patient with diabetes insipidus who drank 30 l of water and urinated almost the same per day.

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1. Introduction

Endocrinologic disorders are frequently encountered in patients undergoing open heart surgery. Of those, diabetes mellitus and thyroid function disorders are commonest. However, diabetes insipidus (DI) is an unusual case in patients who undergo open heart surgery. When various problems due to DI are added to the water–electrolyte imbalance after cardiopulmonary bypass procedure, the management of those patients may become really difficult.

In this report, we aimed to present our experience of performing an atrial septal defect (ASD) operation in a patient with DI. Besides, this case is the first report in English literature related to the performance of open heart surgery in a patient with DI.

2. Case report

The patient was a 19-year-old man who applied to another clinic with the complaint of dyspnea and was diagnosed as secundum type ASD following the required examinations. He was admitted to our clinic for the operation. In the physical examination, mild mental retardation was determined as an extracardiac finding. Besides, on his medical history, he revealed that he drank too much water and urinated as much since birth. However, the patient was not complaining of his situation. When his family history was taken it was realized that too much drinking and much urination also existed both in his mother and some relatives. The water intake and urine output management showed that he drank 25–30 l of water and urinated as much. But there was no electrolyte imbalance. The level of sodium was 140 mEq/l and the level of potassium was 4.3 mEq/l. Serum glucose level was 92 mg/dl. Urine specific gravity was 1002 and there was no glucose or acetone present. While the plasma osmolality was 310 mOsm/kg, the urine osmolality was 128 mOsm/kg. The creatinin clearance was 13.7 ml/min. Brain MRI and pituitary MRI were normal. After consulting with the department of endocrinology and as a result of the laboratory examinations, the diagnosis of the patient was ascertained as central DI and 40 μg/day intranasal desmopressin treatment was initiated. Daily urine output decreased to 10–15 l following desmopressin treatment. Since it was found unsatisfactory, 25 mg hydrochlorothiazide + 2.5 mg amyloride combination (BID) was added. After five days, 2×50 mg indomethacin were added. Urine output decreased to 3–4 l/day with triple treatment. No effort was made to control sodium and other electrolyte levels because there was no electrolyte imbalance. Following the consent of the endocrinology department, the patient was to undergo the operation. The patient’s and guardian’s informed consents were taken, then the patient was given morphine i.v. 6 mg before the operation. The patient was monitored with non-invasive arterial pressure, electrocardiogram, and pulse oximetry. Following standard anesthesia monitoring, arterial cannulation was performed to the right radial artery. Anesthesia was induced with ethomidate (0.3 mg·kg⁻¹) followed by vecuronium (0.1 mg·kg⁻¹) and fentanyl (20 μg·kg⁻¹), and maintained with 2% sevoflurane in nitrous oxide/oxygen. Central catheterization was performed via the internal jugular vein. After the median sternotomy was performed, the heart was reached. Arterial and venous cannulations were performed by the surgeon and then a primary ASD repair was conducted under standard cardiopulmonary bypass. The dosage of mannitol added to prime solution...
(200 mg normally) was decreased to 70 mg during this period. During the operation, hemodynamic and biochemical parameters (including electrolyte levels) were unremarkable. The patient was extubated at the postoperative 4th hour and intranasal desmopressin was started immediately, then a hydrochlorothiazide + amyloride combination and indomethacin treatment was added as soon as possible. The doses of these drugs were not changed after the operation. Urine output was 1200 cc in operative period. In the intensive care unit, urine output was 5200 cc on the first day and was 8900 cc on the second day. The sodium level was 148 mEq/l and the potassium level was 4.4 mEq/l postoperatively. The patient was urinating 5–6 l/day and he was discharged on the 6th postoperative day.

3. Discussion

Central DI originating from insufficiency of circulating antidiuretic hormone (ADH) was reported postoperatively in a few cases after open heart surgery [1–3]. This situation is temporary and may be due to pre-existing selective osmoreceptor dysfunction. It is postulated that transient DI after cardiac operation occurred in some patients who had preexisting selective osmoreceptor dysfunction when cardiac standstill during extracorporeal circulation alters the left atrial non-osmotic receptor function, resulting in suppression of ADH release [3]. It was also reported that DI might develop even after thorax trauma [4]. However, performing open heart surgery in a patient with pre-existing DI is unusual and there is no such case reported in the English literature.

Our patient was not being accepted as a patient by himself and his family, even though he was known to intake too much fluid and output too much urine since his childhood. The similar complaints existed in his mother and in some close relatives, thus they all thought that this situation was regular. We offered to screen his close relatives thinking that it may be a familial DI case, but they rejected.

The subject we thought that would put us into stress preoperatively and postoperatively was the imbalance of water and electrolyte during the operation. However, decreasing the urine output to a reasonable level from 30 l daily, with a logical medical treatment preoperatively and with a good anesthesia management, the patient experienced no problem during and after the operation. Giving a diuretic combination in the treatment of such a patient with DI was also an interesting approach.

In conclusion, open heart surgery in patients with DI is not a usual case and these patients are being treated seemingly with good management. We present our experience of performing open heart surgery in a patient with DI in this report. The tragicomical aspect of this case is our not using any furosemide for the first time in a patient who underwent open heart surgery.

References