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CASE REPORT

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Hypocalcemic Crisis Induced by Excessive Milking
Running Title: Milking-Induced Hypocalcemic Crisis

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Abstract

Background: Calcium loss by lactation does not cause hypocalcemia unless mothers have subclinical hypoparathyroidism.

Case report: A 32-year-old woman was an inhabitant of an island located in the south-western region of Japan. She delivered her second boy by Caesarian section in 37th week of gestation in a hospital in the mainland. She began milking the breasts 6 to 7 times a day, yielding ca. 200 ml each times, on 4th post-operative (henceforth, PO day). She left her baby in the hospital and returned her home island on the 7th PO day. Then, she continued milking the breasts daily and shipped milk to the hospital for her baby. On the 13th PO day, she noticed paresthesia around the mouth and in both hands. Following day, she was admitted in author's hospital for hypocalcemic crisis with intermittent carpopedal spasm and opisthotonos on rare occasions. The initial blood study revealed serum albumin 3.4 g/dl, calcium 4.6 mg/dl (reference range, 8.6-10.2), inorganic phosphate 1.6 mg/dl (reference range, 1.7-2.6). She was given i.v. injections of 8.5% calcium gluconate, 10 ml and 20 ml successively, which was followed by continuous i.v. infusion of calcium-enriched saline until the 15th PO day. Serum calcium normalized after cessation of milking. Serum intact parathyroid hormone level was 153 pg/ml (reference range, 10-65) at the time of the admission.

Conclusion: The amount of milk mother produces is determined by baby's sucking. When mother is separated from her baby, she might milk the breasts more than the baby's need. Excessive milking has conceivably precipitated hypo-calcemic crisis in the present patient.

Keywords: Hypocalcemic crisis; Parathyroid hormone; Lactation

Abbreviations: C section: Caesarian Section; Br'criptine: Bromo Criptine

Background

Acute loss of calcium from the body is not considered to be a cause of hypocalcemia [1]. As human milk contains calcium as much as 25.0 ± 7.1 mg/dl [2], lactation, if excessive and not balanced by mobilization of calcium from the bone and augmented intestinal absorption, could produce hypocalcemia. Here we report hypocalcemic crisis of a woman milking the breasts for her baby separated from her.

Case Report

32-year-old woman was an inhabitant of an island located in the south-western region of Japan. She delivered her second boy by Caesarian section in 37th week of gestation in a hospital in the mainland because of threatened premature labor, the cause of which was not described in the referral letter. On the 4th post-operative day (henceforth, PO day), she began milking the breasts 6 to 7 times a day, yielding ca. 200 ml each time. After she returned her home island on the 7th PO day leaving her baby in the hospital, she continued to milk same amount daily, which was frozen and shipped to the hospital. On the 13th PO day, she became aware of paresthesia around the mouth and in both hands for which she was brought to another hospital. She was thought to suffer from hyperventilation syndrome and treated with sedation and paper-bag without success. Following day, she was transferred to the hospital where one of us (S.I) worked. She was medium sized and normally nourished. She was very apprehensive and complained of acral paresthesia. The blood pressure was 120 mmHg systolic and 80 mmHg diastolic and the pulse 81 per minute. She showed intermittent carpopedal spasm and opisthotonos on rare occasions. The initial studies revealed hemoglobin 10.8 g/dl, hematocrit 30.6%, white blood cells 7,500/μl, platelets 1.6 × 10^4/μl, serum albumin 3.4 g/dl, sodium 145 mEq/L, potassium 3.2 mEq/L, chloride 106 mEq/L, calcium 4.6 mg/dl (reference range, 8.6-10.2), inorganic phosphate 1.6 mg/dl (1.7-2.6), and magnesium 2.1 mg/dl. The pH of the arterial gas was 7.44, partial pressure of oxygen and carbon dioxide 107.8 and 29.6 mmHg, respectively, and bicarbonate 14.9 mEq/L. The EKG showed the sinus tachycardia with corrected

QT interval was 0.49 msec. The time courses of serum calcium and phosphate and calcium supplementation are illustrated in figure 1. At outset, she was given i.v. injection of 8.5% calcium gluconate, 10 ml and 20 ml, successively. Then, she was kept on i.v. infusion of saline with 8.5 g calcium gluconate added in 500 ml saline at a rate of 100 ml per hour until 17:00 hour of the 15th PO day until carpo-pedal spasm had ceased to recur and acral paresthesia weaned. Bromocriptine 75 mg/day PO was started on the 14th PO day. The breasts did not get full by the end of the 16th PO day. Hypocalcemia was observed only when she milked her breasts. Serum intact parathyroid hormone level at the time of the admission was reported in the later period as 153 pg/ml (normal range, 10-65).

Discussion

Lactation-associated hypocalcemia is rare: four cases of lactation-associated hypocalcemia were found by pubmed search using hypocalcemia and lactation as keywords into as early as 1967 [3-6]. All of them were proved to have occult hypoparathyroidism as a cause of hypocalcemia. Calcium loss into milk is thought to be compensated in lactating mothers. Hypocalcemia is ameliorated in patients with hypoparathyroidism presumably mediated either by prolactin-mediated calcium homeostasis [7] or by augmented sensitivity to calcitriol as suggested by decreased requirement of calcitriol in lactating patients with hypoparathyroidism [8-10]. This patient responded to hypocalcemia by augmented secretion of parathyroid hormone. Milk of Japanese mother reportedly contains 25 mg/dl of calcium [2]. As the present patient milked 200 ml six to seven times a day, calcium lost in milk is calculated as 300-350 mg per day. Suppose 2-week-old neonate sucks 500 ml of milk a day, which contains 125 mg of calcium. Hypocalcemia was observed only when she milked the breasts. Hence, hypocalcemic crisis is presumably precipitated by excessive milking. Two calcium levels before Caesarian section were below the reference range. Subclinical hypovitaminosis D before the surgery might have contributed to the development of hypocalcemic crisis, which could not be proved without 25-hydroxy Vitamin D measurement (not obtained for cost uncovered by health insurance).

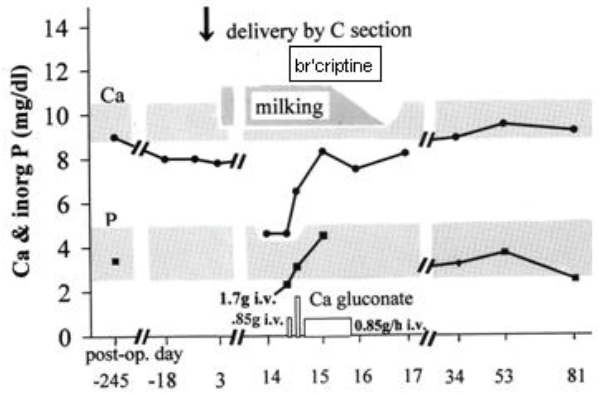

Figure 1: Serial changes of serum calcium and inorganic phosphate before, during, and after lactating period.

The time course of calcium concentrations is shown by bold lines connected by closed circles and that of phosphate concentrations shown by bold lines connected by closed squares. The reference ranges of calcium and phosphate are shown by gray bands.

Conclusion

The amount of milk mother produces is determined by baby's sucking. When mother is separated from her baby, she milked the breasts more than the baby's need. Excessive milking may precipitate hypocalcemic crisis. When baby is separated from mother, mother milking for baby has to be instructed to be watchful of hypocalcemia manifested by acral paresthesia.

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The authors declare no conflict of interest in this case report. The consent to publish this account could not be obtained as the patient was lost from follow-up.

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