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Case Report

Recurrent hypocalcemia due to postoperative total thyroidectomy: a case report

I. Dewa Gede Amara Putra Wibawa*, Dewi Catur Wulandari

Department of Internal Medicine, Wangaya Hospital Denpasar, Bali, Indonesia

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***Correspondence:**
Dr. I. Dewa Gede Amara Putra Wibawa,
E-mail: ajuswibawa168@gmail.com

ABSTRACT

Hypocalcemia is a common complication following total thyroidectomy, caused by inadvertent damage or removal of the parathyroid glands responsible for calcium regulation. This condition poses a significant challenge in postoperative management, often leading to symptoms such as carpopedal spasm, convulsion, and airway constriction occur during hypocalcemia. Patients undergoing total thyroidectomy require vigilant monitoring of serum calcium levels, especially in the immediate postoperative period. Treatment typically involves calcium to prevent hypocalcemic episodes. Long-term management strategies may include the use of calcitriol. We report 30-years-old Indonesian woman suffer hypoparathyroidism because postoperative total thyroidectomy. For a month she did not have any complaints after being prescribed calcium supplement and levothyroxine. But she has stopped the calcium supplement and levothyroxine for 2 days, then she went to emergency room with stiffness all part of body. This report describes proper education of patients on recognizing symptoms of hypocalcemia and ensuring regular follow-up care are essential to prevent complications and improve quality of life post-thyroidectomy.

Keywords: Hypocalcemia, Hypoparathyroidism, Total thyroidectomy

INTRODUCTION

Total thyroidectomy can lead to serious complication, one of the complication is hypoparathyroidism and also hypothyroid. One of meta-analysis study shown 24.92% had transient hypocalcemia and 1.96% had permanent hypocalcemia post total thyroidectomy.[1] There are four parathyroid glands in our body, which are attached on the posterior of the thyroid and it has key role in the regulation of serum calcium and phosphate levels. Which if parathyroid is disturbed there would be an imbalance of serum calcium. Calcium in our body plays an important role to maintain normal cellular function, haemostasis, and muscle contraction.[2]

Hypocalcemia can be anticipated by administering calcium supplement and calcitriol to prevent recurrence of life-threatening symptoms.[3]

CASE REPORT

A 30-year-old Indonesian female with prior hypothyroidism presented to the emergency department with stiffness and muscle cramps. She has medical history total thyroidectomy 2 months ago and hypocalcemia due to suspected secondary hypoparathyroidism. She had been prescribed calcium supplement and levothyroxine but she stopped by herself. Physical examination shown vital sign was normal, the presence difficulty moving the arms, especially the hands. Positive Trousseau's sign on both hands. Laboratory findings revealed, complete blood count showing increased of leukocyte levels 26.83 10^3/ul, thyroid function shown FT4 was normal 0.79 ng/dl and TSHs was increased 34.19 mIU/l. Urinalysis found a leukocyturia, electrolyte levels found severe of hypocalcemia 1.4 mg/dl, sodium serum (Na^+) 142 mmol/, potassium serum (K^+) 2.9 mmol/l, chloride serum (Cl^-) 91

mmol/l, the laboratory findings were shown in Table 1 and normal electrocardiography (ECG) (Figure 1).

Table 1: Laboratory data.

Parameters	Result	Normal range
WBC (103/ul)	26.83	4.0 – 10.0
RBC (103/ul)	5.15	3.80 – 5.20
Hb (g/dl)	16.0	11.7 – 15.5
HCT (%)	49.3	35.0 – 47.0
PLT (103/ul)	441	150 – 440
TSHs (mIU/l)	34.19	0.35 – 5.10
FT4 (ng/dl)	0.79	0.5 – 1.4
Na (mmol/l)	142	136 – 145
K (mmol/l)	2.9	3.5 – 5.1
Cl (mmol/l)	91	98 – 107
Ca (mg/dl)	1.4	8.4 – 9.9
Nitrite urine	Positive	Negative
Leukocyte esterase (leu/ul)	500	Negative
Bacteria urine	Positive	Negative
Protein urine	Negative	Negative

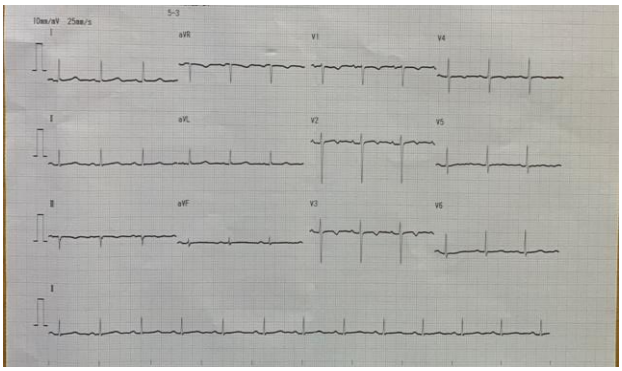

Figure 1: ECG patients.

The patient was we diagnosed with hypoparathyroidism due to total postoperative thyroidectomy. The patient received infusion of calcium gluconate solution 10% in sodium chloride 0.9%, calcitriol 0.25 mcg once daily, KSR 3×600 mg/24 hours, levothyroxine 1×150 mcg and levofloxacin 500 mg once a day for 5 days. 2 days later suddenly patient's complained like-choking, short breathing and muscle cramps. Saturation was decreased 93% no wheezing, ronchi, and stridor, then patient prescribed oxygen supplementation, saturation shown improve and bolus calcium gluconate 1 gram was administrating to patient, stiffness, muscle cramps and short breathing were improving. On the 6th day the potassium serum was 4.2 mmol/l, and after 12 days hospitalized calcium serum was improving 6.3 mg/dl. She continued medication at home levothyroxine 1×150 mcg/24 hours, calcitriol 0.25 mcg once daily and Calos 500 mg three times a day. In the next week she came to endocrinologist and she didn't have any symptoms. parathyroid hormone (PTH) test was not performed, because the test was not available.

DISCUSSION

Calcium serum have impactful in our body especially in our cells and it's regulated in large by PTH. Physiological response of PTH, as low serum calcium levels, targeting kidney to produce calcitriol and stimulates osteoclast to resorb bone which will increase calcium levels. Kidney response of PTH secretion also reduce calcium clearance and stimulate synthesis of 1, 25-dihydroxyvitamin D which stimulate calcium absorption in the gastrointestinal tract. But in other way if there are calcium serum rises, thyroid hormone secretes calcitonin, which will block calcium resorption then calcium level will in normal range. Total calcium concentration in serum remain between 8.5 and 10.5 mg/dl. Calcium help maintain the rhythm of muscle contraction and strength in normal conditions.[2,4,5]

Hypocalcemia occur by autoimmune disease, neck surgery, vitamin D inadequacy, acid-base conditions, kidney failure, drugs in used daily such as; antiepileptics, aminoglycosides, and proton-pump inhibitors.[6,7] One of caused hypocalcemia is post total thyroidectomy such this case. Symptoms associated with hypocalcemia depend on the severity and duration, hypocalcemia should be more considered, which in acute conditions such dyspnea, palpitation, seizures, paresthesia it's can be life-threatening. The first things to think about hypocalcemia are severity of symptoms, determine and evaluate the etiology. Case were found, in patient having seizure in the emergency room, after the emergency was handled and she was hospitalized. After 2 days being hospitalized, she suddenly felt choking, sore throat and dyspnea. Laboratory tests should be evaluated such as electrolyte (calcium, sodium, potassium, phosphate, magnesium) kidney functions, parathyroid hormone, complete blood count.[5,7] Laboratory tests found very low levels of calcium (1.4 mg/dl) and hypopotassemia (2.9 mmol/l) which mean they could reach to critical stage, so we have to be vigilant. Then we corrected of potassium and calcium level with close follow-up. Although PTH level is unknown, there are many symptoms and laboratory examination suggest to secondary hypoparathyroidism.

The patient who postoperative total thyroidectomy usually has any symptoms hypothyroidism and hypoparathyroidism. As we known hypocalcemia is correlated with hypoparathyroidism, administration of calcium supplement and calcitriol should be given. In emergency cases such as seizures, laryngospasm, and tetany, 1 to 2 grams of calcium gluconate should be in administered over 10 minutes and repeated 10 to 60 minutes until the symptoms resolve. Calcitriol is one of active vitamin D, then can give 0.25-2 mcg/day divided into 2-3 doses, we prescribed calcitriol 0.25 mcg once daily. Calcitriol help increasing calcium absorption level in the intestinal, but calcitriol also increase phosphate level. Calcium carbonate 2.5-7.5 g/day divide to 2-3 doses with meal. The patient was prescribed Calos 500 mg three times a day.[6,8,9] Use of levothyroxine as a synthetic of T_4 hormone, it is administered when to body deficient of

natural hormone such as case hypothyroidism postoperative. Levothyroxine dosage of 1.6 mcg/kg/day based on ideal body weight.[10] The patient was prescribed levothyroxine 1×150 mcg/24 hours. The primary goals treatment of hypoparathyroidism control of symptoms and maintaining serum calcium, without developing hypercalciuria which can make nephrocalcinosis. If the patient asymptomatic a laboratory evaluation can do in every 6 months. One of retrospective study demonstrated patients with chronic hypoparathyroidism had significantly increased risk of nephrolithiasis and nephrocalcinosis.[8,11,12] Patients undergoing total thyroidectomy are given calcium carbonate, which can inhibit the absorption of T_4, along with levothyroxine replacement medication.[13]

CONCLUSION

Calcium supplementation, calcitriol, and levothyroxine should be given to postoperative total thyroidectomy patients, especially those with typical symptoms of hypocalcemia. Surely this supplementation must be given for lifetime and regularly, to prevent emergencies due hypocalcemia and evaluate the calcium serum gradually.

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