

Percutaneous Ethanol Ablation of Parathyroid Adenoma to Acutely Treat Severe Hypercalcemia

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Abstract

Context: Severe hypercalcemia requires immediate treatment and hospital admission for IV hydration and medical therapy.

Case description: 59 year old male presented with serum calcium 14.8 mg/dl, PTH 497 pg/ml, he refused hospital admission or IV treatment in the infusion center. Neck ultrasound identified left parathyroid adenoma with hyper vascularity in the inferior part of the gland. Percutaneous ethanol ablation was done in the office and 2 milliliter of dehydrated alcohol was injected in the hyper vascular part of the gland. Calcium decreased to 12 in 14 hours and to normal range in less than 3 days.

Conclusion: PEA of parathyroid adenoma is another option of treatment to sever hypercalcemia, the treatment showed decreases in calcium to a safe level as fast as the current standard of care.

Keywords: Hypercalcemia; Hyperparathyroidism; Ethanol; Parathyroid adenoma; Ultrasound guided

Introduction

Sever hypercalcemia is by definition, Calcium level above 14 mg/dl regardless of the symptoms and it requires immediate intervention. Standard of care is hydration, calcitonin, and bisphosphonate. Calcitonin is expected to lower the calcium over 12 to 48 hours and pamidronate or zoledronic Acid are expected to work after 48 hours. The current treatment requires hospital admission usually for the intravenous fluid administration and the bisphosphonate infusion. Parathyroid adenoma is the most common cause of primary hyperparathyroidism and hypercalcemia in an outpatient setting. The treatment of parathyroid adenoma with sever hypercalcemia is surgical removal of the parathyroid adenoma after managing the immediate hypercalcemia.

Percutaneous ethanol ablation (PEA) of parathyroid adenoma is currently used for treatment of two conditions, recurrent primary hyperparathyroidism in patient with MEN 1 and secondary hyperparathyroidism in patient with renal failure.

Recent review of the Mayo Clinic PEA treatment of recurrent PHP in patient with MEN 1 [1] concluded that PEA is an effective treatment for achieving normocalcemia in the majority of the patient s with MEN 1. Hyper vascularity of the parathyroid adenoma was correlated with the success of PEA of the parathyroid adenoma in primary hyperparathyroidism.

PEA of secondary hyperparathyroidism in patient with renal failure was also more successful if the enlarged parathyroid gland was hyper vascular [2].

Case Description

59 year old male referred to the endocrine clinic for evaluation and management of hypercalcemia. Laboratory results were as follows: Serum calcium 14.8 mg/dl, PTH 497 pg/ml. albumin 4.4 gr/dl, and creatinine 1.46 mg/dl. Patient was diagnosed with hypercalcemia six months earlier but did not receive treatment. He was asymptomatic, he had no history of renal stones of pathological fracture. Physical examination showed no abnormalities.

Neck ultrasound performed the day of the evaluation showed left inferior parathyroid adenoma 13 mm in the largest diameter with welldefined border, and increased vascularity in the upper part of the adenoma.

Patient refused admission to the hospital for treatment of the sever hypercalcemia because of work issues and also he could not afford outpatient Pamidronate infusion or starting Cinacalcet.

On the second day, patient came back to the clinic to discuss other treatment options. We offered the patient PEA treatment for the parathyroid adenoma while arranging for the surgical evaluation and treatment (Figure 1).



Figure 1: Ultrasound guided PEA.

Ultrasound guided PEA was done in the office, Two milliliters of 98% dehydrated ethanol was injected into the hyper vascular part of the adenoma using 10 ml syringe and 25 gauge needle 1.5 inch. The ethanol was injected with no resistance. The ultrasound evaluation after the injection showed crystalized tissue with no more vascularity in the parathyroid adenoma. Patient developed sharp pain in the injection site for about 20 seconds; then the pain stopped and the patient had a feeling of a lamp in the neck for two days. No pain medication was used for the procedure and no complications happened.

Thirteen hours later the calcium decreased to 12 mg/dl, PTH decreased to 37 pg/ml, Cr 1.47 mg/dl. 36 hours after the injection calcium decreased further to 11.0 mg/dl and by the third day the calcium normalized at 10.0 mg/dl, PTH 139 pg/ml and Cr improved to 1.2 mg/dl.

Discussion

Sever hypercalcemia (calcium level >14 mg/dl) from primary hyperparathyroidism is a serious condition and can be associated with significant morbidity and mortality. Treatment usually requires hospitalization. PEA treatment in our patient lowered calcium to safe level within 12 hours and to normal range in 3 days. To our knowledge, this is the first time PEA is used for the treatment of sever hypercalcemia. Also, in this case we were concerned about parathyroid carcinoma because of elevated PTH and the sever hypercalcemia and our plan was still including referral to surgery for parathyroidectomy but we needed immediate action to lower the calcium in a patient who refused hospitalization.

PEA of parathyroid adenoma could be a safe, cost-effective method for lowering calcium level acutely, either as a primary treatment or as a temporary measure until parathyroidectomy is available. Ethanol causes sclerosis in the parathyroid tissue with thrombosis of small blood vessels, Usually 3-5 cc (or half of the volume of the calculated gland) 96% ethanol is administered in two or three sessions. One study assessed ultrasound guided percutaneous ethanol injection in patients with tertiary hyperparathyroidism and results showed successful in treatment of hyperparathyroidism with one adenoma or recurrent adenoma after surgery or cases that are not suitable candidate for surgery. All patients in this study experienced transient burning pain, and 2 out of 22 patients suffered transient laryngeal nerve palsy and in two of them it was permanent [3]. Another study has been done with injection of 2 ml of ethanol into the adenoma on the poor candidate case for the surgery, patient suffered from transient right pupil meiosis, right eyelid ptosis and right vocal cord paralysis, (Horner syndrome) and disappeared during few mounts without any treatment. That study recommended to inject ethanol in several sessions with smallest amount to decrease the rate of complication and achieve acceptable results [4].

The result of study by Iglesias and et al in 2008 showed decrease in calcium level at 36-120 h and PTH normalization 6-78 hours after ethanol injection [5].

We recognize that this procedure requires confidence in recognizing the parathyroid adenoma with the ultrasound. Ethanol injection is essentially the same technique as doing the fine needle aspiration. We believe that an experienced physician with fine needle aspiration biopsy procedure can perform the ethanol injection in the hyper vascular part of the gland easily.

More studies are needed for the parathyroid after PEA treatment.

Referencs

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