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Hypercalcemic crisis associated with primary hyperparathyroidism after aortic surgery in an octogenarian: A Case Report

Hitoshi Sakuda¹, Shinobu Matsubara¹, Noboru Higa², Moriyasu Nakama³, Kazufumi Miyagi², Yoshihiko Kamada¹, Yukio Kuniyoshi¹, Kageharu Koja³, Ichiro Komiya² and Teruo Iwamasa²

¹ Second Department of Surgery, ² Second Department of Internal Medicine and ³ Department of Pathology
Faculty of Medicine, University of the Ryukyus, Okinawa, Japan

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ABSTRACT

We report a rare case of hypercalcemic crisis associated with primary hyperparathyroidism after aortic surgery in an octogenarian. An 86-year-old woman with mild liver dysfunction had a successful abdominal aortic aneurysmectomy and Y grafting. Seventeen days after surgery, she suddenly suffered an unexpected hypercalcemic crisis and fell into stupor with flaccid paraplegia. Diagnosis of hyperparathyroidism was made by measurement of serum calcium (14.5 mg/100ml) and intact-parathyroid hormone (64 pg/ml). Ultrasonographic examination revealed a 7 mm mass at 1 cm caudal to the left lower pole of the thyroid gland. After medical treatment followed by removal of the mass, the serum calcium returned to normal levels. Her consciousness and activity returned to preoperative state. The resected mass was histologically diagnosed as hyperplasia of the parathyroid gland. Hyperparathyroidism must be ruled out by careful clinical assessment before attributing mental impairment in the elderly to primary senile dementia. The measurement of serum calcium and intact parathyroid hormone levels is important in elderly patients with cognitive impairment who undergo surgery. Ryukyu Med. J., 21(1)41-44, 2002

Key words: hyperparathyroidism, octogenarian, abdominal aortic aneurysm, hypercalcemia, senile dementia

INTRODUCTION

The incidence of sporadic primary hyperparathyroidism (PHPS) has been increasing in the elderly. The clinical features of PHPS in the elderly differ markedly from those observed in younger patients. In the elderly, PHPS is characterized by neurologic and psychiatric disturbances, which are often of a vague type (50-60%). Others appear asymptomatic (10-15%). Particularly in the old-old, it is difficult to distinguish PHPS from primary senile dementia. PHPS in elderly is undiagnosed until hypercalcemia is detected either incidentally or during the investigation of other conditions, or when psychiatric and neurologic symptoms are apparently manifested. We report a rare occurrence of stupor with flaccid paraplegia that manifested in an octogenarian after a successful abdominal aortic aneurysm repair. The stupor and paraplegia were considered to be caused by a hypercalcemic crisis associated with PHPS.

CASE REPORT

An active 86-year-old woman with a 3-year history of asymptomatic primary biliary cirrhosis (PBC) was diagnosed as abdominal aortic aneurysm (AAA) with the aid of ultrasonography and computed tomography (CT) (Fig. 1). On November 27, 1995, she was admitted to our hospital for AAA repair. Her consciousness was almost clear (14 points on the Glasgow coma scale, GCS), and she suffered mild memory and cognitive impairments. These symptoms were attributed to mild primary senile dementia, commonly seen in octogenarians. No past and familial history of nephrolithiasis, diffuse osteoarticular pain, peptic ulcer, and endocrine disease was noted. Preoperative physical examination revealed mild hypertension (150/78 mmHg), a slight systolic heart murmur, and a pulsatile mass in the abdomen. Abnormal findings were absent in the neck. Laboratory data showed mild liver dysfunction with 25.8% of indocyanine green retention at 15 minutes (normal range, less than 10%) and 9.7 IU of thymol turbidity test (normal range, 6.8-7.8). Serum al-
hypercalcemic crisis in an octogenarian

Fig. 2 Intraoperative view showing a round mass 1 cm caudal to the left lower pole of the thyroid gland.

kaline phosphatase level was 335 IU/L (normal range, 90-265). Anti-mitochondria antibodies were 320 times higher than standard levels. Serum calcium and inorganic phosphate levels were not measured, because these parameters were not routinely investigated before general surgery at that time. Renal function was normal with serum creatinine level of 0.80 mg/100 ml (normal range, 0.65-1.0) and creatinine clearance of 83 ml/min (normal range, 57-78). Electrocardiogram showed sporadic premature atrial contractions and normal QT interval (0.40 sec, heart rate 90/min).

Fig. 3 Macrophotograph of the resected mass. The surface of the hemisected mass is pale orange in color, 7 × 6 × 5 mm in size, and 121 mg in weight.

Nine days after admission, the patient had an aneurysmectomy with bifurcated graft replacement through an extraperitoneal approach under general and epidural anesthesia. The cause of the aneurysm was non-specific. The estimated intraoperative blood loss was 865 ml, and 600 ml of blood transfusion was performed without administration of calcium gluconate. The patient’s postoperative course was uneventful and she could walk slowly by herself, although her appetite had not fully recovered. On postoperative day (POD) 17, she suddenly experienced delirium and mild flaccid palsy of the right upper extremity, and gradually fell into stupor (6 points on the GCS) with incomplete flaccid paraplegia. Premature ventricular contractions were frequently encountered. Her respiratory function and systemic blood pressure were preserved. Repeated brain CT scans fail to reveal infarction, hemorrhage, or parenchymal edema. The findings of the cerebrospinal fluid were negative for acute bacterial and viral meningitis.

The following day, hypercalcemic crisis was first pointed out by measurement of the serum calcium. The value of serum calcium corrected by albumin value was 14.5 mg/100ml (normal range, 8.5-10.1 mg/100ml) and that of inorganic phosphate was 2.0 mg/100ml (normal range, 2.5-4.7 mg/100ml). The clinical diagnosis of
with normal serum levels of calcium (9.9 mg/l00ml), nor-
me home, and shows no recurrence of hyperparathyroidism
years after surgery, she is 91 years old, doing well at a nurs-
mass in the pituitary, pancreas and adrenal glands. Five
CT scans of brain and abdomen did not reveal abnormal
sciousness and activities gradually returned to their prior
tern without a rim of compressed normal tissue (Fig. 4).
ast of the parathyroid gland, that consisted of oxyphilic
hyperplasia of the parathyroid gland, consisting of oxyphihc
and chief cells proliferating in a glandular pattern without
a rim of compressed normal tissue (hematoxylin-eosin
stain; original magnification x 376).

hyperparathyroidism was made by high serum intact-
parathyroid hormone (iPTH) of 64 pg/ ‡ ( normal range,
15 to 50 pg/ ‡ ). Urgent symptomatic treatment for hy-
ercalcemic crisis was undertaken with intravenous
administration of elcatonin (120 U/day), and the half sa-
linesolution (4 L/day). Her serum calcium level gradu-
decreased to 12.2 mg/100ml, the paraplegia almost disap-
peared, and her mental state improved from stupor to
disorientation (14 points by GCS).

Simultaneously, localization investigation for hyper-
parathyroidism was carried out. Ultrasonographic
examination revealed an oval mass near the thyroid gland
on the neck. CT scans and technetium/ thallium sub-
traction scintigraphics were negative for masses in the
neck and mediastinum. On March 18, 1996, under general
anesthesia, a neck exploration was performed to resect the
mass that was presumably the causative agent. The mass
was noted at 1 cm caudal to the left lower pole of the thyroid
gland (Fig. 2) and resected. Other parathyroid glands ap-
peared normal and remained undissected. The removed
mass was pale orange in color, measured 7 × 6 × 5 mm, and
weighted 121 mg (Fig. 3). It was diagnosed histologically
as hyperplasia of the parathyroid gland, that consisted of
oxyphilic and chief cells proliferating in a glandular pat-
tern without a rim of compressed normal tissue (Fig. 4).
Her further postoperative course was uneventful, and her
consciousness and activities gradually returned to their prior
levels. Ten days after surgery, she showed normocalemia
(9.5 mg/100ml), a normal level of inorganic phosphate
(3.3 mg/100ml), and iPTH (24 pg/ ‡ ) levels. The
CT scans of brain and abdomen did not reveal abnormal
mass in the pituitary, pancreas and adrenal glands. Five
years after surgery, she is 91 years old, doing well at a nurs-
ing home, and shows no recurrence of hyperparathyroidism
with normal serum levels of calcium (9.9 mg/100ml), inor-

DISCUSSION

Due to the rapidly increasing aged population, AAA
repairs are sometimes indicated even for octogenarians13.
Although the operative mortality and morbidity rates in
occtogenarians are higher than those in younger patients,
several reports have concluded that elderly patients with
good functional capacity could benefit from AAA repair
using the same criteria of operation7, 8. Postoperative
morbidity is well known in relation to cardiovascular disease,
hemorrhage, respiratory failure, ileus, ischemic colon, and
multisystem failure9. Serious neurological complications
after abdominal aortic operation are rare. These compili-
cations are usually due to a cerebrovascular event or para-
plegia caused by spinal cord ischemia10, but almost never
due to endocrine disorders. PHPS is associated with tu-
mors in the pituitary, pancreas, and thyroid11, 12. Ohrvall et
al.13 reported that cardiovascular disease occurred in 69%
of PHPS patients and was the main cause of death. We
found no case reports of AAA and PHPS complicated by a
hypercalcemic crisis involving stupor and paraplegia after
aneurysmal repair.

In our present case of an elderly patient, we diag-
nosed PHPS due to an increase of serum calcium and iPTH.
The secondary hyperparathyroidism and hereditary disor-
ders were ruled out by careful investigations and history
taking. She suffered asymptomatic PBC for 3 years before
an aneurysmectomy. An advanced PBC can complicate
secondary hyperparathyroidism due to osteomalacia, which
is caused by a vitamin D deficiency. Our patient was
asymptomatic and free from osteomalacia. An investiga-
tion revealed one mass in the neck; however, other lesions
may have existed. Her hypercalcemia improved after the
removal of the hyperplastic parathyroid gland, and her
serum calcium level has been normal for over 5 years.

Increasing numbers of elderly patients are diagnosed
with PHPS due to the discovery of hypercalcemia during
the investigation of other conditions1. Symptoms of the
disease in the elderly differ from those seen in younger pa-
tients. Elderly patients often complain of general fatigue
with reduced muscular strength, depression, difficulty in
concentration, personality changes, psychomotor retard-
ation, and memory impairment. Manifestations of renal,
bone, and gastrointestinal disorders are rare in elderly pa-
tients, but are classic symptoms in younger patients1, 2, 10.
When very old patients show mild or subtle mental im-
pairment, without checking of serum calcium level, it is
difficult to distinguish hypercalcemia from idiopathic se-
nile dementia as the causative agent.

In our case, the patient might have suffered from
mild hypercalcemia due to PHPS with asymptomatic, or
mild mental impairment that was due to senile dementia.
After aneurysmectomy, she developed symptoms of re-
duced consciousness, muscular fatigue, and inadequate ap-
petite. These symptoms were improperly evaluated, and she fell into hypercalcemic crisis with a stupor with flaccid paraplegia on the POD 17. Purnell et al.\textsuperscript{10} reported that most patients with mild hyperparathyroidism fail to rapidly progress into hypercalcemic crisis and renal failure. In our present case, mechanisms of the rapid manifestation remain unclear. Perioperative immobilization and inadequate hydration might have promoted hypercalcemia after the aneurysctomy. Other factors increasing serum calcium levels, such as vitamin D toxicity, use of thiazide derivatives, and a large amount of calcium input in fluid and electrolyte therapy were excluded. The aging process\textsuperscript{11} and surgical stress could reduce an aged patient’s tolerance to even slight hypercalcemia. Scilari et al.\textsuperscript{19} reported on a case in which the patient was in normocalcemia and had unexpected adenoma of a parathyroid gland preoperatively, and then developed a hypercalcemic crisis due to PHPS after open heart surgery. The trigger of the crisis was presumably metabolic and endocrine alternations during cardiopulmonary bypass.

The course of the present case was very interesting and instructive for us. This rare complication and delay of treatment resulted from a failure in an early diagnosis of hyperparathyroidism. Hyperparathyroidism must be ruled out by careful clinical assessment before attributing mental impairment in the elderly to primary senile dementia. Since the serum calcium level remains within normal range in 13% of patients with PHPS\textsuperscript{16}, we recommend routine pre- and postoperative checks of serum calcium, inorganic phosphate, and iPTH in elderly patients with cognitive impairment who undergo surgery.

**REFERENCE**