A SUCCESSFUL CASE OF ADRENALECTOMY FOR PRIMARY ALDOSTERONISM

by

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Since the first description of primary aldosteronism in 1954 by J. W. Conn, about 30 cases have been reported up to date.

Recently we have observed a patient with this disease, who showed the typical syndrome of primary aldosteronism and who had a cortical adenoma of the left adrenal gland.

In this paper, the characteristic symptoms from the patient are presented with the surgical treatment for the adrenal gland tumor.

CASE REPORT

H. Y., a 27-year-old man, was admitted to our Surgical Clinic on September 2, 1958, with the chief complaint of periodic paralysis of the upper and lower extremities.

In February, 1956, he first noticed muscular weakness of the right hand and additionally noted polydipsia, polyuria, and nycturia.

Until March, 1958, these symptoms developed periodically: the duration of the attack varied from one to ten days, the interval from two to five months. The degree and character of muscular weakness were also not uniform in each attack; for example, intense generalized muscular weakness in major attacks, whereas only the fingers were involved in minor ones. In the intervals between these attacks he suffered from headaches and general fatigue.

On March 18, 1958, he was admitted to the Internal Clinic of our Hospital. From the clinical findings and laboratory examinations, his case was diagnosed as primary aldosteronism by Professor G. Wakisaka, and referred to the Surgical Clinic for surgical treatment.

CLINICAL FINDINGS

The patient was a well developed and moderately nourished man. On admission to the Surgical Clinic, his blood pressure in an arm was 170/110 mmHg, temperature 37.0°C, pulse 80 per minute and respiratory rate 20. The heart in size and position was normal. There were no murmurs or abnormal sounds. The lungs were clear. There was no abnormality in the abdomen, genitalia and skeletal system. No edema

was present.

Urinalysis in preoperative period were as follows: specific gravity 1.013 to 1.005: urine volume 4000 to 3000 cc per day: protein 0 to trace: abnormal sediment negative: Sodium, 51 mEq./L.* Potassium, 42.0 mEq./L.*: Aldosterone, 40.6 gamma/24 hours.*

Serum electrolyte concentrations were: Sodium, 165 mEq./L.*: Potassium, 1.93 mEq./L.*: Calcium, 4.4 mEq./L.*

The electrocardiogram showed the depressed and rounded T waves associated with prominent U waves. Renal clearance test: RPF, 268 cc/m.: RBF, 421 cc/m.: GFR, 50 cc/m.: FF, 18.8%. Retroperitoneal air insufflation with tomography revealed a contour of left suprarenal mass (Figs. 1 and 2).

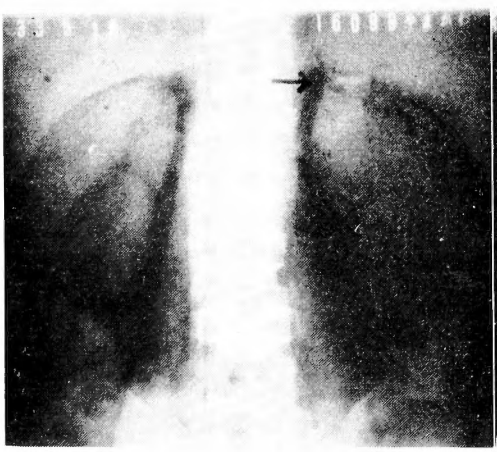

Fig. 1. Perirenal pneumoroentgenogram showing contour of left suprarenal mass at arrow.

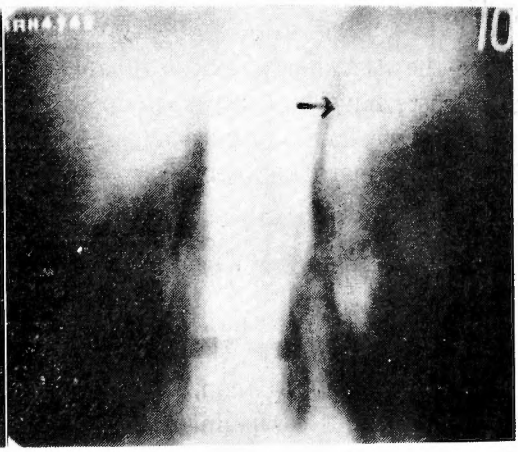

Fig. 2. Tomogram, left suprarenal mass at arrow.

OPERATION (Fig. 3)

For premedication, 50 mg of cortisone acetate was administered 6 hours before the operation. The operative procedure was carried out on September 12, 1958, under balanced anesthesia with nitrous oxide, ether and cyclopropane.

A L-form incision was made in the upper abdomen, a transperitoneal approach was used. The splenic flexure was displaced downwards after cutting off the splenocolic and phrenicocolic ligaments. Subsequently, by cutting off a part of the gastrosplenic and phrenicosplenic ligaments, the stomach, spleen, and pancreas were medially displaced. Thereby the retroperitoneal space was entirely developed, exposing the upper pole of the left kidney situated in the bottom of operative field.

The left adrenal gland was exactly recognized by tracing of the suprarenal vein arising from renal one. In the gland, a golden yellow tumor, large as a cherry, was detected, which was spherical in shape. Therefore, a total left adrenalectomy, including the tumor, was performed, after cutting the adrenal arteries and vein, with

*Each of these values are the extreme ones between March 18, 1958 and September 12, 1958.

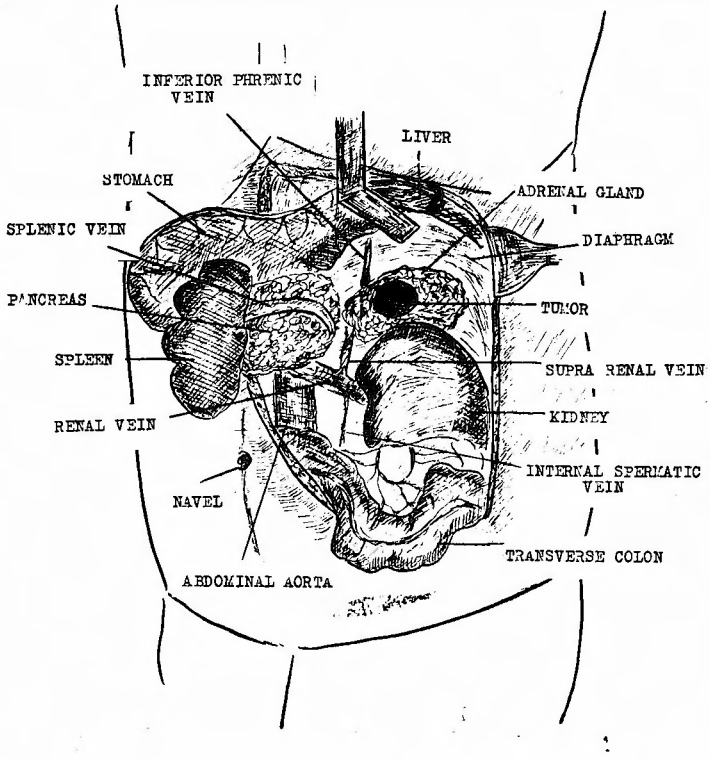

Fig. 3. Schematic illustration of the operative field.

the separation of the surrounding tissues such as of the pancreas, diaphragm, and left kidney.

In exploring the right adrenal, the stomach and spleen were returned to the normal position, and then the transverse colon was retracted downwards, and the duodenum was mobilized from the retroperitoneum. As no abnormalities were detected by palpating the region of the right adrenal gland, it was left alone.

During the operation the patient's blood pressure was almost constant at 130/100, though there was a temporary swing from 120/90 to 150/120.

POSTOPERATIVE COURSE

During the first seven postoperative days the patient was given 100 to 25 mg of cortisone acetate per day. The patient's postoperative course was entirely uneventful. All symptoms were gradually improved, and he was discharged on October 24, 1958, completely cured.

PATHOLOGICAL EXAMINATION (Figs. 4 and 5)

The specimen consisted of an adenoma and the surrounding adrenal gland. The adenoma weighed 2.1 g, measured 1.5 by 1.7 by 1.8 cm, well-encapsulated. The cut surface showed a golden yellow colour, with neither necrosis nor hemorrhage.

Microscopically there were many kinds of cell-arrangements which resembled

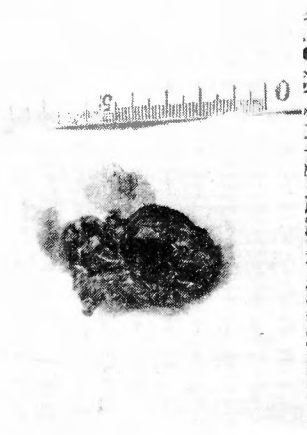

Fig. 4. Cortical adenoma in the left adrenal gland.

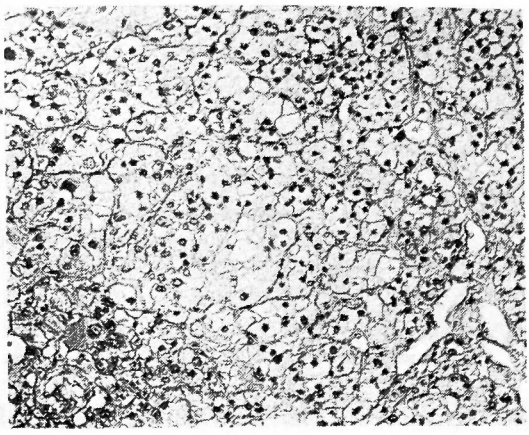

Fig. 5. Microscopic appearance of the adenoma.

each adrenal cortex zone respectively. An adenomatous cell-arrangement was also observed. There was nonuniformity of the size of the cells and nuclei.

The histologic diagnosis was "adrenocortical adenoma".

DISCUSSION

Primary aldosteronism, as established by CONN, is a symptom complex resulting from the hypersecretion of aldosterone. In our case, the typical symptoms were present, i. e., periodic muscular weakness, occasional tetany-like attack with the TROUSSEAU's sign, hypertension, polydipsia and polyuria. Likewise, the characteristic findings were exhibited in clinical examination, i. e., marked increase of aldosterone in urine, hypokaliemia, hypernatremia, hyposthenuria or isosthenuria, potassium depletion wave of electrocardiogram, and impaired renal function.

In most cases of primary aldosteronism reported in the literatures, adrenal cortical adenoma has been disclosed by surgical exploration, although there have been a few cases of carcinoma or hyperplasia. In our case, the adenoma of the left adrenal cortex, which was detected by prior roentgen examination, was successfully removed by surgical operation.

Generally, concerning the surgical management of adrenal gland tumor many opinions have been given. In the resection of the tumor, it is important to choose the most convenient approach. In this respect, it is our opinion that the anterior transperitoneal approach is the most satisfactory procedure in comparison to the posterolateral, transthoracic or various other ones.

Because, the following factors are indicated: 1) it is unnecessary to change the patient's position to exploration of the contralateral adrenal, 2) operative manipulation is easier than the other approaches since a wider operative field is obtained, 3) as a considerable factor, the courses of the blood vessels entering the gland are exposed. The arterial vessels are abundant in number and very slender, on the other hand, the suprarenal vein is the only one larger and almost invariable in course.

Therefore even when the gland is buried in the retroperitoneal adipose tissue, one can accurately find the gland by tracing of the suprarenal vein from the bifurcation. To detect these vessels, the anterior approach is also very useful.

As for the surgical management of primary aldosteronism itself, it has been generally accepted that, 1) one should undergo operation for its removal in an early stage, before secondary irreversible renal and heart lesions develop and that, 2) as CONN describes, in the event that no adenoma is found at operation a total or extensive subtotal adrenalectomy should be performed.

For preoperative preparation and postoperative care, the adequate administration of cortical hormone is of vital importance in order to avoid an acute adrenocortical insufficiency, although there is the opinion that such cortical hormone is not necessarily required because it is almost normally secreted in this lesion.

In our case, a total of 400mg of cortisone acetate was administered without any acute complications.

Anesthetic management for this disease must also be carefully conducted. Recently, GARLINGTON and BAILEY reported two cases of primary hyperaldosteronism, in which the management was complicated by unusual fluctuations of blood pressure and resistance to depressing drugs.

Fortunately, in our case, the blood peressure was almost constant (130/100) throughout the entire course of the left adrenalectomy and the exploration of right adrenal without any relief of depressing drug.

For the regulation of aldosterone secretion, many investigations have been reported. In the research of the field, the question discussed by F. C. BARTTER et al., as to whether a lesion in the central nervous system can lead to aldosterone production is of considerable interest. Furthermore, the experiments carried out in G. FARRELL'S laboratory, concerning the aldosterone regulating center and its inhibitory area in the diencephalon and the midbrain, suggest many important problems.

SUMMARY

A case of primary aldosteronism associated with the left adrenocortical adenoma is described, and the surgical management of the adrenal gland is mainly discussed.

This case has been reported by Ch. KIMURA at the Surgical Conference in KYOTO (the Kyoto-Geka-SHUDANKAI) on Nov. 20, 1958 and also by T. Yamamoto at the IVth Annual Meeting of West Japan of Japan Endocrinological Society on Oct. 4, 1958.

We wish to express our sincere thanks to Prof. G. WAKISAKA, M. D. and G. MASUDA, M. D. for their valuable advice in endocrinological respects, and also to T. ANDO, M. D. for his interpretation of the pathological material.

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和文抄録

Primary Aldosteronism の手術治験例

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27才の男，周期性四肢麻痺を主訴として入院したが，其の特異的な症状及び臨床検査所見からPrimary aldosteronism と診断して手術を行い左副腎腺腫を摘出した結果，術前の診断の正しかつたことを知つた．ついで此の疾患についての文献的考察を行うと共に，一般副腎腫瘍の外科的処置に言及した．