

CASE NOTE

## Laparoscopic treatment of primary hyperaldosteronism in a pregnant patient

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**P**rimarily hyperaldosteronism in pregnancy is a rarely reported clinical entity that may result in life-threatening complications both for mother and the fetus and is most often caused by an aldosterone producing adenoma (APA).<sup>1,2</sup> The physiologic rise in aldosterone during pregnancy overlaps the levels seen in primary aldosteronism, making diagnosis difficult.<sup>2</sup> Suppressed renin in the setting of hyperaldosteronism is, however, diagnostic. Accompanying hypertension and hypokalemia may become more difficult to be controlled as pregnancy progresses, and severe maternal hypertension may lead to intrauterine growth retardation, placental abruption and preterm delivery.<sup>3</sup>

The introduction of advanced laparoscopic techniques has improved the care and therapy for patients with APA in general. Rarely, laparoscopic adrenalectomy has also been performed for pregnant patients.<sup>4</sup> To our knowledge, in this report we document the first laparoscopic retroperitoneal adrenalectomy for an APA in a pregnant patient.

### CASE REPORT

A 28-year-old woman at 19 weeks of gestation of her first pregnancy was referred to our outpatient endocrinology clinic with the suspicion of hyperaldosteronism-induced hypertension. In her medical history, an intracranial hematoma, presumably after a hypertensive crisis, resulted in a transient right hemiparesis syndrome 4 years earlier. Her earlier medical records from various clinics exhibited persistent hypokalemia. On admission, she was found to have uncontrolled blood pressure levels, reaching up to 170/110 mm Hg, and she took 2000 mg of methyl dopa every day. Low serum potassium (2.63 mmol/L), high plasma aldosterone (3467.5 pmol/L, normal range 55–250 pmol/L) and suppressed plasma renin activity (9.18 pmol/mL/h, normal range 5.40–91.89 pmol/mL/h) detected at her initial laboratory evaluation resulted in the diagnosis of primary hyperaldosteronism. Fetal ultrasonography revealed impairment of blood flow in the uterine artery, and the fetus was found to be small for gestational age (comparable to 17 weeks gestation).

Magnetic resonance imaging of the adrenal glands revealed a 17 × 18-mm adrenal mass located at the left adrenal gland (Fig. 1). Her blood pressure levels sometimes peaked at 220/140 mm Hg and were not effectively controlled with the available medical therapy. We discussed the surgical option with the patient, and owing to the fact that she was in the second trimester of her pregnancy, we decided to perform a laparoscopic adrenalectomy.

During the operation, the patient was in the right lateral decubitus position. Initially, we created a 1-cm incision just under the tip of the 11th rib, and a small space under the muscles was created with the index finger bluntly. Later, we placed a 10-mm balloon trocar, and with the tip of the 30° scope the extraperitoneal space was enlarged. An additional 10-mm trocar (for the right

hand, posterior) and 2 5-mm trocars (for the left hand and retraction, anterior) were placed, each 5 cm apart. We identified the adrenal gland after opening up the lateroconal fascia and later following the kidney superiorly. Dissection was mostly carried out with an ultrasonic dissector (Ultracision; Ethicon). After being freed of its vascular connections, the adrenal gland was successfully removed in a retrieval bag.

The histopathological examination of the specimen suggested a cortical adenoma. Even though her plasma aldosterone level and plasma renin activity were found to be normalized in the blood sample obtained at the fourth postoperative day (27.74 pmol/L and 81.08 pmol/mL/h, respectively), her blood pressure was not quite normalized. Thus, methyl dopa was restarted. Thereafter, her blood pressure, as well as serum potassium levels, remained within normal limits through the rest of the pregnancy. At the 30th gestational week, the estimated fetal weight was 900 g. Fetal distress was noted with reversed end diastolic flow; the brain was fortunately spared. The patient was admitted to hospital and pulmonary maturity was induced with  $\beta$ -methazone. A 900-g baby boy was delivered with cesarean section. The baby needed ventilatory support and developed pulmonary infection but was well at 7 weeks of age and was discharged.

## DISCUSSION

Aldosterone, being the primary mineralocorticoid in humans, plays a crucial role in electrolyte and fluid bal-

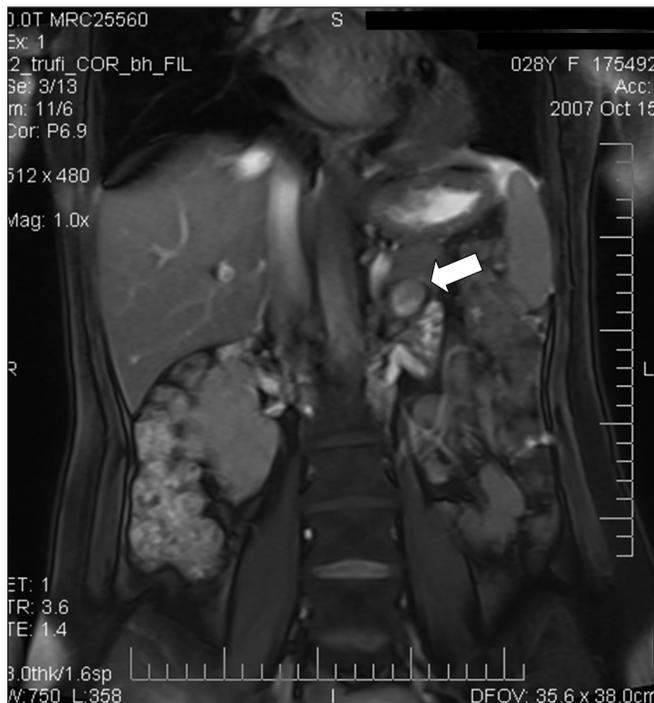
ance. It causes sodium and water retention and potassium release by acting on the colon and kidney epithelium. Hyperaldosteronism causes moderate to severe resistant hypertension, mild hypernatremia and in advanced cases, severe hypokalemia. Aldosterone producing adenoma, which represents about 35% of such cases, is treatable by adrenalectomy.

During normal pregnancy, all components of the renin-angiotensin-aldosterone system are upregulated.<sup>2</sup> Aldosterone, the last step of the cascade, causes an enlargement of the fluid compartments and cardiac output. Fluid expansion starts in the first trimester and levels at 34th week of gestation. These changes are normal and necessary for adequate placental perfusion.

However, in cases of primary hyperaldosteronism, aldosterone levels are much higher and renin levels lower when compared with a normal pregnancy. The refractoriness to angiotensin II varies with each individual, which results in different outcomes as reported in the literature. However, as in our patient's case, hypertension and hypokalemia usually worsen as the pregnancy progresses.

If laboratory tests are clear and radiological scanning does not suggest unilateral disease, patients may be treated medically until delivery.<sup>1</sup> Spironolactone therapy is contraindicated in pregnancy as it crosses the placenta and is a potent antiandrogen that can cause ambiguous genitalia in a male fetus. If surgery is warranted, it may still be delayed until after birth if hypertension can be controlled with agents that are safe in pregnancy such as amiloride, methyldopa, labetalol and calcium-channel blockers.<sup>1</sup> Early diagnosis and treatment of hypertension during the first trimester are strongly recommended to avoid the pathological changes in placental vessels.

To our knowledge, only 24 cases have been reported in the English literature.<sup>4</sup> Of the reported cases, adrenalectomy was performed during pregnancy for only 6 patients.<sup>4</sup> Surgical resection was required in these cases for uncontrollable hypertension, as in our patient, and accompanying fetal distress. Surgical resection resulted in the reduction of blood pressure in all patients; however, 1 patient required additional nifedipine. The ongoing hypertension that was also present in our patient is probably related to the physiologic renin-aldosterone-angiotensin system changes observed in pregnancy. The only 2 laparoscopic cases were performed by the transperitoneal approach. Successful delivery was possible in only 1 of the pregnancies. In the transperitoneal approach, the authors used open access and maintained lower than usual pressure at 8 mm Hg.<sup>4</sup> Although the transperitoneal approach is preferred by some authors, we have been practising the retroperitoneal approach for the last 4 years in our clinic. The working space is smaller with this technique. However, the surrounding organs need not to be mobilized for the exposure, which in the transperitoneal approach may be damaged.<sup>5</sup> A retroperitoneal approach may prove particularly advantageous in the



**Fig. 1.** Coronal section of the abdomen with the white arrow indicating the left adrenal adenoma.

pregnant patient in whom the normal intra-abdominal anatomy is somewhat distorted and the usual space is limited.

**Competing interests:** None declared.

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