

Laparoscopic Adrenalectomy:

A Major Advance in Treating Adrenal Tumors

By Scott P. Edwards

Laparoscopic adrenalectomy is safer for patients than the open procedure, requires less time and therefore less anesthesia, reduces length of stay, and results in significantly less pain.

Laparoscopic adrenalectomy has become the procedure of choice for removing benign and malignant adrenal tumors, proving to be a major advancement in the treatment and management of these lesions.

Surgeons at Baystate Medical Center, under the direction of Richard B. Wait, MD, chair of the Department of Surgery, now perform nearly 30 laparoscopic adrenalectomies a year.

Advantages

“The major difference between the laparoscopic procedure and the open procedure,” says Dr. Wait, “is that the laparoscopic version doesn’t require a large incision to remove a relatively small gland.”

During the laparoscopic surgery, patients lie on one side of their body, and the surgeon makes a series of small incisions, or ports, ranging from 1/4-inch to 3/4-inch to accommodate the special laparoscopic instruments. The surgeon fills the abdominal cavity with carbon dioxide to separate organs and facilitate access to the adrenal gland. A laparoscopic camera allows the surgeon to visualize the surgical field.

The other ports accommodate the instruments needed to remove the adrenal gland. Once the gland is detached from the kidney and surrounding tissues, it is placed in a surgical retrieval bag and removed through one of the ports.

Dr. Wait says the laparoscopic adrenalectomy is safer for patients than the open procedure, requires less time and therefore less anesthesia, reduces length of stay, and results in significantly less pain. In addition, patients undergoing this minimally invasive procedure return to normal activity quicker than those having open surgery, and have a markedly lower incidence of complications. “Outcomes are improved primarily in terms of wound healing and pain,” he says.

While risks are inherent with any surgery, Dr. Wait says there are fewer with the laparoscopic approach than there are with conventional surgery. Right-sided adrenal tumors lie on the inferior vena cava, which makes the procedure more challenging; however Dr. Wait says the increased magnification of the laparoscope ultimately makes this procedure safer.



While risks are inherent with any surgery, Dr. Richard Wait says there are fewer with the laparoscopic approach than there are with conventional surgery.



Dr. J. Enrique Silva says endocrinologists now typically refer patients with adrenal tumors for laparoscopic excision.

Indications

Adrenal tumors may be functioning or non-functioning, benign or malignant. The adrenal glands are composed of two parts, the cortex and the medulla. The cortex produces cortisol, which regulates metabolism; aldosterone for salt and water balance; and androgens that regulate sexual development and drive. The medulla produces adrenaline and norepinephrine, which are central to responses to acute stress, fight-or-flight reactions.

Functioning adrenal tumors may produce an excess of any of these hormones, causing a variety of diseases. Most functioning tumors are benign, but they may also be malignant. In addition, there are non-functioning tumors that may be benign or malignant, and the adrenal gland can be the site of metastasis of malignant tumors originated elsewhere. Adrenalectomy is the first choice to treat any of the above conditions.

Cushing's syndrome occurs when the body's tissues are exposed to excessive levels of cortisol for long periods of time. Many people suffer from Cushing's syndrome because they take synthetic analogs of cortisol, such as prednisone for asthma, rheumatoid arthritis, lupus, and other inflammatory diseases. Cushing's syndrome can also result from adrenal tumors producing an excess of cortisol.

More often, however, the excessive cortisol production is caused by an excess of the pituitary's adrenocorticotropic hormone (ACTH) that normally regulates the production of cortisol and other adrenal hormones. Small tumors of the pituitary secreting ACTH can cause a Cushing's syndrome called "Cushing's disease" to distinguish it from that derived from other causes. Currently, Cushing's disease is primarily treated by removing the causing pituitary tumor. However, there are situations in which the pituitary tumor is not treatable by standard neurosurgical and radiation treatments, and there is no solution but to laparoscopically remove both adrenal glands.

Laparoscopic adrenalectomy is also used to treat pheochromocytoma, a rare disease that develops in the medulla of the adrenal gland, causing excess production of adrenaline, which Dr. Wait says "can have a profound effect on the body's physiology." The excess of this hormone, usually associated with an excess of noradrenaline, causes severe elevation

of blood pressure, heart acceleration, anxiety, and metabolic abnormalities. Left untreated, pheochromocytoma is life threatening. Pheochromocytomas can be successfully removed laparoscopically, but the patient must be prepared medically to control and prevent the effect of those hormones since surges of secretion during the surgery can be fatal.

The adrenal glands may also be removed laparoscopically to treat hyperaldosteronism, the overproduction of the aldosterone, which controls sodium and potassium levels in the blood. High levels of aldosterone can lead to salt retention and potassium loss, causing high blood pressure. Nearly 70 percent of primary hyperaldosteronism results from an adenoma, a typically benign tumor in the adrenal cortex, the outer portion of the gland.

Patients with tumors larger than six centimeters are not ideal candidates for laparoscopic adrenalectomy, says Dr. Wait. Nor are patients with adrenal cancer. These patients may need to undergo a conventional open procedure.

“If the patient bleeds during the laparoscopy,” says Dr. Wait, “it typically requires that the procedure be converted to an open procedure. However, the conversion rate to an open procedure is less than five percent.”

Endocrinologist Perspective

J. Enrique Silva, MD, chief of the Endocrinology, Diabetes and Metabolism Division at Baystate, says endocrinologists now typically refer patients with adrenal tumors for laparoscopic excision. More often, tumors diagnosed by the endocrinologist are functioning, and are referred to this specialist for the symptoms and problems caused by the excess of some of the hormones mentioned above. These patients, particularly those with pheochromocytoma, need accurate diagnosis and preparation for surgery to avoid complications during the surgery, such as marked elevations of blood pressure that can increase mortality.

“Outcomes are improved primarily in terms of wound healing and pain.”

“Laparoscopy is a major leap forward in the surgical approach to many conditions, including adrenal tumors,” says Dr. Silva, adding that patients undergoing open procedures typically have slower tissue healing and other complications.

“A great advantage of laparoscopic adrenalectomy,” he says, “is that it minimizes complications derived from the previous exposure of the patients to the excess of adrenal hormones.” For example, the excess cortisol in Cushing’s syndrome is associated with infections and disrupted, protracted healing of the old operations through the abdominal wall. Laparoscopic adrenalectomy, comparatively a minimally invasive procedure, prevents exposure of the abdominal content to open air and dramatically reduces the size of the incision, reducing the risk of infection and torpid healing.

Dr. Silva continues, “With the increasing use of imaging procedures such as MRI and CT scans, we are seeing more and more incidentally found tumors of the adrenal, and for that matter, other glands and organs. Such lesions, dubbed *incidentalomas*, pose a new challenge, which is to decide whether they are functional or malignant, hence candidates for laparoscopic excision, or benign and amenable to observation and follow-up.”

For more information

or to refer a patient, call
Baystate Surgical Associates
at 413-794-7020.