1

Adrenalectomy

Indications

- Select adrenal tumors or metastases

Essential Steps

1) Perform the appropriate preoperative catecholamine blockade in patients with suspected pheochromocytoma.
2) Expose the adrenal gland and identify, dissect, and ligate the adrenal vein and inferior adrenal artery. With pheochromocytomas, this should be done initially prior to any adrenal manipulation in order to limit hemodynamic instability from blood pressure changes caused by catecholamine release. The anesthesiologist should be informed prior to any adrenal manipulation in these instances.
3) Gently mobilize the adrenal gland cranially and divide its superior vascular supply.
4) Using lateral and upward traction on the adrenal gland, divide the remaining medial vascular attachments.
5) Dissect the adrenal gland caudally off the kidney.
6) After removing the adrenal gland, inspect for renal or vascular bleeding and pleural tears.

Note These Variations

- The choice of incision is dependent on the anatomic characteristics of the tumor (including size, extension, and histology), the patient's body habitus, and the surgeon's preference and comfort. Large tumors, or locally invasive tumors extending superomedially, and bilateral tumors can be managed with a thoracoabdominal or transabdominal (e.g. Chevron) approach, respectively. Alternatively, a posterior approach may be considered in patients with small localized tumors.
- In cases of renal invasion by large adrenal carcinomas, *en bloc* resection of the adrenal gland and kidney should be performed.

Operative Dictations in Urologic Surgery, First Edition. Noel A. Armenakas, John A. Fracchia, and Ron Golan.

- If there is any suspicion of lymphatic invasion, after removal of the adrenal gland a regional lymphadenectomy should be performed from the level of the renal vessels to the diaphragmatic crus.

Complications

- Bleeding
- Infection
- Hemodynamic instability
- Intraabdominal organ injury
- Pneumothorax
- Ileus
- Adrenal Insufficiency

Template Operative Dictation

Preoperative diagnosis: Adrenal tumor
Postoperative diagnosis: Same
Procedure: *Right/Left* adrenalectomy
Indications: The patient is a _____-year-old *male/female* with a ____cm *right/left* adrenal tumor presenting for an adrenalectomy.

> ***For pheochromocytoma*:** The biochemical evaluation was consistent with a pheochromocytoma and the appropriate preoperative medical management completed.

Description of Procedure: The indications, alternatives, benefits, and risks were discussed with the patient and informed consent was obtained.

The patient was brought onto the operating room table, positioned supine, and secured with a safety strap. Pneumatic compression devices were placed on the lower extremities.

After the administration of intravenous antibiotics and general endotracheal anesthesia, a 16 Fr urethral catheter was inserted into the bladder and connected to a drainage bag.

The patient was placed in the lateral decubitus position at a 45° angle with the lower leg flexed 90° and the upper leg extended. An axillary roll was positioned to protect the brachial plexus and a gel pad placed to support the back. Multiple pillows were used to pad beneath and between both the upper and lower extremities to ensure adequate cushioning. The kidney rest was elevated and the table flexed and adjusted horizontally, obtaining optimal flank exposure. The patient was secured to the table with 3 in. surgical tape and safety straps, and was prepped and draped in the standard sterile manner.

The radiographic images were in the room.

A time-out was completed, verifying the correct patient, surgical procedure, site, and positioning, prior to beginning the procedure.

The space between the 10th and 11th ribs was palpated and an incision made at this level from the mid-axillary line and extended medially to the lateral border of the rectus abdominis muscle. Using electrocautery, the latissimus dorsi and external oblique muscles were incised, exposing the underlying ribs. The intercostal attachments were transected, taking care to avoid injury to the pleura and neurovascular bundle on the inferior surface of the rib. The internal oblique muscle was divided with cautery and the transversus abdominis carefully split in the direction of its fibers, avoiding entry into the peritoneum. A generous paranephric space was created by sweeping the peritoneum medially and the retroperitoneal connective tissue superiorly and inferiorly. A self-retaining retractor (e.g. Bookwalter, Omni-Tract) was appropriately positioned to optimize exposure, using padding on each retractor blade.

The parietal peritoneum was incised on the white line of Toldt and the colon reflected medially, exposing Gerota's fascia.

> ***On the right*:** The hepatic flexure and duodenum were mobilized, freeing the kidney and adrenal gland within Gerota's fascia superiorly and medially. The hepatorenal ligament was divided sharply and the liver lifted cranially off the anterior surface of the adrenal gland. Gerota's fascia was incised, exposing the anterior surface of the kidney and adrenal gland. The lateral wall of the inferior vena cava was dissected and the insertion of the right adrenal vein identified posterolaterally. The right adrenal vein was carefully dissected, doubly ligated with 2-0 silk ties and divided. The inferior adrenal artery was then secured and similarly divided.
>
> ***On the left*:** The splenorenal ligament was mobilized and divided sharply freeing the kidney and adrenal gland within Gerota's fascia superiorly, and the spleen and pancreatic tail which was lifted cranially off the anterior surface of the adrenal gland. Gerota's fascia was incised exposing the anterior surface of the kidney and adrenal gland. The insertion of the left adrenal vein into the left renal vein was identified. The left adrenal vein was carefully dissected, doubly ligated with 2-0 silk ties, and divided. The inferior adrenal artery was then secured and similarly divided.

The dissection was continued cranially, using gentle downward traction from lateral to medial. Multiple small adrenal branches were ligated using *an electrothermal bipolar tissue sealing device (LigaSure)/surgical clips*, freeing all apical adrenal attachments. (*Alternatively, these vessels can be clamped, divided, and ligated with chromic or silk ties).* The adrenal gland was retracted laterally exposing the remaining medial vascular and lymphatic attachments, which were divided between surgical clips. Finally, the inferior surface of the adrenal gland was dissected off the renal capsule using sharp and blunt dissection, and meticulous hemostasis obtained with electrocautery.

Once the specimen was completely freed, it was removed and sent to pathology for evaluation. The retroperitoneum was irrigated with warm sterile saline and hemostasis was again confirmed. Prior to closure, the vascular stumps, visceral organs and pleura were inspected and found to be intact. The self-retaining retractor was removed, the kidney rest lowered, and the table taken out of flexion.

The incision was closed using running 1-0 polydioxanone (PDS) to approximate the three muscle layers individually, taking care not to entrap the neurovascular bundle. 3-0

chromic sutures were used on Scarpa's fascia and the skin approximated with a subcuticular 4-0 poliglecaprone (Monocryl) suture. A sterile dressing was applied and the patient repositioned supine.

At the end of the procedure, all counts were correct.

The patient tolerated the procedure well and was taken to the recovery room in satisfactory condition.

Estimated blood loss: Approximately _____ml