Module 26

Endocrine and Nervous Systems

The endocrine system functions by producing and secreting hormones into the bloodstream of the body. There are nine major structures in the endocrine system called endocrine glands.

Anatomy

There are nine glands in the endocrine system.

<table>
<thead>
<tr>
<th>ENDOCRINE GLANDS</th>
<th>LOCATION</th>
<th>FUNCTION</th>
<th>HORMONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adrenal Glands (2)</td>
<td>• On top of each kidney • Outer layer • Inner layer</td>
<td>• Maintain metabolism • Regulate glucose, salts, potassium, electrolytes • Influence sex characteristics</td>
<td>• Steroids • Corticosteroids • Glucocorticoids • Cortisol • Mineralocorticoids • Aldosterone • Androgen • Estrogen • Epinephrine • Norepinephrine</td>
</tr>
<tr>
<td>Cortex Medulla</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parathyroid Glands (4)</td>
<td>• Backside of the thyroid gland</td>
<td>• Stimulate calcium from the bones into the bloodstream</td>
<td>• Parathyroid hormone (PTH)</td>
</tr>
<tr>
<td>Ovaries</td>
<td>• Lower abdominal region of the female</td>
<td>• Promote secondary sex characteristics • Maintain pregnancy</td>
<td>• Estrogen • Progesterone</td>
</tr>
<tr>
<td>Pancreas Islets of Langerhans</td>
<td>• Behind the stomach inferior to the liver</td>
<td>• Regulates blood sugar • Secretes digestive enzymes</td>
<td>• Insulin • Glucagon</td>
</tr>
<tr>
<td>Pituitary Gland (hypophysis)</td>
<td>• Base of the brain in the sella turcica (a depression in the sphenoid)</td>
<td>• Increases body growth • Stimulates ovulation, contraction during childbirth • Promotes secondary sex characteristics</td>
<td>• Growth hormones • GH or STH • Thyrotropin TSH</td>
</tr>
<tr>
<td>Pineal Gland</td>
<td>• Center - Brain</td>
<td>• Induces sleep • Biological Clock</td>
<td>• Melatonin</td>
</tr>
<tr>
<td>Thyroid Gland</td>
<td>• Throat • Surrounds the trachea</td>
<td>• Maintains metabolism • Stimulates calcium</td>
<td>• Thyroxine (T4) • Tetraiodothyronine (T2) • Calcitonin</td>
</tr>
<tr>
<td>Thymus gland</td>
<td>• Mediastinum</td>
<td>• Immune response</td>
<td>• Thymosin</td>
</tr>
<tr>
<td>Testes</td>
<td>• Suspended in the groin region of the male</td>
<td>• Stimulate development of sperm and male secondary sex characteristics</td>
<td>• Testosterone</td>
</tr>
</tbody>
</table>
Module 26 (continued)
Endocrine and Nervous Systems

Pituitary, Pineal Glands, Pancreas, Ovaries, and Testes

Although these glands are part of the endocrine system, they are covered in the following subsections of the CPT manual.

- The **pituitary** and **pineal** glands are located in the **Nervous System** subsection.
- The **pancreas** is located in the **Digestive System** subsection.
- The **ovaries** are located in the **Female Genital System** subsection.
- The **testes** are located in the **Male Genital System** subsection.
Module 26 (continued)

Endocrine and Nervous Systems

Diseases and Conditions

Addison Disease
A condition due to hyposecretion of hormones from the adrenal glands; treatable by hormone replacement therapy (HRT).

Cushing Syndrome
A group of symptoms that includes puffy dull skin, obesity, easily bruised skin, hair loss; most cases are a result of prolonged steroid use or a result of hyperstimulation of the adrenal glands.

Diabetes Mellitus (DM)
Diabetes mellitus is a condition that forms due to a lack of insulin secretion or insulin resistance.

- **Type I**: insulin dependent, childhood (before age 30), acute (rapid) onset; symptoms include polyuria (excessive urination) and polydipsia (excessive thirst)
- **Type II**: usually occurs in adults (after age 30), risk factors include obesity and smoking; treatment by diet and exercise, oral hypoglycemics and possibly insulin
- **Gestational Diabetes**: occurs during the 2nd and 3rd trimesters of pregnancy due to hormone changes; glucose levels typically return to normal after delivery
- **Coding Alert!** If the type of diabetes is unspecified on the chart, then default to type II.

Hyperthyroidism
Graves’ disease is the most common form of hyperthyroidism. This disease is a result of over activity of the thyroid gland. Treatment includes antithyroid drugs and administration of radioactive iodine.

Hypothyroidism
Hypothyroidism is caused by an underactive thyroid gland. Symptoms of this disease include tiredness or fatigue, weight gain, slow heart rate, and sluggishness. Treatment usually consists of the administration of thyroid hormone medication.

Surgery/Endocrine System (60000–60699)

There are nine glands in the endocrine system; however, **only four** are included in the Endocrine System subsection (60000–60699) of the CPT manual.

Thyroid Gland (60000–60300)
- Incision, excision, and removal
Module 26 (continued)

Endocrine and Nervous Systems

Parathyroid, Thymus, Adrenal Glands, Pancreas, and Carotid Body (60500–60699)

• Excision, laparoscopy, and other procedures

The nervous system is a highly complex body system that functions by coordinating and regulating the communications within the body. Everything we see, taste, smell, think, and hear is coordinated by the organs and nerve cells (neurons) within the nervous system.

Anatomy

Neurons

Neurons are microscopic individual nerve cells, the primary cells of the nervous system.

• **Cell body**: part of the nerve cell; contains the nucleus

• **Dendrite**: fiber of the nerve cell; receives impulses

• **Axon**: fiber of the nerve cell; carries impulses

• **Myelin sheath**: white fatty tissue that surrounds and insulates the axons

• **Glia cells**: (glia means glue); support cells that connect cell functions
  1. **Astrocytes**: star-shaped glia cells; transport water and salts
  2. **Microglia**: phagocytic (eats) glia cells that swallow waste
  3. **Oligodendrocytes**: glia cells that form the myelin sheath
  4. **Ependymal**: glia cells that act as a lining within the spinal cord and brain

The nervous system is classified into two divisions: central nervous system (CNS) and peripheral nervous system (PNS).
Module 26 (continued)

Endocrine and Nervous Systems

Central Nervous System (CNS)

Brain

The brain is protected by the cranium, a skeletal structure (cage) composed of eight bones that weigh approximately 3 pounds in an adult.

The brain is divided into two (2) cerebral hemispheres (halves). Each hemisphere has four (4) lobes.

Hemispheres

- Right hemisphere
- Left hemisphere

Lobes

1. Frontal lobe: thought, personality, and emotions
2. Temporal lobe: language, hearing, and speech
3. Occipital lobe: eyesight (vision)
4. Parietal lobe: senses

Brainstem: lowest part of the brain that connects the spinal cord with the brain.

- Pons: part of the brainstem that connects the cerebellum and cerebrum with the entire brain; pons means bridge
- Medulla oblongata: part of the brainstem that connects the spinal cord with the brain

Cerebellum: the large posterior part of the brain.

Cerebrospinal fluid (CSF): clear fluid that surrounds the brain and is present in the spinal cord.

Cerebrum: the largest part of the brain; it is responsible for thought, personality, movement, and memory.

Thalamus: lies deep within the diencephalon (inner brain). It functions by processing and relaying important senses, such as pain. The thalamus also regulates sleep and wakefulness.

Hypothalamus: lies directly below the thalamus; regulates body temperature and controls the pituitary gland.
Module 26 (continued)
Endocrine and Nervous Systems

Spinal Cord and Meninges

Spinal Cord
The entire spinal cord is encased in the vertebral column extending from the medulla oblongata down to the second lumbar vertebra. The nerves of the spine are numbered according to their region.

Meninges
The meninges have three layers of connective tissue surrounding the brain.

1. **Dura mater**: thick, tough, outside layer; subdural space lies directly below the dura mater
2. **Arachnoid membrane**: spider-web like membrane; middle layer of the meninges; subarachnoid space lies directly below the arachnoid membrane
3. **Pia mater**: thin, delicate membrane rich in blood vessels; innermost layer of the meninges

Peripheral Nervous System (PNS)
The peripheral nervous system is composed of all the nerves located outside of the brain and spinal cord. It is further subdivided into two systems: peripheral nervous system (PNS) and autonomous nervous system (ANS).

Cranial Nerves
There are 12 pairs of cranial nerves within the PNS.

Spinal Nerves
There are 31 pairs of spinal nerves within the PNS.

Autonomic Nervous System (ANS)
The autonomic nervous system consists of nerves that function automatically or involuntarily, called peripheral nerves. The peripheral nerves carry signals or messages away from the central nervous system (CNS).

- **Parasympathetic nerves**: involuntary (autonomic) nerves that regulate body functions, such as heart rate and breathing
- **Sympathetic nerves**: involuntary (autonomic) nerves that regulate body functions in response to stress or injury

Surgery/Nervous System (61000–64999)
Codes from the nervous system are divided by anatomy, beginning with the skull, meninges, and brain.
Module 26 (continued)

Endocrine and Nervous Systems

**Skull, Meninges, and Brain (61000–62258)**

**Injection, Drainage, or Aspiration (61000–61070)**
- Injection, drainage, or aspiration; initial or subsequent
- **Fontanelle**: soft spot on an infant or newborn; gaps of unossified (non-bone) tissue in the skull (61000-61001)

**Twist Drill, Burr Hole(s), or Trephine (61105–61253)**
- **Burr hole**: a surgical procedure using a drill that keeps the skull intact; making a hole through the bone
- Code 61107 is modifier -51 exempt

**Craniectomy or Craniotomy (61304–61576)**
- **Craniectomy**: surgical removal of a portion of the skull; diagnostic procedure
- **Craniotomy**: surgical incision of the skull
- Grafting may be coded in addition to the craniectomy or craniotomy

**Surgery of Skull Base (61580–61619)**
- **Skull base**: base (bottom) of the cranium; holds the lobes
- Extensive notes regarding the surgical management of lesions
- Categorized by approach
  1. **Approach procedure**: done to obtain visualization of the lesion
  2. **Definitive procedures**: "what was done"; repair, biopsy, resection, or excision of lesion; **code in addition to approach procedure**
  3. **Repair/reconstruction**: following the definitive procedure; **code in addition** to definitive procedure if extensive grafting or repair is performed
- Each surgeon codes for the specific procedure performed; add modifier -51 to the additional procedure(s)
- Use modifier -62 for co-surgeons (two surgeons)
- Use modifier -66 for a surgical team

**Endovascular Therapy (61623–61642)**
- Codes for occlusion of vessels and arteries of the head and neck
- Code also catheterization and radiology supervision in addition to the therapy
- Stent placement within the cranium; includes balloon angioplasty
Module 26 (continued)

Endocrine and Nervous Systems

Surgery for Aneurysm, Arteriovenous Malformation, or Vascular Disease (61680-61711) and Stereotaxis (61720-61791)

- Simple or complex surgery of intracranial arteriovenous malformation and aneurysm
- Creation of lesion by stereotactic method
- Stereotactic biopsy, aspiration, or excision
- Stereotactic implantation of depth electrodes, localization, and computer-assisted procedures

Stereotactic Radiosurgery (Cranial) (61796–61800)

Neurostimulators (Intracranial) (61850–61888)

- Simple and complex stimulators
- See 95970–95975 for initial and subsequent electronic analysis

Repair (62000-62148)

Neuroendoscopy (62160–62165)

- Code 62160 is an add-on code only (cannot be used alone)

Cerebrospinal Fluid (CSF) Shunt (62180–62258)

- Shunts are used to drain accumulation of fluids in the brain

Spine and Spinal Cord (62263–63746)

- Extensive notes regarding fluoroscopy, radiology and interpretation, lysis of adhesions, and epidurography
- Use modifier -50 for bilateral procedures
- Use modifier -51 for multiple procedures
- Code radiology supervision and interpretation

Extracranial Nerves, Peripheral Nerves, and Autonomic Nervous System (64400–64999)

- Neuroplasty: freeing of the nerves; pressure on the nerves from scar tissue or excessive force, causing pain and restriction
- Code 64721 – Carpal Tunnel Release; performed for carpal tunnel syndrome; one of the most common neuroplasty procedures
Module 26 (continued)

Endocrine and Nervous Systems

2014 Code Alert! The Destruction by Neurolytic Agent (eg, Chemical, Thermal, Electrical or Radiofrequency), Chemodenervation subheading contains new and deleted codes.

- Codes 64613-64614 (Deleted)
- Codes 64616-64617, 64642-64647 (New)