Complete Summary

GUIDELINE TITLE

Neuroendocrine imaging.

BIBLIOGRAPHIC SOURCE(S)

Seidenwurm DJ, Davis PC, Brunberg JA, De La Paz RL, Dormont PD, Hackney DB, Jordan JE, Karis JP, Mukherji SK, Turski PA, Wippold FJ II, Zimmerman RD, McDermott MW, Sloan MA, Expert Panel on Neurologic Imaging. Neuroendocrine imaging. [online publication]. Reston (VA): American College of Radiology (ACR); 2006. 11 p. [44 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Seidenwurm D, Drayer BP, Anderson RE, Braffman B, Davis PC, Deck MD, Hasso AN, Johnson BA, Masaryk T, Pomeranz SJ, Tanenbaum L, Masdeu JC. Neuroendocrine imaging. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):563-71.

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- May 23, 2007, Gadolinium-based Contrast Agents: The addition of a boxed warning and new warnings about the risk of nephrogenic systemic fibrosis (NSF) to the full prescribing information for all gadolinium-based contrast agents (GBCAs).

COMPLETE SUMMARY CONTENT

** REGULATORY ALERT **
SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS
QUALIFYING STATEMENTS
IMPLEMENTATION OF THE GUIDELINE
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES
IDENTIFYING INFORMATION AND AVAILABILITY
DISCLAIMER

SCOPE

DISEASE/CONDITION(S)

Endocrine disorders, including the following:

- Hypopituitarism
- Obesity/eating disorder
- Hyperthyroidism (high thyroid stimulating hormone [TSH])
- Cushing's syndrome (high adrenal corticotrophic hormone [ACTH])
- Hyperprolactinemia
- Acromegaly/gigantism
- Dwarfism (proportionate)
- Diabetes insipidus
- Pituitary apoplexy
- Postoperative sella
- Precocious puberty

GUIDELINE CATEGORY

Diagnosis
Evaluation

CLINICAL SPECIALTY

Endocrinology
Family Practice
Internal Medicine
Neurological Surgery
Neurology
Pediatrics
Radiology
Surgery

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for patients with endocrine disorders

TARGET POPULATION

Patients with endocrine disorders

INTERVENTIONS AND PRACTICES CONSIDERED

1. Magnetic resonance imaging (MRI), head:
    - Without contrast
    - Without and with contrast
2. Magnetic resonance angiography (MRA), head
3. Computed tomography (CT), head:
    - Without contrast
    - Without and with contrast
    - With contrast
4. CT angiography (CTA), head
5. X-ray
    - Sella
    - Skull, tomography
6. Invasive (INV), catheter angiogram
7. Venous sampling

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of recent peer-reviewed medical journals, and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed for reaching agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by the Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible. If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Neuroendocrine Imaging

Variant 1: Hypopituitarism.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without and with contrast	8	Multiplanar thin sellar imaging
MRI, head, without contrast	7	Multiplanar thin sellar imaging
CT, head, without contrast	4	Indicated if MRI not available or contraindicated
CT, head, without and with contrast	4	Indicated if MRI not available or contraindicated
MRA, head	3	Indicated if better visualization of carotid arteries needed
CTA, head	2	For surgical planning of vascular detail if MRI and MRA contraindicated
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter angiogram	1	
Venous sampling	1	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9**		

Radiologic Exam Procedure	Appropriateness Rating	Comments
1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Obesity/eating disorder.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without contrast	4	In carefully selected patients with high clinical likelihood of structural abnormality. Multiplanar thin sellar imaging.
MRI, head, without and with contrast	4	In carefully selected patients with high clinical likelihood of structural abnormality. Multiplanar thin sellar imaging.
CT, head, without contrast	3	Indicated if MRI not available or contraindicated. In selected patients with high clinical likelihood of structural abnormality.
CT, head, without and with contrast	3	Indicated if MRI not available or contraindicated. In selected patients with high clinical likelihood of structural abnormality.
MRA, head	2	
CTA, head	1	
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter angiogram	1	
Venous sampling	1	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 3: Hyperthyroidism (high TSH).

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without and with contrast	8	Multiplanar thin sellar imaging
MRI, head, without contrast	7	Multiplanar thin sellar imaging
CT, head, without contrast	3	Indicated if MRI not available or contraindicated
CT, head, without and with contrast	3	Indicated if MRI not available or contraindicated
MRA, head	3	
CTA, head	2	For surgical planning or vascular detail if MRI and MRA contraindicated
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter angiogram	1	
Venous sampling	1	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 4: Cushing's syndrome (high ACTH).

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without and with contrast	8	Multiplanar thin sellar imaging
MRI, head, without contrast	7	Multiplanar thin sellar imaging
CT, head, without contrast	4	Indicated if MRI not available or contraindicated

Radiologic Exam Procedure	Appropriateness Rating	Comments
CT, head, without and with contrast	4	Indicated if MRI not available or contraindicated
Venous sampling	4	Indicated if MRI is negative or equivocal
MRA, head	3	Indicated if better visualization of carotid arteries needed
CTA, head	2	
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter angiogram	1	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 5: Hyperprolactinemia.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without and with contrast	8	Multiplanar thin sellar imaging
MRI, head, without contrast	7	Multiplanar thin sellar imaging
CT, head, without contrast	4	Indicated if MRI not available or contraindicated
CT, head, without and with contrast	4	Indicated if MRI not available or contraindicated
MRA, head	3	Indicated if better visualization of carotid arteries needed
CTA, head	2	For surgical planning or vascular detail if MRI and MRA contraindicated
X-ray, sella	1	
X-ray, skull,	1	

Radiologic Exam Procedure	Appropriateness Rating	Comments
tomography		
INV, catheter angiogram	1	
Venous sampling	1	Indicated in unusual cases in which lateralization is indeterminate.
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 6: Acromegaly/gigantism.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without and with contrast	8	Multiplanar thin sellar imaging
MRI, head, without contrast	7	Multiplanar thin sellar imaging
CT, head, without contrast	4	Indicated if MRI not available or contraindicated
CT, head, without and with contrast	4	Indicated if MRI not available or contraindicated
MRA, head	3	Indicated if better visualization of carotid arteries needed
Venous sampling	3	Indicated in unusual cases in which lateralization is indeterminate.
CTA, head	2	For surgical planning or vascular detail if MRI and MRA contraindicated
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter angiogram	1	
Appropriateness Criteria Scale		

Radiologic Exam Procedure	Appropriateness Rating	Comments
1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 7: Dwarfism (proportionate).

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without contrast	7	Multiplanar thin sellar imaging
MRI, head, without and with contrast	5	Multiplanar thin sellar imaging
CT, head, without contrast	4	Indicated if MRI not available or contraindicated
CT, head, without and with contrast	4	Indicated if MRI not available or contraindicated
CTA, head	2	For surgical planning or vascular detail if MRI and MRA contraindicated
MRA, head	2	
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter angiogram	1	
Venous sampling	1	
***Appropriateness Criteria Scale* 1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 8: Diabetes insipidus.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without contrast	7	Multiplanar thin sellar imaging
MRI, head, without and with contrast	6	Multiplanar thin sellar imaging
CT, head, without contrast	4	Indicated if MRI not available or contraindicated
CT, head, without and with contrast	4	Indicated if MRI not available or contraindicated
MRA, head	4	
CTA, head	2	For surgical planning or vascular detail if MRI and MRA contraindicated
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter angiogram	1	
Venous sampling	1	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 9: Pituitary apoplexy.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without and with contrast	8	Multiplanar thin sellar imaging
MRI, head, without contrast	7	Multiplanar thin sellar imaging
CT, head without contrast	6	
CT, head, without and with contrast	4	Indicated if MRI not available or contraindicated

Radiologic Exam Procedure	Appropriateness Rating	Comments
CTA, head	4	
MRA, head	4	Indicated if better visualization of carotid arteries needed
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter angiogram	1	
Venous sampling	1	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 10: Postoperative sella.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without and with contrast	8	Multiplanar thin sellar imaging
MRI, head, without contrast	7	Multiplanar thin sellar imaging
CT, head without contrast	4	CT may be indicated to assess bony anatomy and if MRI is not available or contraindicated
CT, head, without and with contrast	4	CT may be indicated to assess bony anatomy and if MRI is not available or contraindicated
CTA, head	4	
MRA, head	2	
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter	1	

Radiologic Exam Procedure	Appropriateness Rating	Comments
angiogram		
Venous sampling	1	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 11: Precocious puberty.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, head, without and with contrast	8	Multiplanar thin sellar imaging
MRI, head, without contrast	7	Multiplanar thin sellar imaging
CT, head, without contrast	2	
CT, head, with contrast	2	If MRI not available or contraindicated
CTA, head	2	
MRA, head	2	
X-ray, sella	1	
X-ray, skull, tomography	1	
INV, catheter angiogram	1	
Venous sampling	1	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

The imaging approach to the hypothalamic pituitary axis is based on specific endocrine testing suggested by clinical signs and symptoms. Endocrine disorders are generally characterized by excess or deficiency of specific hormones. Hormone excess is diagnosed under conditions that would ordinarily suppress hormone secretion. Endocrine deficiencies are diagnosed on the basis of hormone measurements under conditions of stimulation. Specific clinical syndromes of hormonal disorders are determined by the physiologic role of that particular hormone.

The hypothalamic pituitary axis consists of two separate neuroendocrine organs, the anterior pituitary system and the posterior pituitary system. The hormones of the anterior pituitary are TSH, ACTH, prolactin (PRL), growth hormone (GH), and the gonadotropins (follicle stimulating hormone [FSH] and luteinizing hormone [LH]). These are secreted under the influence of hypothalamic trophic factors, corticotrophin releasing factor (CRF), thyrotropin releasing factor (TRF) and somatostatin- and gonadotropin-releasing hormone (GnRH). Prolactin release is under the control of a dopaminergic circuit. The hypothalamic-releasing hormones are transported to the pituitary gland by the hypophyseal portal system.

The posterior pituitary gland consists of axonal terminations of neurons whose cell bodies are located in the hypothalamus. The principal hormones secreted by these cells are oxytocin and vasopressin or antidiuretic hormone (ADH). The hypothalamus also participates in complex mediation of food intake, temperature regulation, sleep and arousal, memory, thirst, and other autonomic functions.

Structural causes of obesity, anorexia, central hypothermia and hyperthermia, insomnia and hypersomnia are only very rarely demonstrated in the hypothalamus and pituitary gland. Imaging in patients who present with these symptoms absent other specific neurological or endocrine abnormality is almost always unrewarding. An exception is in children in whom the "diencephalic syndrome" of hypothalamic lesions is relatively common. Also precocious puberty in children can result from hypothalamic lesions.

Pituitary adenomas are the most common lesions of the pituitary gland. These may secrete prolactin, TSH, GH, ACTH, or gonadotropins. Prolactinomas are the most common and are generally present as microadenomas in premenopausal females with amenorrhea and galactorrhea. Prolactin elevation by itself is nonspecific and may be due to a variety of medical, neurological, or pharmacological causes as well as pituitary adenoma, depending on serum hormone level. In males, prolactinomas may be entirely asymptomatic until visual symptoms occur, due to compression of the chiasm, or they may result in hypogonadotropic hypogonadism with loss of libido and impotence. Growth-hormone-secreting tumors generally present as larger lesions manifesting clinical acromegaly. Because of the gradual onset of deformity, these tumors may be present for many years and grow to substantial size prior to their detection. In a prepubertal individual the growth-hormone-secreting tumor may result in gigantism. TSH- and ACTH-secreting tumors may present at very small size because the impact of their hormone product is usually apparent more rapidly. Gonadotropin-secreting tumors are rare.

Precocious puberty and other neurological symptoms can be produced by hypothalamic lesions such as hamartoma. MRI is generally indicated in all patients

with endocrinologically confirmed precocious puberty, especially when rapid progression of development and neurological symptoms are present. Posterior pituitary dysfunction with loss of antidiuretic hormone results in the clinical syndrome of diabetes insipidus. This may occur as a transient phenomenon after trauma or neurosurgical procedures. The etiology is usually evident, and the phenomenon is frequently transient. Imaging is performed to search for the cause of stalk transsection, which can be a manifestation of numerous sellar or parasellar pathologies, trauma, or congenital. Rarely, the hormone is absent developmentally. The syndrome of inappropriate ADH is usually due to an extracranial source. Frequently this is a paraneoplastic phenomenon related to small-cell lung carcinoma, though a variety of pulmonary diseases and pharmacological disturbances can result in syndrome of inappropriate antidiuretic hormone secretion (SIADH).

Other common mass lesions that may affect the neuroendocrine system are germ-line tumors, meningioma, craniopharyngioma, and Rathke's cleft cyst among others. Metastatic lesions may affect the sella. Sarcoid and other inflammatory processes occur in the sellar and suprasellar regions as well. Pituitary apoplexy is a syndrome of headache ophthalmoplegia and visual loss that results from pituitary hemorrhage. In the postpartum period, pituitary infarcts may occur, and hypophysitis is an uncommon disorder resulting in endocrine disturbance and other symptoms.

Classically, plain radiography and pluridirectional x-ray tomography was the mainstay of sellar imaging. CT largely replaced these modalities through the seventies and eighties. More recently, MRI has largely supplanted CT. MRI for sellar pathology includes thin-section multiplanar imaging with slice thickness of 3 mm or less, often before and after contrast administration. Other techniques that are used for evaluation of this anatomical region are CTA, MRA, direct catheter angiography, and petrosal sinus sampling.

Plain radiography and pluridirectional tomography are insensitive and nonspecific imaging modalities for evaluating sellar pathology. Pituitary microadenoma and even small pituitary macroadenomas are frequently associated with a normal sella size. The sella turcica can be enlarged when no neoplasm or mass is present. This is due to pulsations of cerebral spinal fluid (CSF) transmitted through a developmental or acquired dehiscence of the diaphragm sella in the empty sella syndrome. Therefore, these imaging modalities are rarely, if ever, employed productively in the evaluation of endocrine disease.

CT revolutionized evaluation of the sella and suprasellar region. Due to the ability of CT, especially with intravenous contrast, to depict pathology within the unenlarged sella, and its ability to visualize suprasellar pathology noninvasively, this technique facilitates accurate diagnosis of neuroendocrine abnormality. Pituitary microadenomas and macroadenomas are reliably detected. There is, however, difficulty at times in distinguishing the tumor from the optic chiasm, diagnosis of cavernous sinus invasion is difficult, and on occasion, cystic lesions of the suprasellar region may be confused with normal CSF. Additionally, artifact due to dental amalgam, difficulty in obtaining reliable contrast enhancement and awkward positioning for direct coronal scanning limit the utility of this imaging modality. In the hands of experienced radiologists this technique can result in

excellent diagnostic accuracy, though the examinations are sometimes difficult to interpret despite excellent technique.

MRI provides excellent noninvasive evaluation of the hypothalamus and pituitary gland. It is the only imaging modality that reliably depicts the hypothalamus in a useful fashion. It depicts the anatomy of the pituitary gland, infundibulum, optic chiasm, cavernous sinuses and neighboring vascular structures accurately and noninvasively. The addition of gadolinium facilitates diagnosis of microadenoma and increases the confidence with which cavernous sinus invasion can be diagnosed or excluded. The specific bony landmarks may be difficult to demonstrate but the signal pattern of sphenoid sinus mucosa permits assessment of septa for operative planning. Visualization of vascular structures in the parasellar region or even intrasellar carotid artery loop or aneurysm is crucial in some cases.

Angiography is reserved for those patients in whom vascular pathology is known or suspected on the basis of clinical or radiological findings. Aneurysm is the most important vascular lesion in the parasellar region, but these lesions rarely present as endocrine disorders. Knowledge of vascular anatomy guides surgery. Occasionally, a sellar lesion may grow to displace or encase the carotid arteries or other major intracranial vessels. Interventional neuroradiology procedures can be planned on the basis of CTA, MRA, or catheter angiography.

Petrosal sinus venous sampling is reserved for those cases in which a definite excess of pituitary hormone is present, medical management has failed, sectional imaging is negative or equivocal and surgery is planned. When a significant discrepancy in hormone level, usually ACTH, exists between the vessels studied, tumor localization is very accurate. Complications occur uncommonly in experienced hands.

A significant problem encountered in CT and MRI of the pituitary, particularly when endocrine findings suggest microadenoma, is the false-positive examination. Since the endocrine studies confirm the presence of a lesion, and first-line therapy is usually medical, false negative examinations are less problematic once chiasmatic compression has been excluded. Approximately 20% of the population may harbor small incidental nonfunctioning adenomas or cysts. It is important, therefore, that the probability of disease be high in the target population if positive MRI is to be relied upon for surgical planning. Additional problems are created by variations in size of the pituitary gland, which occur normally in response to physiological hormonal changes. The gland may enlarge in puberty and pregnancy. Pituitary hyperplasia in hypothyroidism may simulate a pituitary adenoma in some patients. Similar problems arise in imaging the posterior pituitary since up to 29% of normal subjects do not demonstrate a bright posterior pituitary.

Abbreviations

- ACTH, adrenal corticotrophic hormone
- CT, computed tomography
- CTA, computed tomography angiography
- INV, invasive
- MRA, magnetic resonance angiography

- MRI, magnetic resonance imaging
- TSH, thyroid stimulating hormone

CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures for evaluation of patients with endocrine disorders

POTENTIAL HARMS

False-positive results in computed tomography and magnetic resonance imaging examinations of the pituitary are possible, particularly when endocrine findings suggest microadenoma.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Seidenwurm DJ, Davis PC, Brunberg JA, De La Paz RL, Dormont PD, Hackney DB, Jordan JE, Karis JP, Mukherji SK, Turski PA, Wippold FJ II, Zimmerman RD, McDermott MW, Sloan MA, Expert Panel on Neurologic Imaging. Neuroendocrine imaging. [online publication]. Reston (VA): American College of Radiology (ACR); 2006. 11 p. [44 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1999 (revised 2006)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Neurologic Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: David J. Seidenwurm, MD; Patricia C. Davis, MD; James A. Brunberg, MD; Robert Louis De La Paz, MD; Pr. Didier Dormont; David B. Hackney, MD; John E. Jordan, MD; John P. Karis, MD; Suresh Kumar Mukherji, MD; Patrick A. Turski, MD; Franz J. Wippold II, MD; Robert D. Zimmerman, MD; Michael W. McDermott, MD; Michael A. Sloan, MD, MS

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Seidenwurm D, Drayer BP, Anderson RE, Braffman B, Davis PC, Deck MD, Hasso AN, Johnson BA, Masaryk T, Pomeranz SJ, Tanenbaum L, Masdeu JC. Neuroendocrine imaging. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):563-71.

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

ACR Appropriateness Criteria® *Anytime*, *Anywhere*™ (PDA application). Available from the ACR Web site.

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable

Document Format (PDF) from the American College of Radiology (ACR) Web site.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on July 31, 2001. The information was verified by the guideline developer as of August 24, 2001. This summary was updated by ECRI on August 17, 2006. This summary was updated by ECRI Institute on May 17, 2007 following the U.S. Food and Drug Administration (FDA) advisory on Gadolinium-based contrast agents. This summary was updated by ECRI Institute on June 20, 2007 following the U.S. Food and Drug Administration (FDA) advisory on gadolinium-based contrast agents.

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