Complete Summary

GUIDELINE TITLE

Evidence based clinical practice guideline hypertrophic pyloric stenosis.

BIBLIOGRAPHIC SOURCE(S)

Cincinnati Children's Hospital Medical Center. Evidence based clinical practice guideline for hypertrophic pyloric stenosis. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2007 Nov 14. 17 p. [185 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Cincinnati Children's Hospital Medical Center. Evidence based clinical practice guideline for hypertrophic pyloric stenosis. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2001 Aug 8. 16 p.

COMPLETE SUMMARY CONTENT

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)

Hypertrophic pyloric stenosis

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Emergency Medicine
Family Practice
Gastroenterology
Pediatrics
Radiology
Surgery

INTENDED USERS

Advanced Practice Nurses
Nurses
Pharmacists
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To provide evidence based clinical practice guidelines for the management of children with hypertrophic pyloric stenosis

TARGET POPULATION

- Children <3 months of age with signs, symptoms, or exam findings suggesting a diagnosis of hypertrophic pyloric stenosis

These guidelines are not intended for use in patients with:

- Suspected sepsis
- Bilious vomiting suggesting intestinal obstruction
- History or presence of significant comorbidities or chronic conditions which would alter approaches to care

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnostic Assessment

1. Assessment of signs and symptoms with physical examination, palpation of the hypertrophic pyloric muscle mass, and estimation of dehydration
2. Laboratory assessment including electrolytes
3. Ultrasound exam (US)
4. Upper gastrointestinal series (UGI)

Surgical Correction and Postoperative Management

1. Ramstedt pyloromyotomy
2. Anesthetic management
3. Pain assessment and management using the Neonatal Infant Pain Scale, wound infiltration with local anesthetic (e.g., bupivacaine), and administration of acetaminophen

4. Infection prophylaxis with cefazolin or clindamycin
5. Feeding advancement
6. Parent education and counseling

MAJOR OUTCOMES CONSIDERED

- Sensitivity, specificity, accuracy, and predictive value of diagnostic instruments
- Rates of postoperative infection
- Rates and severity of postoperative vomiting

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

To select evidence for critical appraisal by the group for the update of this guideline, the Medline, EmBase, CINAHL, and the Cochrane databases were searched. Evidence from 2000 and before was verified for inclusion in the guidelines. Evidence from January 2001 to January 2007 was reviewed to generate an unrefined, "combined evidence" database using a search strategy focused on answering clinical questions relevant to hypertrophic pyloric stenosis, employing a combination of Boolean searching on human-indexed thesaurus terms (e.g., Medical Subject Heading [MeSH] headings using an OVID MedLine interface) and "natural language" searching on keywords in the title, abstract, and indexing terms. The citations were reduced by eliminating duplicates, non-English articles, and adult articles. The resulting titles, abstracts, and full text articles were reviewed by a methodologist to eliminate low quality and irrelevant citations. During the course of the guideline development, additional clinical questions were generated and subjected to the search process, and some relevant review articles were identified. December, 2000 was the last date for which literature was reviewed for the previous version of this guideline. The details of that review strategy are not documented. However, all previous citations were reviewed for appropriateness to this revision.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Not stated

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The recommendations contained in this guideline were formulated by an interdisciplinary working group which performed systematic and critical literature reviews, using a grading scale, and examined current local clinical practices.

Recommendations have been formulated by a consensus process directed by best evidence, patient and family preference and clinical expertise. During formulation of these guidelines, the committee members have remained cognizant of controversies and disagreements over the management of these patients. They have tried to resolve controversial issues by consensus where possible and, when not possible, to offer optional approaches to care in the form of information that includes best supporting evidence of efficacy for alternative choices.

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

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guidelines have been reviewed and approved by clinical experts not involved in the development process, senior management, Risk Management & Corporate Compliance, other appropriate hospital committees, and other individuals as appropriate to their intended purposes.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Each recommendation is followed by an evidence classification identifying the type of supporting evidence. Definitions for the types of evidence are presented at the end of the "Major Recommendations" field.

Clinical Assessment

History of Symptoms

1. It is recommended that practitioners consider the diagnosis of hypertrophic pyloric stenosis (HPS) in an otherwise healthy infant between the age of 2 and 12 weeks of life who presents with projectile and/or frequent episodes of non-bilious emesis with or without associated weight loss. Increasing frequency and volume of vomiting, despite trials of small frequent feedings of formula, breast milk, and Pedialyte, often are suggestive of HPS (Smith, Mihalov, & Shields, 1999 [D]; Breaux & Georgeson, 1986 [D]).

Physical Exam

1. In an infant with the above history, palpation of the hypertrophic pyloric muscle mass (also called the *olive*) in the epigastrium or right upper quadrant (RUQ) by a skilled examiner is pathognomonic for the diagnosis of HPS. If the olive is palpated, no additional diagnostic testing may be necessary. Gastric distension or visible gastric peristalsis, seen as a wave of contraction from the left upper quadrant to the epigastrium, may be seen in some cases (Murtagh et al., 1992 [S]; Spicer, 1982 [S]). The inability of a clinician to palpate an olive does not rule out the diagnosis of HPS (Forman, Leonidas, & Kronfeld, 1990 [C,D]).
    - **Note 1**: Several methods for olive palpation are recommended (Garcia & Randolph, 1990 [S], Spicer, 1982 [S]). One method is described below.
        - Remove the child's clothing so as to expose the abdomen. Allow patient to relax by sucking on sugar water while lying supine in the parent's lap.
        - Gently elevate the child's feet and flex the legs (this relaxes the abdominal wall).
        - Place examining hand between the child's legs so that the fingers rest on the abdominal wall. Using fingertips, palpate the inferior margin of the liver edge
        - Slide fingertips under the liver edge and superiorly under liver, then posteriorly to the back of the abdomen.
        - With fingers flexed and palpating the posterior abdomen, draw fingers inferiorly along abdominal wall. The "olive" will pop under the fingers.
        - The mobility of the pyloric olive in all 4 directions distinguishes hypertrophic pyloric stenosis from a retroperitoneal mass.
        - When palpable, the olive will feel smooth and hard, oblong, and approximately 1.5 to 2.0 centimeters in size.

- **Note 2**: The ability to palpate the olive varies with the experience and persistence of the examiner and ranges from 40% to 100% (Murtagh et al., 1992 [S]).

Estimating Dehydration in Hypertrophic Pyloric Stenosis

1. Dehydration may be encountered in patients with HPS. Estimating dehydration is an important first step in determining optimal approaches to diagnose HPS. Acute body weight changes provide the best measure of dehydration in a young child (Duggan et al., 1996 [C]; Gorelick, Shaw, & Murphy, 1997* [C]). Mucous membrane hydration, capillary refill time (Saavedra, Harris, & Finberg, 1991 [D]), absence of tears, and alterations in mental status are the next best associated measures. The presence of any three or more of these latter four signs has a sensitivity of 87% and specificity of 82% for detecting a deficit of 5% or more (Duggan et al., 1996 [C]; Gorelick, Shaw, & Murphy, 1997* [C]). (See Table 1 in the original guideline document for physical parameters associated with degree of dehydration.)

   * Population studied was one month to 5 years of age. Other considerations may apply for children less than one month of age.

Laboratory Assessment

1. The assessment of electrolyte status is not routinely indicated in the early diagnosis of HPS. Once a diagnosis is confirmed, it is recommended that the electrolyte status of the patient be checked pre-operatively and any significant abnormalities in electrolytes or hydration status be addressed prior to surgery. The Cincinnati Children's Hospital Medical Center Department of Anesthesiology (CHMCC) suggests a pre-operative bicarbonate level of $\leq$30 mEq/L, be achieved before surgical correction is performed (Local expert consensus [E]; Bissonnette & Sullivan, 1991 [S]; Habre et al., 1999 [D]; Goh et al., 1990 [C]; Graham et al., 1993 [D]).
   - **Note 1**: Earlier studies indicated that up to 10% of patients with HPS present with electrolyte abnormalities including hypokalemia and hypochloremic alkalosis (Chen et al., 1996 [D]; Papadakis et al., 1999 [D]). More recent studies report fewer metabolic derangements (Poon et al., 1996 [D]).

Referral for Further Evaluation of HPS

1. In children who present with HPS symptoms but are deemed to be well hydrated, factors influencing the next step include the time of day, severity of symptoms, and social situation. If the child is well hydrated and the social situation permits, the patient may be scheduled for an elective outpatient radiologic evaluation or direct referral to a pediatric surgeon within 24 hours of this visit. Under these circumstances, parents are instructed to call if signs and symptoms of dehydration develop (Abbas, Weiss, & Alvear, 1999 [D]).
   - **Note 1**: Palpation of an olive by an experienced examiner, such as a pediatric surgeon, may obviate need for a confirmatory imaging study. This is due to the high specificity of positive exam (Forman, Leonidas,

& Kronfeld, 1990 [C, D]; Breaux & Georgeson, 1986 [D]; Macdessi & Oates, 1993 [D]; Godbole et al., 1996 [C]; White et al., 1998 [Q]).

2. It is recommended that the infant be referred to the Emergency Department for evaluation and treatment with intravenous fluids if dehydration is suspected clinically or the social situation warrants more immediate action (Local expert consensus [E]).

Radiologic Assessment

1. The diagnosis of HPS can be made with imaging by an ultrasound exam (US) or fluoroscopic upper gastrointestinal series (UGI). These imaging tests have similar performance in terms of sensitivity and specificity for the diagnosis of HPS (see Table 2 in the original guideline document). In the absence of a large prospective comparison study with receiver operating characteristic (ROC) analysis or a meta-analysis of existing studies, neither test can be proved as clearly superior in the diagnosis of HPS. UGI is superior to US in diagnosing some other conditions associated with vomiting in infants, such as gastroesophageal reflux, malrotation, and gastric webs (Cohen et al., 2000 [E]). However, sonography has certain advantages over UGI, including the absence of ionizing radiation exposure and lack of oral contrast use which eliminates the risk of barium aspiration or intraperitoneal barium spillage during surgery. This has led to US becoming the standard or preferred initial imaging method when HPS is the most likely diagnosis (Blumhagen & Noble, 1983 [C & D]; Khamapirad & Athey, 1983 [D]; Hayden et al., 1984 [D]; Stunden, LeQuesne, & Little, 1986 [C]; Weiskittel, Leary, & Blane, 1989 [O]; Garcia & Randolph, 1990 [S]; Rollins et al., 1991 [C]; Hernanz-Schulman et al., 1994 [D]; Cohen et al., 2000 [E]).
2. A persistent pyloric muscle thickness >3-4 mm or pyloric length >15-18 mm in the presence of functional gastric outlet obstruction is generally considered in the diagnostic range for HPS by US. There is not strong agreement in the literature regarding the optimal size threshold for diagnosis. Many studies show pyloric size overlap between HPS and non-HPS cases, and the diagnostic performance of specific size thresholds varies across studies (Haller & Cohen, 1986 [E]; Stunden, LeQuesne, & Little, 1986 [C]; Mollitt et al., 1987 [D]; Lund Kofoed et al., 1988 [C]; Blumhagen et al., 1988 [C & D]; Westra et al., 1989 [C]; Philippin & Zieger, 1989 [D]; O'Keefe et al., 1991 [D]; Lamki et al., 1993 [C & D]; Hernanz-Schulman et al., 1994 [D]; Neilson & Hollman, 1994 [D]; Godbole et al., 1996 [C]; Rohrschneider et al., 1998 [C]; Cohen et al., 1998 [D]). The use of smaller diagnostic size thresholds may be more applicable in younger or smaller neonates (Cohen et al., 2000 [E]). With any size cut-off there is a reciprocal relationship of sensitivity and specificity, where a larger size cut-off will increase specificity at the expense of sensitivity, and a smaller size cut-off will increase sensitivity at the expense of specificity. The dynamic evaluation of gastric emptying by real-time US is important, particularly in cases with borderline size measurements (Strauss et al., 1981 [D]; Ball, Atkinson, & Gay, 1983 [C]; Stunden, LeQuesne, & Little, 1986 [C]; Mollitt et al., 1987 [D]; Hernanz-Schulman et al., 1994 [D]; Nielson & Hollman, 1994 [D]; Godbole et al., 1996 [C]; Cohen et al., 1998 [D]; Rohrschneider et al., 1998 [D]). Many experienced sonologists rely more on a subjective visual impression of the pyloric size and gastric emptying than

on pyloric measurements (Hayden et al., 1984 [D]; Blumhagen, 1986 [E]; Westra et al., 1989 [C]; Godbole et al., 1996 [C]).

- **Note 1**: An US exam is technically nondiagnostic when the pyloric region is inadequately visualized. This may occur from excessive patient motion or from obscuration or displacement out of the field of view by excessive gastric contents. At the discretion of the sonologist, a nasogastric tube may be placed to empty the stomach and facilitate pyloric visualization. If the US exam remains nondiagnostic due to technical factors, an UGI is suggested.
- **Note 2**: Cases with borderline pyloric size measurements by ultrasound may represent pylorospasm or HPS in evolution. Persistent pyloric muscular thickening and functional gastric outlet obstruction suggests HPS. If pyloric muscular thickening and gastric outlet obstruction are transient, pylorospasm is implied (Cohen et al., 1998 [D]).
- **Note 3**: Despite careful attention to pyloric size measurements and pyloric function by real-time US observation, some US exams may be inconclusive, particularly those with borderline size measurements. Patients with an inconclusive US exam may undergo an UGI or may be followed closely clinically with repeated physical exams and/or additional imaging studies as indicated. Follow-up is highly recommended as some of these cases may progress to frank HPS, with reported time periods ranging from a few days to greater than one month (Tunell & Wilson, 1984 [C]; Blumhagen et al., 1988 [D]; O'Keefe et al., 1991 [D]; Lamki et al., 1993 [C & D]; Hallam et al., 1995 [D]; Godbole et al., 1996 [C]; Bergami et al., 1996 [C]).

3. An UGI is favored over US as the most cost-effective initial imaging study when:
    a. The clinical presentation of the vomiting infant is atypical for HPS (e.g., bilious emesis, emesis present since birth, patient age extreme) and favors other conditions more amenable to diagnosis by UGI such as gastroesophageal reflux (GER) or malrotation (Olson, Hernandez, & Hirschl, 1998 [Q]; Foley et al., 1989 [C]; Forman, Leonidas, & Kronfeld, 1990 [C & D]).
    b. An UGI planned if the US is negative (a negative US leading to an UGI does not save the patient radiation exposure and increases the overall cost of imaging (Cohen et al., 2000 [E]).
        - **Note 1**: The primary criterion for the diagnosis of HPS by UGI is a narrowed, elongated pyloric channel with pyloric mass effect on the stomach and duodenum. This may produce a string sign, double tract sign, beak sign, or pyloric teat sign. Ancillary findings of HPS on UGI are gastric hyperperistalsis, large volume gastric residue, and delayed gastric emptying (Shopfner, Kalmon, & Coin, 1964 [D]; Shuman, Darling, & Fisher, 1967 [D]; Cremin & Klein, 1968 [D]).
        - **Note 2**: As with US, some UGI studies may be inconclusive. These cases may undergo an US or be followed closely clinically with repeated physical exams and/or additional imaging studies as indicated.

Surgical Correction

HPS is corrected surgically by Ramstedt pyloromyotomy. The pylorus may be accessed by various incision techniques including transverse right upper quadrant, circumumbilical, and laparoscopic. All methods are considered acceptable practice with minimal differences in outcomes noted (Hingston, 1996 [D]; Tan & Bianchi, 1986 [C]; Poli-Merol et al., 1996 [C]; Leinwand, Shaul, & Anderson, 1999 [D]; Fujimoto et al., 1999 [C]; Fitzgerald et al., 1990 [D]).

Anesthetic Management

1. Infants with HPS have a functional gastric outlet obstruction that may place them at a greater risk for aspiration of gastric contents during induction of anesthesia (Cook-Sather et al., 1998 [E]). Regardless of whether the stomach contents were aspirated prior to the infant's arrival in the operating theater, it is recommended that precautions be taken to prevent pulmonary aspiration. These maneuvers include oral/nasogastric suction prior to induction of anesthesia and maintaining cricoid pressure (Sellick's maneuver) during induction of anesthesia (Bissonnette & Sullivan, 1991[S]).

Pain Management

1. Pain management is important for optimal patient outcomes. It is recommended that pain be routinely assessed using standard age appropriate scales (Salantera et al., 1999 [C]).
2. It is recommended that the "Neonatal Infant Pain Scale" be utilized for pain assessment.
    - **Note 1**: Valuable information regarding pain management may also be obtained through the measurement of physiologic changes, behavioral observation, and caregiver/parental input (Finley & McGrath, 1998 [S]).

3. It is recommended that the wound be infiltrated with a local anesthetic (i.e., bupivacaine 0.125% up to 1mL/kg) at the conclusion of the surgical procedure. Wound infiltration with local anesthetic has been shown to decrease postoperative analgesic requirements (Habre et al., 1999 [D]).
4. Further analgesia, if necessary, may be accomplished via the administration of acetaminophen (15 mg/kg/dose every 4 to 6 hours. Not to exceed 5 doses in 24 hours.) (Bissonnette & Sullivan, 1991 [S]; Habre et al., 1999 [D]). Use of opioids may potentiate the risk of respiratory depression in infants undergoing pyloromyotomy (Habre et al., 1999 [D]). Therefore, it is recommended that narcotics not be administered in the routine post-operative pain management of these infants.

Surgical Site Infection Prophylaxis

1. It is recommended that one dose of cefazolin, 25 mg/kg of body weight, be used to decrease the risk of surgical site infection in all patients. In the event of penicillin allergy, it is recommended that clindamycin, 10 mg/kg of body weight, be the alternative antibiotic of choice.
    - **Note 1**: *Staphylococcus aureus* is the most common organism associated with wound infections in patients who have undergone pyloromyotomy (Rao & Youngson, 1989 [D]; Mangram et al., 1999 [E])

2. To assure adequate blood level at the time of incision, it is recommended that antibiotics be given approximately 30 minutes prior to surgery (Mangram et al., 1999 [E]). Therefore, it is recommended that prophylactic antibiotics be given in the perioperative care before induction and the practice of giving antibiotics "on call to the operating room" be discouraged as delays in patient transport or schedule changes may result in suboptimal blood and tissue levels (Page et al., 1993 [S]; Silver et al., 1996 [D]).
    - **Note 1**: For cephalosporins, adequate blood levels are achieved and sustained for 3 to 4 hours. If the interval between antibiotic administration and closure of the surgical incision is greater than 4 hours, the administration of an additional dose may be considered (Mangram et al., 1999 [E]).
    - **Note 2**: Although rates of infection appear to be higher in the umbilical route, the administration of antibiotics reduced the risk of infection in both groups (Leinwand, Shaul, & Anderson, 2000 [D]).

Feeding Advancement

1. Vomiting following pyloromyotomy is usually self limiting. Although frequency of vomiting is related to type of feeding regimen, duration is independent of the timetable or composition of post-operative dietary regimen (Carpenter et al., 1999 [D]; Georgeson et al., 1993 [D]; Gollin et al., 2000 [D]; Wheeler et al., 1990 [C]). It is recommended that following pyloromyotomy, infants be fed early and with regular formula or breast milk.
    - **Note 1**: The composition of feeding, and the rate of advancement (Georgeson et al., 1993 [D]; Leinwand, Shaul, & Anderson, 2000 [D]; Gollin et al., 2000 [D]) may affect the incidence or severity of vomiting post-regimen, but ultimately does not affect time to full feedings, discharge, or post operative weight gain (Foster & Lewis, 1989 [D]). (See Table 3 in the original guideline document.)
    - **Note 2**: Duration of post-procedure vomiting is variable, with reports of 3.5% to 24% of infants with continued emesis more than 48 hours after surgery (Carpenter et al., 1999 [D]; Scharli & Leditschke, 1968 [C]; Wheeler et al., 1990 [C]).
    - **Note 3**: The most significant predictor of post-operative emesis is the duration and severity of pre-operative vomiting and is frequently manifested by electrolyte abnormalities (Gollin et al., 2000 [D]).
    - **Note 4**: Postoperatively, infants may be fed volumes based on feedings taken pre-operatively (Local expert consensus, [E]).

Discharge Criteria

1. Otherwise healthy infants may be discharged once they have tolerated two to three full feedings and/or at the discretion of the Health Care Provider (Carpenter et al., 1999 [D]). Infants with significant pre-operative vomiting, severe electrolyte imbalance, or malnutrition may need a longer period of recovery.
2. Counseling of parents regarding post-operative emesis, assessment of hydration status, and signs and symptoms of infection are essential components of patient/family education (Local expert consensus, [E]).

Definitions:

Cincinnati Children's Hospital Medical Center Evidence Grading Scale

M: Meta-analysis or Systematic Review
A: Randomized controlled trial: large sample
B: Randomized controlled trial: small sample
C: Prospective trial or large case series
D: Retrospective analysis
O: Other evidence
S: Review Article
E: Expert opinion or consensus
F: Basic Laboratory Research
L: Legal requirement
Q: Decision analysis
X: No evidence

CLINICAL ALGORITHM(S)

An algorithm is provided in the original guideline document for the diagnosis of hypertrophic pyloric stenosis.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of evidence is classified for each recommendation (see "Major Recommendations").

Evidence Grading Scale

M: Meta-analysis or Systematic Review
A: Randomized controlled trial: large sample
B: Randomized controlled trial: small sample
C: Prospective trial or large case series
D: Retrospective analysis
O: Other evidence
S: Review Article
E: Expert opinion or consensus
F: Basic Laboratory Research
L: Legal requirement
Q: Decision analysis
X: No evidence

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Successful treatment of hypertrophic pyloric stenosis

POTENTIAL HARMS

- Upper gastrointestinal series caries the risk of ionizing radiation exposure, barium aspiration, and intraperitoneal barium spillage during surgery.
- Infants with hypertrophic pyloric stenosis have a functional gastric outlet obstruction that may place them at a greater risk for aspiration of gastric contents during induction of anesthesia.
- Surgical procedures carry a risk of infection.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

These recommendations result from review of literature and practices current at the time of their formulations. This guideline does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. The guideline document is not intended to impose standards of care preventing selective variances from the guidelines to meet the specific and unique requirements of individual patients. Adherence to this pathway is voluntary. The physician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Appropriate companion documents have been developed to assist in the effective dissemination and implementation of the guideline.

IMPLEMENTATION TOOLS

Chart Documentation/Checklists/Forms
Clinical Algorithm

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

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Cincinnati Children's Hospital Medical Center. Evidence based clinical practice guideline for hypertrophic pyloric stenosis. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2007 Nov 14. 17 p. [185 references]

ADAPTATION

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

DATE RELEASED

2001 Aug 8 (revised 2007 Nov 4)

GUIDELINE DEVELOPER(S)

Cincinnati Children's Hospital Medical Center - Hospital/Medical Center

SOURCE(S) OF FUNDING

Cincinnati Children's Hospital Medical Center

GUIDELINE COMMITTEE

Hypertrophic Pyloric Stenosis Guideline Team

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Community Physician: Lynn Croteau, MD, Pediatrics

Cincinnati Children's Hospital Medical Center Physicians: Mark Arkovitz, MD, Fellow -- Ped. Surgery; Paul Guillerman, MD, Radiology; Richard Berlin, MD, Anesthesiology; Michael Josephs, MD, Fellow -- Ped. Surgery; Uma Kotagal, MBBS, MSc. Director HPCE; Scott Reeves, MD, Emergency Medicine; Fred Ryckman, MD*, Pediatric Surgery; Brad Warner, MD, Pediatric Surgery

Patient Services: Kathleen Blair, RN, MS, Ed. Coordinator -- OR; Dawn Butler, PharmD, Pharmacy; Toral Freson, RN, MSN, CNP – Ped Surgery; Tammy Lingsch, RN, C5 Charge Nurse; Amy Sapsford, RD, Nutrition Services; Marilyn Stoops, RN, MS, CPNP -- Ped. Surgery; Laurie Ravagnani, RN, MS, Emergency Department; Susan Ralston, PharmD, Pharmacy

Clinical Effectiveness: Mary Pat Alfaro, RD, MS, Research Coordinator; Charlotte L. Anderson, RN, MS, Pathway/Guideline Admin; Betsy Bushman, BA, Guideline Coordinator; Edward Donovan, MD*, Medical Director; Danette Stanko-Lopp, MA,

MPH*, Epidemiologist; Carol Tierney, RN, MSN*, Education Specialist; Kate Turck, BS, Decision Support Analyst

Ad Hoc Advisors: Richard Azizkhan, MD, Chair -- Ped. Surgery; Melissa Berner, ESQ, Legal Services; Thomas DeWitt, MD, General/Community Peds; Michael Farrell, MD, Chief of Staff; Ken Goldschneider, MD, Pain Management; Dorine Seaquist, RN, MS, VP Patient Services

*Involved with the 2007 revision

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

The guideline was developed without external funding. All Team Members and Clinical Effectiveness support staff listed have declared whether they have any conflict of interest and none were identified.

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Cincinnati Children's Hospital Medical Center. Evidence based clinical practice guideline for hypertrophic pyloric stenosis. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2001 Aug 8. 16 p.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Cincinnati Children's Hospital Medical Center.

Print copies: For information regarding the full-text guideline, print copies, or evidence-based practice support services contact the Children's Hospital Medical Center Health Policy and Clinical Effectiveness Department at HPCEInfo@chmcc.org.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Post operative orders for hypertrophic pyloric stenosis. Cincinnati (OH): Children's Hospital Medical Center; 2007 Nov. 1 p.
- Hypertrophic pyloric stenosis discharge instructions. Cincinnati (OH): Children's Hospital Medical Center; 2007 Nov. 1 p.

Electronic copies: Available from the Cincinnati Children's Hospital Medical Center.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on March 28, 2002. The information was verified by the guideline developer on June 21, 2002. This NGC summary was updated by ECRI Institute on February 26, 2008.

COPYRIGHT STATEMENT

This NGC summary is based on the original full-text guideline, which is subject to the following copyright restrictions:

Copies of Cincinnati Children´s Hospital Medical Center (CCHMC) Evidence-Based Clinical Practice Guidelines (EBCG) are available online and may be distributed by any organization for the global purpose of improving child health outcomes. Examples of approved uses of CCHMC's EBCG include the following:

- Copies may be provided to anyone involved in the organization's process for developing and implementing evidence-based care guidelines.
- Hyperlinks to the CCHMC website may be placed on the organization's website.
- The EBCG may be adopted or adapted for use within the organization, provided that CCHMC receives appropriate attribution on all written or electronic documents.
- Copies may be provided to patients and the clinicians who manage their care.

Notification of CCHMC at HPCEInfo@cchmc.org for any EBCG adopted, adapted, implemented or hyperlinked to by a given organization and/or user is appreciated.

DISCLAIMER

NGC DISCLAIMER

The National Guideline Clearinghouse™ (NGC) does not develop, produce, approve, or endorse the guidelines represented on this site.

All guidelines summarized by NGC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public or private organizations, other government agencies, health care organizations or plans, and similar entities.

Guidelines represented on the NGC Web site are submitted by guideline developers, and are screened solely to determine that they meet the NGC Inclusion Criteria which may be found at http://www.guideline.gov/about/inclusion.aspx .

NGC, AHRQ, and its contractor ECRI Institute make no warranties concerning the content or clinical efficacy or effectiveness of the clinical practice guidelines and related materials represented on this site. Moreover, the views and opinions of developers or authors of guidelines represented on this site do not necessarily state or reflect those of NGC, AHRQ, or its contractor ECRI Institute, and inclusion or hosting of guidelines in NGC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding guideline content are directed to contact the guideline developer.

© 1998-2008 National Guideline Clearinghouse

Date Modified: 11/3/2008