

Evaluation and Treatment of Cryptorchidism

Research Focus for Clinicians

In response to a request from the public, an Evidence-based Practice Center funded by the Agency for Healthcare Research and Quality performed a review of the literature to evaluate the evidence regarding the relative accuracy of various imaging modalities for identifying and localizing the testicles in patients with cryptorchidism. Additionally, the comparative effectiveness and harms of various nonsurgical and surgical modalities for treating cryptorchidism were also assessed. This review did not cover studies of disorders of sexual development or ambiguous genitalia. The systematic review included 60 unique eligible studies published between 1980 and February 2012. An online version of this summary provides links directly to the sections of the full report with references for individual findings, inclusion criteria for the studies, and an explanation of the methods for rating the studies and determining the strength of evidence for individual findings. The online version of this summary and the full report are available at www.effectivehealthcare.ahrq.gov/undescended-testicle.cfm. This summary is provided to inform discussions with patients of options and to assist in decisionmaking along with consideration of a patient's or caregiver's values and preferences. However, reviews of evidence should not be construed to represent clinical recommendations or guidelines.

Background

Cryptorchidism may be unilateral or bilateral, and the undescended testicles (UDTs) may be palpable or nonpalpable. UDTs may be located in the abdomen, or the groin area or may be misplaced in the scrotum. They may be functional or atrophied.

The etiology of cryptorchidism is not well understood. It affects an estimated 3 percent of full-term male neonates and up to 30 percent of premature infants. Although about 70 percent of cryptorchid testicles spontaneously descend within the first 6 months of life, the number of boys whose condition persists after this period remains constant at approximately 1 percent.

The appropriate evaluation and treatment strategies for cryptorchidism may be influenced by many factors including whether or not the testicle is palpable, whether the condition is present unilaterally or bilaterally, the age at presentation, and comorbid conditions. The majority of UDTs can be located on physical examination. For locating nonpalpable UDTs, laparoscopic surgery is routinely used in clinical practice.

Treatment for cryptorchidism is usually initiated between the ages of 6 months and 12 months. There are three key surgical options commonly used for treating cryptorchidism, depending on the location and appearance of the UDT. Primary orchiopexy is possible if the testicle is of normal size and appearance and if the testicular vessels are of adequate length. In this procedure, the testicle is moved to the scrotum and fixed in place. If the vessels are so short that tension-free placement of the testicle in the scrotum is not possible, a

Fowler-Stephens orchiopexy is performed. The Fowler-Stephens technique can be performed in one of two ways: either (1) as a single-stage operation in which the vessels are ligated and the testicle is then placed into the proper position in the scrotum, or (2) as a two-stage procedure, in which the vessels are ligated in the first operation, and the testicle is then moved to the proper position in the scrotum during a second procedure, usually 3–6 months later. Both primary orchiopexy and the Fowler-Stephens procedures can be performed using a laparoscopic or open surgical technique.

In addition to surgery, clinical treatment planning (using imaging or hormonal stimulation testing) and intervention approaches including hormonal therapy have been investigated. The authors of this systematic review examined the available evidence on use of imaging and hormonal testing for diagnostic treatment planning and the use of various treatment options for managing cryptorchidism.

Conclusion

Regarding treatment planning, although accuracy varies by the location of UDTs, the availability and quality of current evidence does not suggest that any specific imaging technique is able to evaluate nonpalpable or atrophied testicles with sufficient accuracy to eliminate the need for laparoscopic evaluation.

For treating cryptorchidism, surgical options are effective with rates of successful testicular positioning of 96.4 percent with primary orchiopexy and 78.7 percent and 86 percent with one-stage and two-stage Fowler-Stephens orchiopexy, respectively. Rates of testicular atrophy vary with these surgical procedures, and adverse effects are rare. However, each of the three types of surgery is used to address a different clinical presentation, so the success rates cannot be compared with one another.

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Conclusion (Continued)

Low levels of evidence suggest that open and laparoscopic repair of UDTs appear to be equally effective in achieving testicular positioning.

Regarding hormonal treatment options, only human chorionic gonadotropin (hCG) is available in the United States for treating UDT. Studies on hormonal treatment are small and mostly of poor quality, with evidence related to benefits and harms too limited to inform changes in practice.

Clinical Bottom Line

Evaluation of Cryptorchidism: Imaging Modalities Used To Identify Nonpalpable Undescended Testicles[†]

The overall sensitivity and specificity of the various imaging modalities using laparoscopic or open surgery as a reference standard are reported in Table 1. Studies examining sensitivity and specificity were mostly of poor or fair quality and were too limited to provide evidence for changing current practice in evaluating nonpalpable testes.

Treatment of Cryptorchidism: Evidence of Benefits

Surgical Interventions for Undescended Testicles in Different Locations

The overall success rate[‡] for testicular descent with primary orchiopexy* was 96.4 percent (range 89.1–100%). ●●●

The overall success rate for testicular descent with one-stage Fowler-Stephens orchiopexy* was 78.7 percent (range 33–94.3%). ●●○

The overall success rate for testicular descent with two-stage Fowler-Stephens orchiopexy* was 86 percent (range 67–98%). ●●○

Laparoscopy and open repair were equally effective in achieving testicular descent. ●○○

Hormonal Therapies

Note: The studies on hormonal therapies had several limitations. The studies were small (number of patients ranged from 33 to 324), mainly of poor quality, and included patients with retractile testes. The initial location of the testicle was lower in most of the patients included in the studies. Doses of human chorionic gonadotropin (hCG) used in the studies were highly variable. Luteinizing hormone-releasing hormone (LHRH) is not available in the United States for treating cryptorchidism and has been included in this table for purposes of comparison. The followup period in the included studies was short, so there were insufficient data on long-term re-ascent/failure. These studies excluded patients with an inguinal hernia, which can accompany UDT and would require surgical treatment.

hCG achieves slightly higher rates of testicular descent when compared with placebo (successful bilateral and unilateral descent rates of 23% and 18%, respectively, with hCG vs. 0% with placebo in both cases). ●○○

LHRH achieves slightly higher rates of testicular descent when compared with placebo (successful descent rates of 9–62% with LHRH vs. 0–18% with placebo). ●●○

hCG is as effective as LHRH in achieving testicular descent (successful descent rates of 0–18.8% with LHRH vs. 5.9–23% with hCG). ●○○

Treatment of Cryptorchidism: Evidence of Harms

The overall testicular atrophy rate for primary orchiopexy was 1.83 percent (range 0–4%). ●●○

The overall testicular atrophy rates for one-stage and two-stage Fowler-Stephens orchiopexy were 28.1 (range 22–67%) and 8.2 percent (range 0–12%), respectively. ●○○

Laparoscopy and open repair were associated with similar rates of testicular atrophy. ●○○

Other adverse events associated with surgery were rare and included Veress needle puncture (injury to the sigmoid colon during laparoscopy), laparoscopic port-site hernia, and incarcerated hernia.[†]

Reported harms of hormonal treatments were mild and included virilizing effects (e.g., pubic hair, increase in penis size and erections) and behavioral changes (e.g., aggression). However, the followup period in all the included studies was short, so data on long-term fertility or cancer outcomes were insufficient. ●●○

[†] These findings were not rated.

[‡] Success rate was defined as the proportion of testicles achieving testicular descent or testicular positioning.

* These findings were based on retrospective studies. Each intervention was compared with an implicit control based on the known natural history of the disease.

hCG = human chorionic gonadotropin; LHRH = luteinizing hormone releasing hormone

Strength of Evidence Scale

High: ●●● High confidence that the evidence reflects the true effect. Further research is very unlikely to change our confidence in the estimate of effect.

Moderate: ●●○ Moderate confidence that the evidence reflects the true effect. Further research may change our confidence in the estimate of effect and may change the estimate.

Low: ●○○ Low confidence that the evidence reflects the true effect. Further research is likely to change our confidence in the estimate of effect and is likely to change the estimate.

Insufficient: ○○○ Evidence is either unavailable or does not permit a conclusion.

Table 1. Accuracies of Imaging Modalities in Identifying Nonpalpable Undescended Testicles

Imaging Technique	Number and Quality of Studies			Performance Characteristic Measures				
	Good	Fair	Poor	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value	Overall Accuracy Rate (%)
US	1	2	6	15–80	67–100	67–100	0–80	21–76
MRI		3	7	33–91	56–100	83–100	0–75	42–92
CT			1	57	100	100	14	60
MRA [‡]		1	1	100	NA–100	100	NA–100	100
MRV [‡]			1	100	100	100	100	100
MRI & MRAr/V			1	57	NA	100	0	57

CT = computed tomography; MRA = magnetic resonance angiography; MRAr/V = magnetic resonance arteriography/venography; MRI = magnetic resonance imaging; MRV = magnetic resonance venography; NA = not available; US = ultrasonography

[‡] MRA and MRV are invasive tests that require anesthesia or sedation.

Sensitivity: The proportion of testicles correctly identified as present by imaging among those identified as present by surgery.

Specificity: The proportion of testicles correctly identified as absent or vanishing by imaging among those considered absent by surgery.

Positive predictive value: Among those testicles identified as present by imaging, what is the probability that it will actually be confirmed by surgery?

Negative predictive value: Among those testicles with a negative imaging result, what is the probability that the surgery also did not find them?

Overall accuracy rate: The proportion of testicles correctly identified by imaging as present or absent among all the testicles subjected to both imaging and surgery.

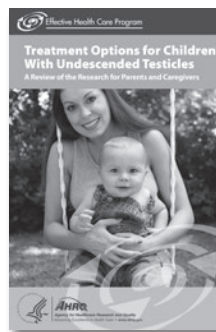
Gaps in Knowledge

- The studies included in this review are of poor quality and are too limited to determine:
 - The relative effectiveness of computed tomography, magnetic resonance venography, and magnetic resonance angiography in locating testicles
 - The comparative effectiveness of single- or two-stage Fowler-Stephens orchiopexy in treating cryptorchidism
 - The effect of the pretreatment location of the testicles on treatment outcomes
- In the studies that assessed treatment modalities and were included in this review, analyses are not stratified according to the pretreatment location of the testicles, which might affect treatment outcomes.
- Data on the long-term effects, including harms, of hormonal therapy are missing in the literature.
- The appropriate age for treatment remains unknown, with very few data available on the modifying effect of age on outcomes.
- Studies of important long-term outcomes of treatment, including fertility and cancer, have not been identified in the current literature. Establishing a long-term cohort or registry could provide such long-term data.

What To Discuss With the Parents and/or Caregivers of Your Patients

- What cryptorchidism is and the consequences of the condition
- The clinical characteristics of the patient's case, including the location and viability of the UDT
- How cryptorchidism is evaluated, the options for guiding its treatment, and the associated benefits and/or harms of the treatment options
- The limited value of imaging in these patients

Resource for Patients



Treatment Options for Children With Undescended Testicles, A Review of the Research for Parents and Caregivers is a free companion to this clinician research summary. It can help caregivers of patients talk with their health care professionals about the many options for treating cryptorchidism.

Ordering Information

For electronic copies of *Treatment Options for Children With Undescended Testicles, A Review of the Research for Parents and Caregivers*, this clinician research summary, and the full systematic review, visit www.effectivehealthcare.ahrq.gov/undescended-testicle.cfm. To order free print copies, call the AHRQ Publications Clearinghouse at 800-358-9295.

Source

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