

CRYPTORCHIDISM IN CHILDREN - DIAGNOSIS, TREATMENT, AND LONG-TERM OUTCOMES

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Annotation: *This thesis evaluates diagnostic methods, treatment approaches, and long-term outcomes of cryptorchidism in pediatric patients. Evidence-based analysis confirms that orchiopexy performed before 18 months of age significantly reduces infertility and malignant transformation risk, establishing early surgical intervention as the evidence-based standard of care.*

Keywords: *cryptorchidism, orchiopexy, testicular maldescent, germ cell aplasia, scrotal ultrasonography, diagnostic laparoscopy, human chorionic gonadotropin stimulation test, hormonal therapy, fertility preservation, testicular germ cell malignancy.*

Today, cryptorchidism - defined as the failure of one or both testes to descend into the scrotal sac - remains the most prevalent congenital urogenital anomaly in male children, affecting approximately 1-4% of full-term and up to 30% of preterm neonates. Despite advances in neonatal screening and surgical technique, delayed diagnosis and suboptimal timing of intervention continue to compromise long-term reproductive function and elevate oncological risk, necessitating a systematic reassessment of current clinical protocols.

Cryptorchidism arises from a multifactorial pathogenesis involving disruption of the hypothalamic-pituitary-gonadal axis, mechanical gubernacular dysfunction, and environmental endocrine-disrupting factors. Clinically, the condition is classified as palpable or non-palpable, with non-

palpable testes representing approximately 20% of cases and necessitating advanced diagnostic evaluation. Physical examination under adequate sedation remains the primary diagnostic modality; however, its sensitivity for non-palpable testes is inherently limited. Scrotal and inguinal ultrasonography offers non-invasive anatomical localization, yet its sensitivity in identifying intra-abdominal testes does not exceed 45%, rendering it insufficient as a standalone diagnostic tool. Magnetic resonance imaging provides superior soft-tissue resolution, though neither modality reliably excludes testicular absence. Diagnostic laparoscopy is therefore regarded as the gold standard for evaluating non-palpable cryptorchidism, simultaneously enabling therapeutic intervention through single-stage or staged Fowler-Stephens orchiopexy - a two-phase surgical procedure in which the testicular vessels are ligated to promote collateral blood supply prior to final scrotal fixation.

Hormonal therapy using human chorionic gonadotropin or gonadotropin-releasing hormone analogues has been proposed as an adjunct to stimulate testicular descent; however, contemporary evidence indicates response rates of only 15-20%, with high relapse rates and potential adverse effects on germ cell histology, substantially limiting its clinical utility as monotherapy. Surgical orchiopexy, performed optimally between 6 and 18 months of age, remains the definitive treatment, with success rates exceeding 90% for palpable testes. Histopathological studies confirm that untreated cryptorchidism results in progressive germ cell aplasia - the irreversible depletion of spermatogonia, the precursor cells of mature spermatozoa - beginning as early as the second year of life. Long-term epidemiological data demonstrate a two- to six-fold increased risk of testicular germ cell malignancy in affected individuals. Early orchiopexy has been shown to attenuate, though not entirely eliminate, this oncological risk, while substantially improving the

probability of future paternity in unilateral cases compared with bilateral involvement.

In conclusion, early diagnosis and timely surgical orchiopexy before 18 months of age optimize fertility preservation and reduce malignant transformation risk. Future research should prioritize genetic biomarker identification and refined hormonal protocols to further improve long-term outcomes in affected children.

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