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EARLY DIAGNOSIS OF PITUITARY DWARFISM AND EVALUATION OF THE EFFECTIVENESS OF GROWTH HORMONE THERAPY

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Annotation : Pituitary dwarfism is an endocrine disorder associated with growth hormone deficiency and characterized by significant growth retardation in children. This article analyzes the etiopathogenesis of the disease, principles of early diagnosis, modern laboratory and instrumental diagnostic methods, as well as criteria for evaluating the effectiveness of recombinant growth hormone therapy. Research findings indicate that timely diagnosis and early initiation of treatment significantly improve final adult height and help prevent metabolic complications.

Keywords : pituitary dwarfism, growth hormone deficiency, IGF-1, growth velocity, bone age, recombinant somatropin, pediatric endocrinology.

Pituitary dwarfism (growth hormone deficiency) is a pathological condition resulting from insufficient secretion of growth hormone, primarily diagnosed during childhood. Growth hormone is secreted by the pituitary gland and stimulates cell proliferation in the epiphyseal growth plates of long bones.

The biological effects of growth hormone are largely mediated by insulin-like growth factor-1 (IGF-1). Hormonal deficiency leads to impaired skeletal growth, delayed puberty, and metabolic disturbances.

Etiology and Pathogenesis The main etiological factors include:

- Congenital pituitary hypoplasia
- Genetic mutations (GH1, GHRHR genes)
- Birth trauma
- Intracranial tumors (e.g., craniopharyngioma)
- Central nervous system infections

The pathogenesis is based on decreased secretion of growth hormone, leading to reduced IGF-1 synthesis in the liver. Consequently, chondrocyte proliferation in the epiphyseal plates decreases, resulting in impaired longitudinal bone growth.

Principles of Early Diagnosis

Anthropometric Assessment

- Height SDS < −2
- Growth velocity < 4 cm/year
- Monitoring using percentile growth charts

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Laboratory Diagnostics

- Serum IGF-1 and IGFBP-3 levels
- Growth hormone stimulation tests (insulin tolerance test, clonidine test)

Instrumental Examination.

- Hand and wrist radiography to determine bone age
- Magnetic resonance imaging to assess pituitary morphology

Early diagnosis plays a crucial role in improving the patient's final height prognosis.

Growth Hormone Therapy Treatment involves the administration of recombinant human growth hormone — Somatropin.

Dosage: 0.025–0.035 mg/kg/day, administered subcutaneously.

Duration: Until epiphyseal closure or achievement of target height.

Criteria for Evaluating Therapy Effectiveness

1. Auxological Criteria:
- Growth velocity ≥ 8–10 cm during the first year
- Improvement in height SDS

2. Biochemical Criteria:
- Normalization of IGF-1 levels
- Stabilization of metabolic parameters

3. Radiological Criteria:
- Adjustment of bone age progression

4. Safety Monitoring:
- Intracranial hypertension
- Risk of diabetes mellitus
- Development or progression of scoliosis

According to current literature, early initiation of growth hormone therapy significantly improves final adult height outcomes. Treatment response depends on age at diagnosis, baseline IGF-1 levels, genetic background, and adherence to therapy.

Early identification of pituitary dwarfism requires systematic anthropometric monitoring in pediatric practice. Laboratory and imaging methods are essential for confirming the diagnosis. Timely initiation of recombinant growth hormone therapy significantly improves final height prognosis and enhances quality of life.

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