



Advancements in understanding and treating occult spinal dysraphism in children

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Description

Occult Spinal Dysraphism (OSD) encompasses a spectrum of congenital spinal abnormalities characterized by incomplete closure of the neural tube during embryonic development. These anomalies may involve the skin, subcutaneous tissues, spinal cord, and surrounding structures, leading to diverse clinical presentations and complications. In recent years, advancements in medical technology and diagnostic techniques have significantly enhanced our understanding of OSD in children, enabling more accurate diagnosis and improved treatment outcomes.

Occult spinal dysraphism encompasses various congenital anomalies, including tethered cord syndrome, lipomyelomeningocele, dermal sinus tracts, filum terminale lipomas, and intradural lipomas. These anomalies result from abnormal closure of the neural tube during embryogenesis, leading to incomplete development of the spinal cord and surrounding structures. The clinical manifestations of OSD can vary

widely, ranging from cutaneous stigmata such as skin dimples or hairy patches to neurological deficits such as motor or sensory abnormalities, bowel or bladder dysfunction, and orthopedic deformities. Understanding the pathophysiology and clinical spectrum of OSD is essential for accurate diagnosis and timely intervention.

Recent advancements in diagnostic imaging techniques have revolutionized the evaluation of occult spinal dysraphism in children. Magnetic Resonance Imaging (MRI) is the gold standard for diagnosing OSD, allowing for detailed visualization of the spinal cord, nerve roots, and associated anomalies. High-resolution MRI sequences, such as T2-weighted imaging and Constructive Interference In Steady-State (CISS) sequences, provide exquisite anatomical detail and facilitate the detection of subtle abnormalities. Additionally, advanced neuroimaging techniques such as Diffusion Tensor Imaging (DTI) and Magnetic Resonance Spectroscopy (MRS) offer valuable insights into the microstructural and metabolic characteristics of spinal cord lesions, aiding in treatment planning and prognostication.

The management of occult spinal dysraphism in children is individualized based on the specific type of anomaly, clinical presentation, and associated complications. Surgical intervention is often indicated to address tethered cord syndrome, lipomyelomeningocele, or other symptomatic OSD lesions. The goals of surgery include decompression of the spinal cord, detethering of neural structures, and restoration of normal spinal cord anatomy and function. Advances in surgical techniques, including minimally invasive approaches, intraoperative neurophysiological monitoring, and neuroendoscopic

procedures, have led to improved surgical outcomes and reduced morbidity in pediatric patients with OSD. Additionally, multidisciplinary collaboration among neurosurgeons, pediatricians, orthopedic surgeons, urologists, and physical therapists is essential to optimize patient care and long-term outcomes.

Long-term management of occult spinal dysraphism in children involves regular monitoring of neurological function, bladder and bowel function, musculoskeletal development, and overall quality of life. Close follow-up with a multidisciplinary team is essential to detect and address potential complications such as neurological deterioration, spinal deformities, urinary tract infections, and orthopedic abnormalities. Early intervention and proactive management strategies, including physical therapy, orthopedic bracing, and bladder training, can help mitigate the impact of OSD-related complications and optimize functional outcomes in pediatric patients.

Psychosocial support is integral to the care of children with occult spinal dysraphism and their families. Coping with the challenges of a chronic medical condition can be emotionally taxing for children and parents alike,

leading to feelings of anxiety, depression, or social isolation. Providing comprehensive psychosocial support, including counseling, education, and access to support groups, can help pediatric patients and their families navigate the emotional and psychological aspects of OSD and develop coping strategies to enhance resilience and well-being.

Conclusion

In conclusion, advancements in understanding and treating occult spinal dysraphism in children have transformed the management of this complex condition. By using diagnostic imaging techniques, surgical innovations, multidisciplinary collaboration, and psychosocial support, healthcare providers can deliver comprehensive care to pediatric patients with OSD and optimize long-term outcomes. Continued research and innovation in the field of pediatric neurosurgery hold promise for further advancements in the diagnosis, treatment, and management of occult spinal dysraphism, ultimately improving the quality of life for affected children and their families.