



PEDIATRIC SURGERY Update ©

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Electric Burns

Electrical burns and injury are the third most common cause of burns after scald and flame injury. The population most prone to electrical injury is young children and teenagers. In children, the injuries tend to occur in the household. In adolescents, they are most often associated with misguided youthful exploration outside the home. Electrical current can reach deep tissues and cause extensive deep injury to tissues including nerve, bone, tendon tissue, muscle and skin. The injury caused by electrical burns depends on the magnitude of the electric current, the duration of exposure and the resistance of the tissue involved. They are classified as high voltage when above 1000 volts or low voltage if it's less. The morbidity and mortality in cases of high voltage injury are significant. Most cases involve males. Hospitalization is longer for children with high-voltage burns. Electrical burns accompanied by trauma are the result of falls from height. Once the child arrives at the ER an assessment of total body surface area compromised should be done and hydration according to Parkland formula instituted. Cardiac rhythm and renal function should also be examined with appropriate labs (myoglobinuria, BUN, serum creatinine, CPK, etc). Clinical parameters such as the mechanism of injury, voltage, burn size and depth, gross urine color and myoglobinemia can be easily used to predict and estimate the muscle damage. Myoglobin and hemoglobin pigment in the child urine present risk of acute renal failure and must be cleared promptly. Wound dressing should be done daily and wound debridement, tangential excision and grafting performed when necessary. Since it's difficult to assess internal damage the child is observed closely for signs of compartment syndrome and escharotomy or fasciotomy performed as needed. Gadolinium-enhanced MRI has demonstrated potential viability in zones of tissue edema with good correlation with histopathology of the lesion. Wound complications and infections are associated with electrical burns with *Pseudomonas*, *Acinetobacter* and *Escherichia coli* leading the organism spectrum. Intravenous antibiotics are essential component of management. Sepsis and renal failure are a common cause of late death. Electrical burns are associated with complications including orthopedic injury, amputation, and sensory and neuropsychiatry disturbances. They reduce cardiopulmonary functional exercise capacity to a greater degree than flame injuries.

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Calcinosis Cutis

Calcinosis cutis means that aberrant calcium deposits have developed in the skin and subcutaneous tissue of the patient. According to the etiology four types of calcinosis cutis have been described: dystrophic, metastatic, iatrogenic and idiopathic. Dystrophic calcinosis is a calcification associated with infection, inflammatory process, cutaneous neoplasm or connective tissue disorders (juvenile dermatomyositis, systemic lupus erythematosus and systemic sclerosis). Metastatic calcinosis cutis results from an elevated calcium or phosphate level in a child with cancer. Subepidermal calcified nodules and tumoral calcinosis are idiopathic form of calcifications. Idiopathic calcinosis as the names implies has no known cause for the calcinosis or when neither local tissue damage nor systemic metabolic disorder can be demonstrated. In all types of calcinosis cutis insoluble compounds of calcium (hydroxyapatite crystals or amorphous calcium phosphate) are deposited within the skin due to local or systemic factors. Commonly the skin and subcutaneous fat are involved, but deeper tissues such as muscle and visceral organs might also be affected. When muscle is affected this might cause contractures. If the calcium extrudes it will cause local ulceration and inflammation. Should the biopsy revealed calcinosis cutis serum calcium, serum phosphorus and ALP should be obtained along with a detailed history and physical exam looking for a malignant process, collagen vascular disease, renal insufficiency, excessive milk ingestion or Vitamin D poisoning. There is a very rare idiopathic calcinosis cutis known as milia-like characterized by multiple whitish to skin colored, firm, tiny milia-like papules mostly in the hands and feet. This subtype is equally frequent in both sexes and most commonly found in childhood and disappears spontaneously by adulthood without scarring. This milia-type has been associated with Down syndrome. Surgical excision of calcinosis cutis is both needed for establishing a diagnosis and symptomatic relief.

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Suicide

Suicide rates has increased in all ages groups during the past ten years. Suicide is the second leading cause of death in children aged 10 to 15 years. The risk factors associated with suicide in adolescents include mental health problems, family history of suicidal behavior, biologic factors, problems with family and most importantly peer victimization and bullying. Relationship problems with parents are the most common antecedents within these risk factors. There is a strong correlation between adolescent smoking and substance use with psychosocial context and suicidal behavior. Addressing these predictors would be crucial in the development of effective strategies targeting the prevention of smoking and substance use, which might consequently reduce suicidal behaviors among adolescents. Suicidal thoughts and behaviors are prevalent among young people with psychotic disorders relative to the general population. Victims of cyber-bullying and school bullying have a significantly higher risk of suicidal ideas, plans, and attempts. The “Zero suicide” model developed by the US Action Alliance Strategy for Suicide prevention provides administrators and providers the resources for a systematic approach to quality improvement for suicidal prevention in health care systems via seven essential elements (Lead, Train, Identify, Engage, Treat, Transition, Improve). The Center for Disease Control has published charts demonstrating that an increase number of suicides in children/adolescent involve the use of firearms. Case control and ecological studies investigating geographic and temporal variations in firearm ownership and firearm suicide rates indicate that greater firearm availability is associated with higher firearm suicidal rates. Effective strategy for reducing the use of lethal weapons as arms of self destruction include eliminating access to guns in the house by storing them in locked firearm safes or handgun lock boxes or outside the home. Also, having access to effective management and care for adolescents with mental health and substance abuse conditions working toward remission and reducing self harm injury.

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