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REVIEW ARTICLE

Assessment of acute motor deficit in the pediatric emergency room☆

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Guillain–Barré syndrome;
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Child

Abstract

Objectives: This review article aimed to present a clinical approach, emphasizing the diagnostic investigation, to children and adolescents who present in the emergency room with acute-onset muscle weakness.

Sources: A systematic search was performed in PubMed database during April and May 2017, using the following search terms in various combinations: ''acute,'' ''weakness,'' ''motor deficit,'' ''flaccid paralysis,'' ''child,'' ''pediatric,'' and ''emergency''. The articles chosen for this review were published over the past ten years, from 1997 through 2017. This study assessed the pediatric age range, from 0 to 18 years.

Summary of the data: Acute motor deficit is fairly common presentation in the pediatric emergency room. Patients may be categorized as having localized or diffuse motor impairment, and a precise description of clinical features is essential in order to allow a complete differential diagnosis. The two most common causes of acute flaccid paralysis in the pediatric emergency room are Guillain–Barré syndrome and transverse myelitis; notwithstanding, other etiologies should be considered, such as acute disseminated encephalomyelitis, infectious myelitis, myasthenia gravis, stroke, alternating hemiplegia of childhood, periodic paralyzes, brainstem encephalitis, and functional muscle weakness. Algorithms for acute localized or diffuse weakness investigation in the emergency setting are also presented.

Conclusions: The clinical skills to obtain a complete history and to perform a detailed physical examination are emphasized. An organized, logical, and stepwise diagnostic and therapeutic management is essential to eventually restore patient's well-being and full health.

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PALAVRAS-CHAVE
Fraqueza aguda;
Déficit motor;
Síndrome de Guillain–Barré;
Mielite transversa;
Criança

Avaliação do déficit motor agudo no ambiente de pronto socorro pediátrico

Resumo
Objetivos: O objetivo deste artigo de revisão é apresentar uma abordagem clínica, enfatizando a investigação diagnóstica, voltada para crianças e adolescentes no pronto socorro com fraqueza muscular de surgimento agudo.
Fontes: Foi realizada uma pesquisa sistemática na base de dados PubMed entre abril e maio de 2017, utilizando os seguintes termos de pesquisa em várias combinações: ''agudo'', ''fraqueza'', ''déficit motor'', ''paralisia flácida'', ''criança'', ''pediátrico'' e ''emergência''. Os trabalhos escolhidos para esta revisão foram publicados nos últimos dez anos, de 1997 a 2017. Este trabalho aborda a faixa etária pediátrica, de 0 a 18 anos.
Resumo dos dados: O déficit motor agudo é uma causa razoavelmente comum para crianças e adolescentes procurarem o pronto socorro. Os pacientes podem ser classificados como apresentando deficiência motora localizada ou difusa, e uma descrição precisa das características clínicas é essencial para possibilitar um diagnóstico diferenciado completo. As duas causas mais comuns de paralisia flácida aguda no pronto socorro pediátrico são síndrome de Guillain-Barré e mielite transversa, independentemente de outras etiologias serem consideradas, como encefalomielite disseminada aguda, mielite infecciosa, miastenia grave, derrame, hemiplegia alternante da infância, paralisia periódica, encefalite do tronco encefálico e fraqueza muscular funcional. Os algoritmos da investigação de fraqueza aguda localizada ou difusa na configuração de emergência também são apresentados.
Conclusões: São enfatizadas as habilidades clínicas para obter um histórico completo e realizar um exame físico detalhado. Um manejo diagnóstico e terapêutico organizado, lógico e por etapas é essencial para eventualmente restaurar o bem-estar e a saúde total do paciente.

Introduction

Acute motor deficit or weakness is a fairly common presentation in the pediatric emergency room (ER). Across all age ranges, 5% of all patients visiting the ER have neurologic symptoms.[1] In this setting, the pediatrician must be comfortable in performing the initial workup, as some etiologies may be life-threatening and demand urgent care. Timely interventions are likely to restore patient's well-being and full health.

Weakness is categorized as a negative motor sign, as well as ataxia and apraxia. It is valuable to have a firm grasp on the definition of these three negative motor signs. *Weakness* is defined as the inability to generate normal voluntary *force* in a muscle or normal voluntary *torque* in a joint, while *ataxia* is the inability to generate a normal voluntary movement *trajectory* that cannot be attributed to weakness or involuntary muscle activity in the affected joints.[2] Ataxic movements are uncoordinated and clumsy, but there is no underlying weakness of the involved muscles. *Apraxia* is the inability to perform *previously learned* complex movements, which is not explained by weakness, ataxia, or involuntary motor activity, *i.e.*, the motor, sensory, basal ganglia, and cerebellar functions are intact.[2] It is noteworthy that sensory weakness does not exist.

For the purpose of this study, plegia will be used to denote complete or partial weakness,[3] but the reader is informed that strictly speaking *plegia* means complete paralysis and *paresis* implies that muscle strength is only partially affected. A common descriptor of acute weakness is *acute flaccid paralysis*, meaning that in the ER setting, paralysis is usually not accompanied by spasticity or other abnormal signs of central nervous system (CNS) motor tracts, *e.g.*, hyperreflexia, clonus, or Babinski reflex.[4]

This study aimed to present a clinical diagnostic approach to children and adolescents who present with an acute motor deficit in the ER and to review the most frequent etiologies.

Methods

A systematic search was performed in PubMed database during April and May 2017, using the following search terms in various combinations: ''acute,'' ''weakness,'' ''motor deficit,'' ''flaccid paralysis,'' ''child,'' ''pediatric,'' and ''emergency''. The articles chosen for this review were published over the past ten years, from 1997 through 2017. This study assessed the pediatric age range, from 0 to 18 years.

Clinical features and differential diagnosis

Acute weakness may present either as a localized or diffuse impairment. A precise description of the motor deficit — its mode of onset, duration, and progression — is essential to allow a complete differential diagnosis. In this sense, a detailed history and a full physical examination, including an objective neurologic examination, provide the best opportunities to expedite etiology identification. Table 1 outlines