

Adrenocorticotrophic Hormone (ACTH) Stimulation Testing in Premature Neonates

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Abstract

Purpose

The purpose of this study is to evaluate ACTH stimulation testing in very low birth weight (< 1500 g) preterm neonates who were previously exposed to systemic corticosteroids at the St. Louis Children's Hospital Neonatal Intensive Care Unit (NICU). Additionally, this will allow us to identify the incidence of adrenal suppression in this population. This data will be utilized in the development of standardized protocols for ACTH stimulation testing frequency, timing, and indication.

Methods

This is a retrospective chart review of patients admitted to St. Louis Children's Hospital NICU from July 1, 2021 to June 30, 2025 that received an ACTH stimulation test after being exposed to systemic corticosteroids. Data collection will be de-identified and will consist of compiling corticosteroid exposure in prednisone dose equivalents, date and time of cosyntropin administration(s), date and time of cortisol levels, pass/fail ACTH stimulation test, and if the patient was discharged on steroids. Basic statistics will be utilized to note trends in the data.

Results

All 35 patients received at least one ACTH stimulation test, whereas 9 of those 35 received a second test and 1 received a third. 60% passed the first test, 67% passed the second test, and 100% passed the third test. In test 1, 8 patients (23%) received cosyntropin 1 mcg, 26 (74%) received cosyntropin 125 mcg, and 1 (3%) received 250 mcg. 25 patients (71%) received intravenous cosyntropin and 10 (29%) received intramuscular. Median age at test 1 was 137 days (41 - 314), baseline cortisol was 3.7 mcg/dL (0.2 - 21.1), and time since steroid exposure was 28 days (0 - 156). The total prednisolone equivalent exposure was 35 mg/kg (4 – 124) and the primary steroids utilized prior to stimulation testing were hydrocortisone (17%), dexamethasone (6%), and a combination of multiple steroids (77%).

Discussion

The most frequently used cosyntropin dose and route across all 3 tests was 125 mcg IV. The days since last steroid exposure for test 1 varied widely from 0 days to 156 days. Multiple corticosteroids were most often utilized prior to stimulation testing. Of the 14 patients that failed their first stimulation test, only 9 were re-tested. Of the 3 that failed the second test, only 1 was tested for a third time. However, only 2 patients were discharged on stress dose steroids, one of which passed an ACTH stimulation test and the other did not. This oversight may be due to a lack of standardized protocol regarding ACTH stimulation testing.