ADRENAL INSUFFICIENCY IN PEDIATRIC PATIENTS WITH ADRENOLEUKODYSTROPHY IN THE ERA OF THE NEWBORN SCREENING

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OBJECTIVE AND METHODS

- Adrenoleukodystrophy (ALD) was added to the Recommended Uniform Screening Panel (RUSP) in the U.S. in 2016 to facilitate early diagnosis of ALD and associated adrenal insufficiency (AI).
- We set out to investigate whether the diagnosis by newborn screening (NBS) has altered (1) age at diagnosis of AI in children with ALD and (2) severity of AI at time of diagnosis, using a Retrospective medical chart review of children with ALD seen between May 2006 through June 2021 in a single academic center in the U.S.

RESULTS

- **Sample:** 116 patients (94% male) with ALD were included, with ages ranging from 2.4 months to 17.8 years of age (median [IQR] = 8.2 [4.1-12.4] years).

- **ALD diagnosis:** (Figure 1)
  - 31 (27%) by NBS (median age [IQR] 11 [8.5, 15.5] days).
  - 85 (73%) outside the newborn period (median age [IQR] 5.53 [2, 8.03] years).

- **AI prevalence: 70% (all males).**

- **Age at AI diagnosis** (Figure 2)
  - Patients diagnosed with ALD by NBS were diagnosed with ALD and AI significantly earlier than patients diagnosed with ALD outside the newborn period (p<0.001).

- **Severity of AI at diagnosis** (Figs 3 & 4)
  - In patients diagnosed with ALD outside the newborn period, at the time of initiation of maintenance dose of glucocorticoids:
    - ACTH levels were significantly higher.
    - Peak cortisol levels were significantly lower.

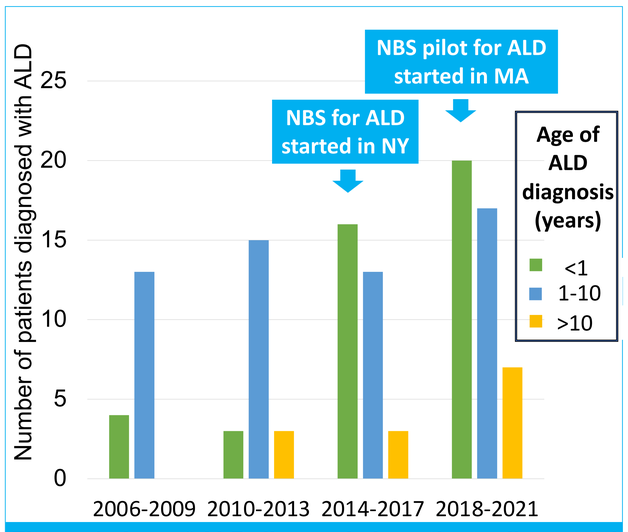

Figure 1. Age of ALD diagnosis in patients diagnosed by NBS and outside the newborn period.

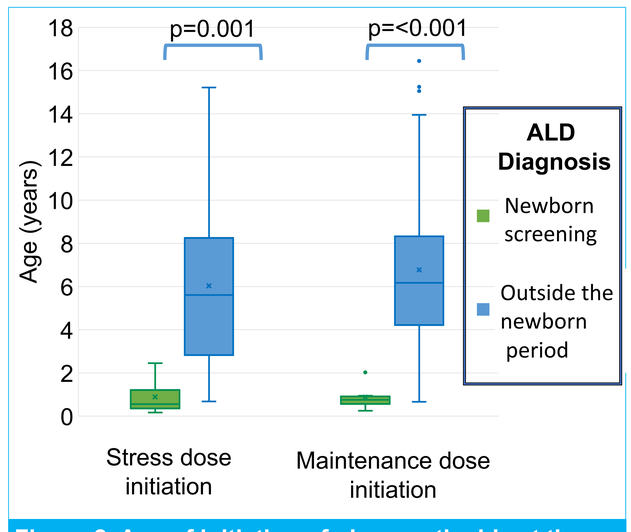

Figure 2. Age of initiation of glucocorticoids at the time of diagnosis of AI.

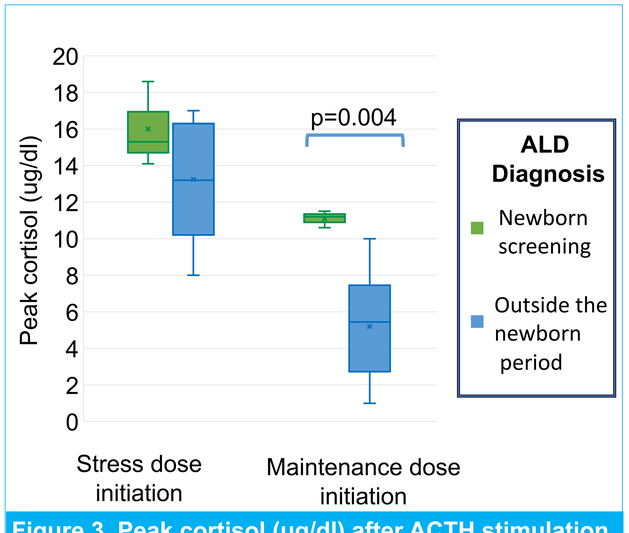

Figure 3. Peak cortisol (ug/dl) after ACTH stimulation testing at the time of glucocorticoid initiation.

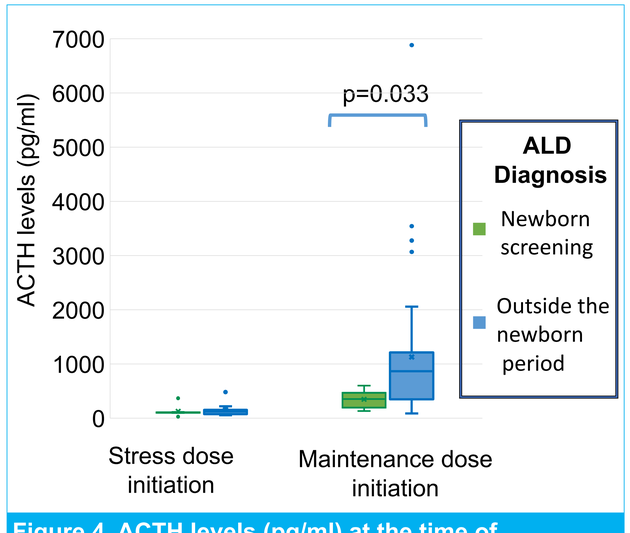

Figure 4. ACTH levels (pg/ml) at the time of glucocorticoid initiation.

DISCUSSION

- To our knowledge, this study reports the largest cohort of pediatric patients with ALD and AI published to date and demonstrates that testing for ALD by NBS leads to a significantly earlier diagnosis of ALD and AI.
- After NBS for ALD was implemented, there was a rise in diagnosis of ALD in the first year of life.
- Age at diagnosis of AI is lower in children diagnosed by NBS.
- Patients with AI diagnosed with ALD by NBS seem to have better adrenal function at the time of AI diagnosis.

CONCLUSION

- Our results suggest that ALD implementation as part of the NBS leads to significantly earlier AI detection and initiation of glucocorticoid treatment. Considering these findings, NBS, due to the RUSP, should improve care and clinical outcomes for patients with ALD and AI across the United States.

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