

# Corticosteroid-induced adrenal insufficiency in a child with T cell lymphoblastic lymphoma: A case report

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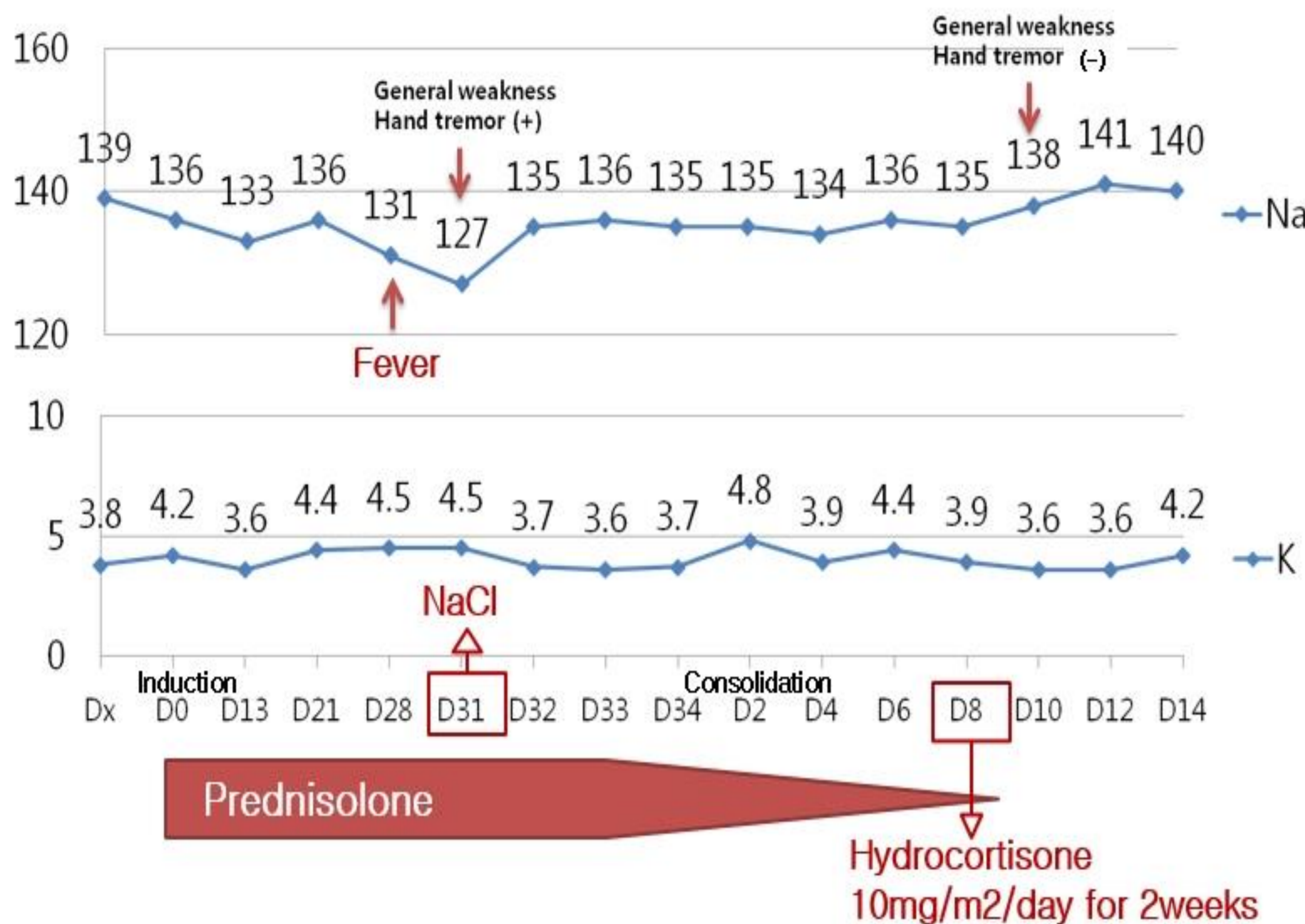
## Introduction

Glucocorticoids play a major role in the treatment of lymphoblastic lymphoma and lymphoma.

However, supraphysiological glucocorticoid therapy can suppress hypothalamic secretion of corticotrophin-releasing hormone (CRH) and adrenocorticotropic hormone (ACTH) by the pituitary gland, and is the most common cause of secondary adrenal insufficiency.

## Case presentation

Eleven-year-old boy with T cell lymphoblastic lymphoma, treated according to COG A5971 protocol, experienced sudden onset of general weakness and hand tremor with hyponatremia on 31<sup>st</sup> day of induction therapy (Figure 1). He had normal adrenal function before prednisolone was used. Morning serum cortisol level on 34<sup>th</sup> day of induction suggested adrenal insufficiency (Table 1). Serum Na was stable after correction, but other symptoms still remained until after tapering prednisolone. The combined pituitary stimulation test using insulin on 6<sup>th</sup> day of consolidation also showed adrenal insufficiency (Table 2), so glucocorticoid therapy with hydrocortisone was started. After hydrocortisone replacement therapy, morning serum cortisol, ACTH level were normalized and all symptoms of adrenal insufficiency were improved.



**Figure 1. Level of Na and K during induction and consolidation therapy.** Hyponatremia was developed on 31<sup>st</sup> day of induction and recovered after Na correction. General weakness and hand tremor were improved after glucocorticoid replacement therapy.

**Table 1. Morning serum ACTH and Cortisol level.**

Cortisol concentration on 34<sup>th</sup> day of induction was lower than 3 ug/dL and suggested adrenal insufficiency. Serum cortisol was normalized after 2 week replacement of hydrocortisone..

	Induction D0	Induction D34	Consolidation D18	Delayed intensification D0
<b>ACTH</b> (10-60 pg/mL)	19.51	7.95	78.13	15.36
<b>Cortisol</b> (3-21 ug/dL)	6.72	0.45	12.45	8.48

**Table 2. Combined pituitary stimulation test on 6<sup>th</sup> day of consolidation.** Peak cortisol level was failed to increase more than 7 ug/dL compared with basal level in 30-60 minutes after insulin administration. .

	Glucose (mg/dL)	TSH (uIU/mL)	PRL (mg/dL)	hGH (ng/mL)	Cortisol (ug/dL)	FSH (mIU/mL)	LH (mIU/mL)
basal	73	4.28	13.26	0.44	4.27	0.41	0.94
30min	22	15.29	57.95	7.26	5.32	1.70	1.04
60min	23	11.96	36.17	2.78	7.75	1.82	1.06
90min	29	8.58	22.18	0.97	9.23	2.08	1.13
120min	35	5.79	21.77	1.01	9.64	1.57	0.84

## Conclusion

Secondary adrenal insufficiency commonly occurs in the first days after cessation of glucocorticoid therapy.

But in this case, adrenal insufficiency occurred during glucocorticoid therapy. Stressful event such as febrile illness requires 10 to 15 times above normal cortisol level but suppression of hypothalamic-pituitary axis cause an impaired stress response.

Careful observation and attention to adrenal function will be recommended in all children using glucocorticoid for chemotherapeutic therapy who develop a stressful event.

## References

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- Reducing the risk for adrenal insufficiency in those treated for ALL: tapering glucocorticoids before abrupt discontinuation, Felner EI et al. J Pediatr Hematol Oncol. (2011)
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