TITLE

Simultaneous occurrence of thyroid storm, diabetic ketoacidosis, and multiple cerebral infarctions in a 16-year-old girl

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Background

Thyroid storm is a life-threatening endocrine emergency. Diabetic ketoacidosis is one of the precipitating factors that can evoke a thyroid storm. The coexistence of these two endocrine emergencies may have an atypical clinical presentation and rapidly progress to a life-threatening condition. Thyroid storm may cause cerebral ischemia in moyamoya disease, which coexist in the patient with Graves' disease.

Case Presentation

A 16-year-old girl complaining of dizziness and palpitation visited emergency room, and was diagnosed with diabetic ketoacidosis(DKA) combined by hyperthyroidism. Thyroid storm occurred in 6 hours after the start of DKA management. Burch and Wartofsky score was 65 points. Right hemiplegia developed during the thyroid storm and brain MR diffusion weighted images revealed multiple acute infarcts on the both hemispheres (Fig.1). MR angiography showed stenosis of both distal internal carotid arteries and both M1 portions of the middle cerebral arteries, consistent with moyamoya disease (Fig.2). After the acute management for the thyroid storm with methimazole, Lugol's solution, and hydrocortisone, her neurologic symptoms were completely recovered in 1 month and free T4 level was normalized in 2 months (Table 1).

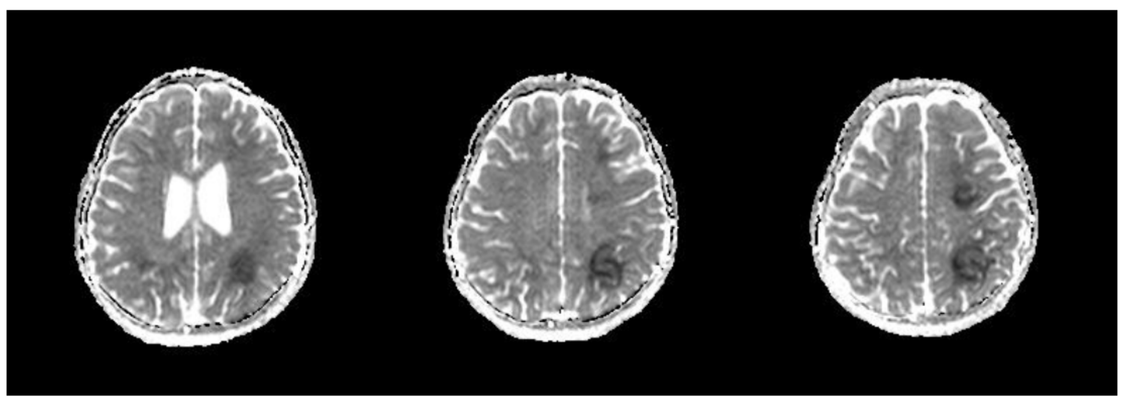

Fig. 1. MR diffusion-weighted images. Signal changes are apparent on multiple foci of both hemispheres.

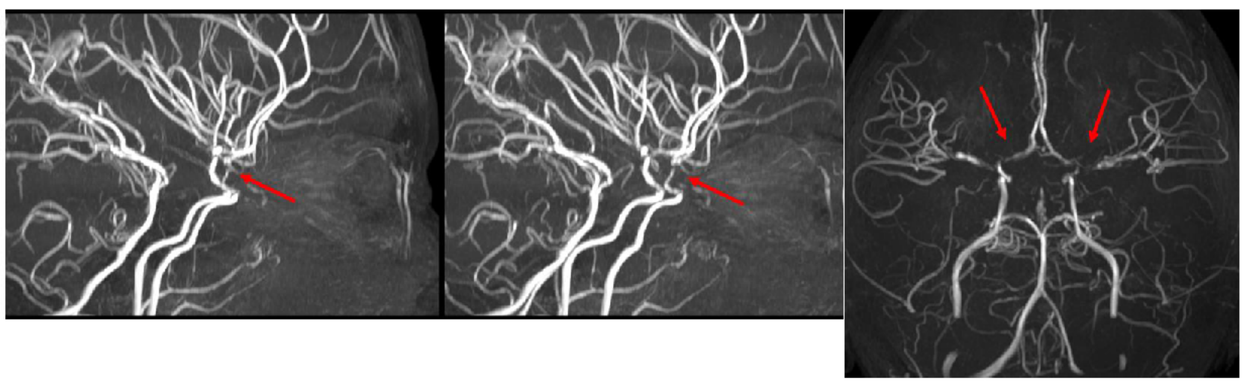

Fig. 2. Narrowing regions were found in both cerebral arteries (distal ICA and M1) on MR angiogram.

Table 1. Laboratory data during the critical period and after improvement

	Critical period		After	After	Ref. range
	initial	worst	1 mo	3 mo	
Free T4 (ng/dL)	9	>12	2.0	1.08	0.89-1.76
T3 (ng/mL)	7.24	7.24	2.25	1.09	0.6-1.81
HbA1c (%)	11.8			8.2	4-6
AST (U/L)	30	>5500	20	14	0-34
ALT (U/L)	35	>5500	22	15	10-49
T.bilirubin (mg/dL)	0.3	3.4	0.4	0.2	0.3-1.2
PT (INR)	1.39	2.45			0.92-1.17
aPTT (sec)	23.8	>180			26-37
FDP (ug/mL)		27.54			0.0-5.0
Fbrinogen (mg/dL)		147			200-400
Antithrombin III (%)		68			80-120

CONCLUSIONS

Underlying thyroid disease should be suspected in patients with atypical symptoms or signs unexplainable by DKA alone. Clinicians should perform close monitoring not only for the development of thyroid storm but also for the presence of cerebrovascular abnormality in the management of hyperthyroid patients who have other metabolic stressors such as DKA. As the simultaneous occurrence of DKA, thyroid storm, and cerebrovascular accident in moyamoya disease highly elevates morbidity and mortality, early diagnosis and treatment is crucial for saving the patient's life.

References

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Pituitary

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