A case of central diabetes insipidus developed 4 years after the non-CNS-risk unifocal bone lesion of Langerhans cell histiocytosis

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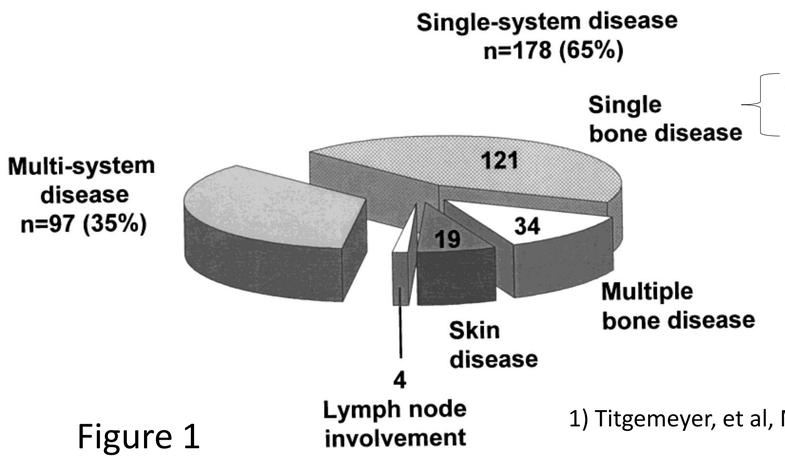
Background

- Langerhans cell histiocytosis (LCH)
  - A rare disease with an incidence of less than 10 per million
  - Characterized by the clonal proliferation of pathogenic Langerhans cells
  - The clinical courses: diverse, ranging from spontaneously remitting single organ disease to life-threatening multisystem involvement
  - Complications: diabetes insipidus (DI)



2)
- CNS-risk lesions 17.5%
- Non CNS-risk lesions 82.5%

The type of our case

Figure 1

1) Titgemeyer, et al, Med Pediatr Oncol 2001;37:108-114

Objective

- Report a case of DI associated with LCH with non-CNS-risk single-system single site lesion

Case presentation

- A 6-year-old Japanese boy (Figure 2)
  - 2 yrs: A single lytic lesion in his femur → histologically diagnosed as LCH
    → Clinically self-limited
  - 6 yrs: ☒ Hospitalized due to polyuria and polydipsia for one and a half months
    ☒ Revealed hyperosmotic dehydration (s-Osm 298 mmol/kg; Table 1) with inappropriately diluted urine (u-Osm 205 mmol/kg) and polyuria (7570 ml/m^2/day).
    ☒ Pitressin test: compatible with a diagnosis of CDI. (Table 2)
    ☒ Anterior pituitary functions was intact by stimulating tests.
    ☒ Administration of DDAVP dramatically improved polyuria and polydipsia.
    ☒ Brain MRI (Figure 3): consistent with the diagnosis of CDI due to LCH
    ☒ Examination of spinal fluid: β-hCG not detected
    ⇒ Not likely germinoma, strongly suggested the relapse of LCH.

<Blood test>		<Tumor markers (serum)>	
BUN	1.93 mmol/L	α-fetoprotein	2.0 μg/L
Cre	28.3 μmol/L	β-hCG	<0.1 ng/ml
UA	173 μmol/L	sIL-2 receptor	293 U/ml
Na	148 μmol/L		
K	4.8 μmol/L	<Tumor markers (CSF)>	
Cl	113 μmol/L	α-fetoprotein	<0.4 μg/L
s-Osm	298 mmol/kg	β-hCG	<0.1 ng/ml
Glu	4.5 mmol/L	PLAP	<8.0 pg/ml
HbA1c (NGSP)	5.3 %		
HbA1c (IFCC)	34.4 mmol/mol		

Table 1 Laboratory tests

Table 2 Pitressin test

	10:00	10:30	11:00	11:30	12:30	13:30	14:30
Body weight (kg)	21.5	21.4	21.1				
Urine volume (ml)	75	70	75	50	50	25	75
Urine-Osm (mmol/kg)	152	159	156	313	539	427	215
Urine-SG	1.005	1.004	1.005	1.008	1.014	1.012	1.006
Serum-Osm (mmol/kg)	298		300				
Serum-Na (μmol/L)	147		148				
AVP (pmol/L)	0.55		0.92				

Dehydration test
- Lost of 2 % body weight
- ΔU-Osm < 30 mmol/kg

Pitressin test
- ΔU-Osm ≒ 250 %

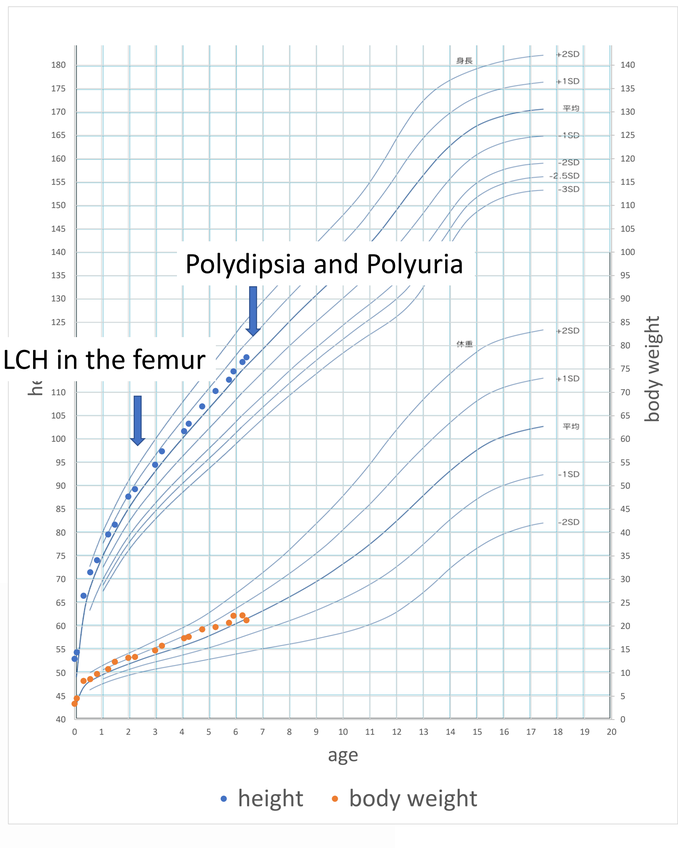
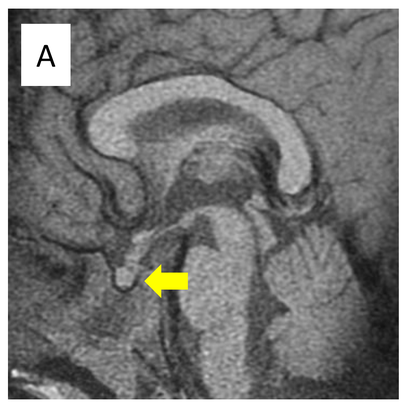


Figure 2 Growth chart
No suppression in height velocity



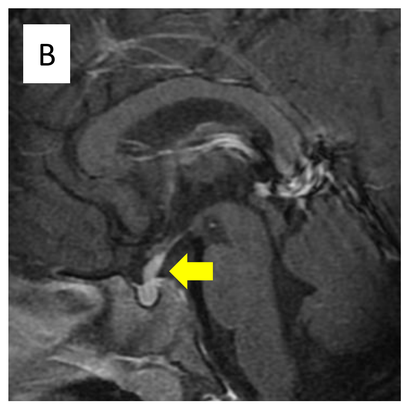


Figure 3
A. Loss of the pituitary bright spot on T1 sequences.
B. Enlarged pituitary stalk with gadolinium enhancement.

Discussion ~ The risk for CDI in LCH ~

- The incidence of DI in overall LCH patients is 12-25% [4-8].
- LCH with CNS-risk lesions (≒ craniofacial lesions):
  The risk for DI : High (50%) [8]
  Systematically following up by endocrinologists is recommended.
- LCH with non-CNS-risk single-system single site lesion:
  The risk for DI : Estimated to be extremely low [2]
  > A large cohort study of LCH with single-system single site type in Japan (n=146)
  Association with DI: none [2]
  Not routinely followed up by endocrinologists.
- Our case suggests that
  Even in a patient with non-CNS single organ affected, DI could be involved as a complication of LCH.
  Further epidemiological studies with an accumulation of cases are necessary.

Conclusion

- **We recommend to systematically follow up the patients with a history of LCH, even non CNS-risk single-system single site affected type**

References

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