Scholars Journal of Medical Case Reports **ISSN 2347-6559 (Online)**
Sch J Med Case Rep 2015; 3(5)385-386 **ISSN 2347-9507 (Print)**

(An International Publisher for Academic and Scientific Resources) DOI: 10.36347/sjmcr.2015.v03i05.010

Magnetic Resonance Imaging Findings of a Patient with Congenital Anosmia

Nobuko Makino[1], Shinji Makino[2*]
[1]Department of Public Health, Jichi Medical University, Shimotsuke, Tochigi, Japan
[2]Department of Ophthalmology, Jichi Medical University, Shimotsuke, Tochigi, Japan

***Corresponding Author:**
Name: Shinji Makino
Email: makichan@jichi.ac.jp

Abstract: We present a case of congenital anosmia in a 23-year-old man. He was unable to sense smell since birth. He showed scale-out results on T&T olfactogram. Brain magnetic resonance imaging (MRI) detected absence of the olfactory bulbs, tracts, and hypoplasia of the olfactory sulci. MRI findings were useful for diagnosing and confirming congenital anosmia.
Keywords: Congenital anosmia, Magnetic resonance imaging, Olfactory bulb, Olfactory sulcus

INTRODUCTION

Anatomical structures for initial olfactory reception (olfactory bulbs, grooves, tracts, and sulci) in humans are located in the anterobasal portion of the brain [1]. Congenital loss of smell, i.e., the inability to recognize odors since birth, can be classified into 2 categories: group 1 comprises about 12% of patients and they commonly exhibit familial loss of smell associated with major congenital abnormalities including hypogonadotropic hypogonadism as well as genetic, somatic, and neurologic abnormalities [2] and group 2 comprises the majority (88%) of patients with congenital loss of smell [2]. Group 2 patients show the same degree of loss of smell as group 1 patients; however, they generally lack a familial association, have normal gonadal function, and do not exhibit other somatic abnormalities [2]. The cause of congenital loss of smell in group 1 patients has been related to anatomical changes in brain olfactory structures resulting in agenesis or malformation of olfactory structures [2, 3]. Several reports have been published concerning the possibility of diagnosing morphological abnormalities of the olfactory bulbs, tracts, and sulci by using MRI to examine group 2 congenital anosmia patients [2-6]. Herein, we describe the MRI findings of a patient with congenital anosmia.

CASE REPORT

A 23-years-old Japanese man was referred to Jichi Medical University Hospital with an olfactory complaint. He was unable to experience a sense of smell since birth. He did not have any other relevant medical history. The findings of systemic examination were normal. Examination by T&T olfactogram revealed total anosmia. Otolaryngological endoscopic examination was unremarkable in both nasal cavities.

The coronal T2-weighted MRI showed absence of the olfactory bulbs, grooves (Fig. 1A and B; right: arrows, left: broken arrows), and decreased olfactory sulci (Fig. 1C) on both sides. These findings were more prominent on the left side.

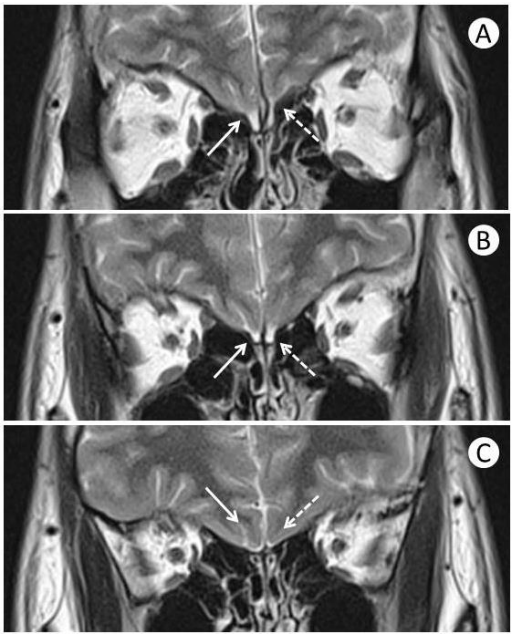

Fig. 1: Coronal T2-weighted MRI shows absence of the olfactory bulbs (A, B) and decreased olfactory sulci (C)

The sagittal T2-weighted MRI revealed absence of the olfactory bulbs, tract, and groove under the anterobasal portion of the brain (Fig. 2A, B, D and E; right: arrows, left: broken arrows). In contrast, an apparently normal pituitary gland was detected (Fig. 2C arrowhead).

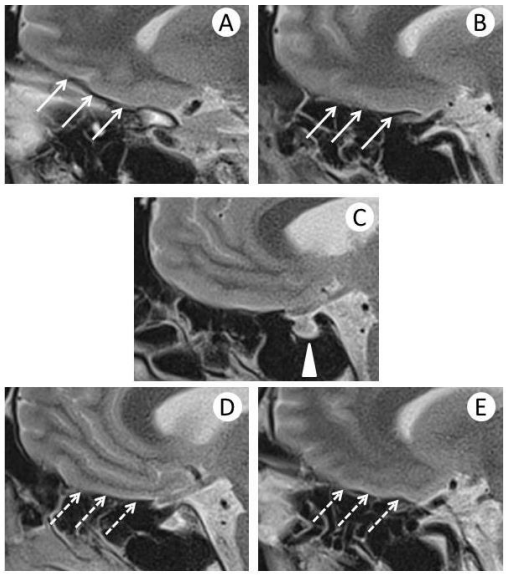

Fig. 2: Sagittal T2-weighted MRI shows absence of the olfactory bulbs, tract, and groove (A, B, D and E). An apparently normal pituitary gland was detected (C).

DISCUSSION

Olfactory bulb volume and depth of the olfactory sulci have been reported to be smaller than those in normal patients with congenital anosmia [1, 2, 5-7]. In the largest series, Levy *et al*. [2] evaluated the MRI findings of 40 patients with group 2 congenital anosmia. According to their report, the macroscopic findings on MRI were as follows: (a) Twenty-six patients (65%) showed absence of 1 olfactory bulb, whereas 30 (75%) showed decreased bulb size or an absent bulb on both sides; (b) olfactory bulb size was decreased in 31 patients (78%); (c) olfactory groove abnormalities were present in all patients, with 30 (75%) showing an absence of one or both grooves; (d) 21 patients (53%) showed absence of sulcus on one side, whereas 5 (12%) exhibited normal sulci on both sides; and (e) mean olfactory sulcus depth was significantly shallower and mean olfactory bulb diameter was significantly smaller in olfactory bulbs of patients than in controls. Our patient showed absence of the olfactory bulbs, tracts, and hypoplasia of the olfactory sulci.

CONCLUSION

Although this case lacks novel findings, we emphasize that MRI is useful for diagnosing and confirming congenital anosmia.

REFERENCES

1. Levy LM, Degnan AJ, Sharma S, Kelahan L, Henkin RI; Morphological changes of olfactory bulbs and grooves: initial report of supernumerary olfactory bulbs. J Comput Assist Tomogr., 2012; 36(4): 406-409.
2. Levy LM, Degnan AJ, Sethi I, Henkin RI; Anatomic olfactory structural abnormalities in congenital smell loss: magnetic resonance imaging evaluation of olfactory bulb, groove, sulcal, and hippocampal morphology. J Comput Assist Tomogr., 2013; 37(5): 650-657.
3. Yousem DM, Geckle RJ, Bilker W, McKeown DA, Doty RL; MR evaluation of patients with congenital hyposmia or anosmia. AJR Am J Roentgenol., 1996; 166(2): 439-443.
4. Aiba T, Inoue Y, Matsumoto K, Shakudo M, Hashimoto K, Yamane H; Magnetic resonance imaging for diagnosis of congenital anosmia. Acta Otolaryngol Suppl., 2004; Suppl 554: 50-54.
5. Abolmaali ND, Hietschold V, Vogl TJ, Hüttenbrink KB, Hummel T; MR evaluation in patients with isolated anosmia since birth or early childhood. AJNR Am J Neuroradiol., 2002; 23(1): 157-164.
6. Huart C, Meusel T, Gerber J, Duprez T, Rombaux P, Hummel T; The depth of the olfactory sulcus is an indicator of congenital anosmia. AJNR Am J Neuroradiol., 2011; 32(10): 1911-1914.
7. Rombaux P, Duprez T, Hummel T; Olfactory bulb volume in the clinical assessment of olfactory dysfunction. Rhinology, 2009; 47(1): 3-9.