

Macrosomatognosia in frontal lobe infarct—a case report

N. R. Weijers · A. Rietveld · F. J. A. Meijer ·
F. E. de Leeuw

Received: 15 September 2012 / Revised: 24 December 2012 / Accepted: 27 December 2012 / Published online: 13 January 2013
© Springer-Verlag Berlin Heidelberg 2013

Dear Sirs,

The perception of the size of body parts involves the postcentral sulcus, parts of the parietal lobe (superior part, parieto-insular region and the temporo-parietal junction) and its connections to other cortical and subcortical regions involved in visual and motor tasks via the corpus callosum (CC) [1, 2]. Diseases that affect the parietal cortex, like migraine, epilepsy and stroke, may result in micro- or macrosomatognosia; the perception of the size of body parts as disproportionately small or large. To the best of our knowledge macrosomatognosia has never been described in ischemia in other regions than the parietal lobe. We describe a patient with macrosomatognosia of his left hand immediately after cerebral ischemia of the right frontal lobe and the CC.

A 65-year-old left-handed man, with a medical history of HIV infection, prostate carcinoma, hypertension, hypertriglyceridemia, smoking and diabetes mellitus, reported a sudden numbness of the left leg and hand and a mild weakness of the left leg. Moreover, he had both the

visual and sensory perception of an increased size of his left hand. On admission, he described: 'I reached for a cup and saw that the size of my hand had increased'. He was aware of the fact that this enlargement was not real. He also noted mental slowness, slow speech and difficulty with writing. The symptoms disappeared within 17 h after the onset, except for the dexterity problems during writing, which normalized after 4 weeks. There were no other symptoms, in particular no left motor or visual neglect. Prior to this clinical event, there was no history of cerebral lesions or deterioration in the patient's cognitive state.

Brain computed tomography (CT; Fig. 1) revealed evidence of an acute infarct in the right frontal lobe, including a part of the CC, superior frontal and cingulate gyrus. CT angiography showed an occlusion of the right internal carotid artery and a pinpoint stenosis of the proximal left internal carotid artery at the carotid bifurcation; the presumed mechanism of ischemia is embolic, due to extensive atherosclerosis.

Lesions of the right parietal lobe can result in perturbations of the internal representation of one's body. Here we presented a patient with acute onset macrosomatognosia with an infarct in the right frontal lobe and in a part of the CC, which has, to our knowledge, not been described previously. This case expands the knowledge on the structures involved in disorders of the body scheme.

Focal white matter injury can cause malfunction of regions remote from the primary lesion site without morphological changes of those regions, so-called disconnection syndromes [3]. A contribution of white matter tracts in disorders of visual perception has been suggested in recent studies using diffusion tensor imaging tractography (DTI). Ischemia involving the ventral bundle of the superior longitudinal fasciculus, connecting the parietal to the frontal lobe, resulted in asomatognosia in one patient [4], while a

N. R. Weijers · A. Rietveld (✉) · F. E. de Leeuw
Department of Neurology, Donders Institute for Brain, Cognition
and Behaviour, Centre for Neuroscience, Radboud University
Nijmegen Medical Centre, PO Box 9101, 6500 HB Nijmegen,
The Netherlands
e-mail: a.rietveld@neuro.umcn.nl

N. R. Weijers
e-mail: ninkeweijers@student.ru.nl

F. E. de Leeuw
e-mail: H.deLeeuw@neuro.umcn.nl

F. J. A. Meijer
Department of Radiology, Radboud University Nijmegen
Medical Centre, Nijmegen, The Netherlands
e-mail: F.Meijer@rad.umcn.nl

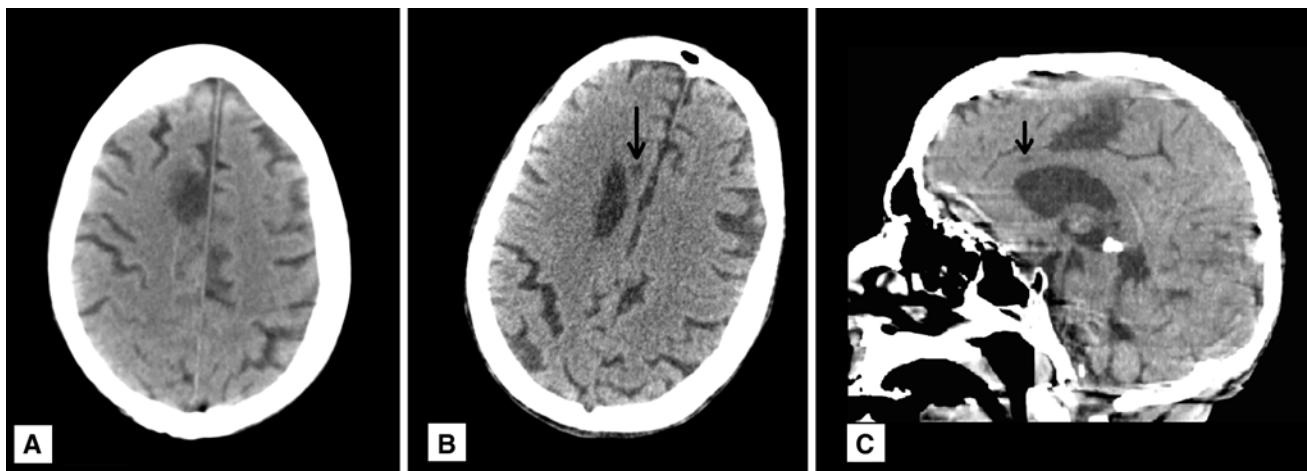


Fig. 1 Cerebral CT image shows an infarction in the right superior frontal gyrus, with no abnormalities in both parietal lobes (a). There is a small area of ischemia in the corpus callosum on the right side (b, c)

left-sided neglect was associated with a lesion in the inferior fronto-occipital fasciculus in two other patients [5]. Similarly, tractography of the genu of the CC has been shown to contain fibers connecting, amongst other regions, parietal cortices and intricate frontal circuitry involved in visuomotor tasks, possibly through interhemispherical connections between association sensory cortex and the prefrontal cortex [6]. Disconnection between these regions by the callosal infarction in our patient may have resulted in macrosomatognosia. Since the patient died shortly after this event due to cardiac complications after recurrent cerebral ischemia, we were not able to confirm our hypothesis by magnetic resonance imaging with DTI.

We present for the first time a case of acute onset macrosomatognosia after an infarct in the right frontal lobe and a part of the CC in which disconnection of white matter tracts between the prefrontal cortex and the association sensory cortex may have resulted in this changed perception of the body scheme.

Conflicts of interest The authors declare that they have no conflict of interest.

References

1. Ehrsson HH, Kito T, Sadato N, Passingham RE, Naito E (2005) Neural substrate of body size: illusory feeling of shrinking of the waist. *PLoS Biol* 3:e412
2. Giannarri MJ, Gibson SJ, Georgiou-Karistianis N, Bradshaw JL (2007) Central mechanisms in phantom limb perception: the past, present and future. *Brain Res Rev* 54:219–232
3. Chang TP, Huang CF (2010) Unilateral paresthesia after isolated infarct of the splenium: case report. *Acta Neurol Taiwan* 19: 116–119
4. Chabwine JN, Granziera C, Vargas MI, Aboulaffia T, Caratsch L, Schnider A, Landis L, Perren F (2011) Simultaneous Doppelgänger and limb amputation impression in right frontal opercular stroke. *J Neurol Neurosurg Psychiatry* 82:1209–1211
5. Urbanski M, Thiebaut de Schotten M, Rodrigo S, Catani M, Oppenheim C, Touzé E, Chokron S, Méder J-F, Lévy R, Dubois B, Bartolomeo P (2008) Brain networks of spatial awareness: evidence from diffusion tensor imaging tractography. *J Neurol Neurosurg Psychiatry* 79:598–601
6. Miller EK, Cohen JD (2001) An integrative theory of prefrontal cortex function. *Annu Rev Neurosci* 24:167–202