Response to Role of the Carotid Body in Obesity-Related Sympathoactivation

We thank Prof Andrea Porzionato for her comment and support of our review that raises the issue of the role of the carotid body in obesity-related sympahtoactivation.

In our review, we summarized the intriguing association of raised peripheral chemosensitivity in several disease states, including hypertension, heart failure, and sleep apnea. On the basis of our recent preclinical data, we emphasized that in addition to increased peripheral chemoreflex sensitivity, the carotid body develops substantial afferent tone in hypertensive (but not normotensive) rats, and that by severing its connection to the central nervous system, arterial pressure falls substantially. This was associated with a reduction in sympathetic vasomotor tone and enhanced cardiac baroreflex sensitivity; the latter indicating restoration of autonomic balance. As reviewed by us, unilateral carotid body resection has been performed in patients with asthma and chronic obstructive pulmonary disease to treat dyspnea. The precedent for unilateral carotid body resection in these patients led us to surmise unilateral carotid body ablation as a safe and potentially effective form of treatment for reducing sympathetic activity and restoring cardiac vagal drive in patients with drug-resistant hypertension.

The issue of whether carotid body ablation will benefit patients with obesity as suggested by Prof Porzionato is of significant interest scientifically. It is well established that obesity is associated with high sympathetic drive with an associated role for leptin but a full understanding of the drivers and mechanisms remains to be identified. Given that leptin can activate glomus cells from the carotid body, it is conceivable that its resection may result in a reduction of sympathetic drive in patients with obesity. This, in turn, could have a positive impact on insulin sensitivity, glucose metabolism, and diabetes mellitus. However, clinical translation of carotid body resection for obesity will need to be backed by convincing preclinical data, as well as being justified ethically, given the array of both lifestyle (ie, diet, exercise) and contemporary clinical therapeutic options available to these patients. One of these, bariatric surgery, includes reducing the size of the stomach with a gastric band or removal of a portion of the stomach. An additional consideration is the obesity survival paradox affecting certain subgroups of patients who are obese who tolerate chronic diseases better with an increased body mass index. Identifying these patients may provide an additional confounder in any decision-making process involving an irreversible procedure.

Disclosures

None.

Julian F.R. Paton
School of Physiology and Pharmacology
Bristol Heart Institute
University of Bristol
Bristol, England

Paul A. Sobotka
Marat Fudim
Zoar J. Engelman
Cibiem NCI
New York, NY

Emma C.J. Hart
Fiona D. McBryde
Ana P. Abdala
School of Physiology and Pharmacology
Bristol Heart Institute
University of Bristol
Bristol, England

Nepthali Marina
Alexander V. Gourine
Departments of Neuroscience
Physiology and Pharmacology
University College London
London, United Kingdom

Mel Lobo
NIHR Barts Cardiovascular Biomedical Research Unit
William Harvey Research Institute
London, England

Nik Patel
Department of Neurosurgery
Frenchay Hospital
Bristol, England

Amy Burchell
Laura Ratcliffe
Angus Nightingale
Bristol Heart Institute
Bristol Royal Infirmary
University Hospitals Bristol NHS Foundation Trust
Bristol, England

Response to Role of the Carotid Body in Obesity-Related Sympathoactivation

Hypertension. 2013;61:e58; originally published online May 6, 2013;
doi: 10.1161/HYPERTENSIONAHA.113.01301

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://hyper.ahajournals.org/content/61/6/e58

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Hypertension can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Hypertension is online at:
http://hyper.ahajournals.org//subscriptions/